Economic Studies ISSN 1112-7988 / E-ISSN 8627-2710
volume : 26 issue: 01 year : 2026 PP : 01-25

Artificial Intelligence Tools and Digital Transformation in the Algerian Market: A Marketing Perspective

Maanaoui Fatima* , University of Algiers 3 (Algeria), maanaoui.fatima@univ-alger3.dz / Traditional Industries Laboratory
University of Algiers 3

Elmoffock Nabila, University of Algiers 3 (Algeria), elmoffock.nabila@univ-alger3.dz / PERMANEN Laboratory "EHEC " Kolea

Received: 29/10/2025	Accepted: 30/12/2025	Published: 08/06/2026

Abstract

This study explores the role of artificial intelligence (AI) tools in supporting digital transformation within the Algerian context, with a focus on their applications in the marketing field of local institutions. The research centers on the main question: To what extent do AI tools contribute to the development of marketing practices in the Algerian market? A descriptive-analytical methodology was adopted, along with a comparative analysis of international experiences, as the most suitable approach for examining complex phenomena. The findings indicate that Algerian institutions have gradually begun adopting technologies such as recommendation systems, chatbots, and big data analytics, particularly in the banking, commerce, and higher education sectors. Despite the relative availability of digital infrastructure, digital transformation remains limited and faces challenges including weak digital culture, resistance to change, skill gaps, and financial constraints. The study concludes with recommendations to accelerate digital transformation and enhance institutional readiness for smart marketing.

Keywords: Artificial Intelligence, Digital Transformation, Algerian Market, AI Tools, Digital Culture.

* Maanaoui Fatima

1. INTRODUCTION:

Amid the rapidly evolving transformations of the digital world, artificial intelligence has emerged as one of the most prominent innovations reshaping business rules, marketing relationships, and interactions between organizations and customers (Kotler et al., 2021). AI and digital transformation are no longer merely technical tools; they have become strategic pillars in economic development, business management, and competitiveness at both the local and international levels (Vial, 2019; Nambisan et al., 2019). The Algerian market forms part of this shifting global landscape, with signs of digitization appearing in key sectors such as start-ups, banking services, e-commerce, and higher education (GIE Monétique, 2024; Kemp, 2024).

Despite this dynamic progression, the reality of artificial intelligence in Algeria still faces structural and organizational challenges, including weak digital infrastructure, a shortage of specialized competencies, limited investment in advanced technologies, and a lack of digital culture within institutions (Charrak & Fortas, 2024; Ramdani & Boudinar, 2021). Digital transformation cannot be measured solely by the adoption of technological tools; rather, it requires reengineering organizational processes and adopting a flexible institutional culture that promotes innovation and self-learning, supported by clear strategies guiding this trajectory (Westerman et al., 2014; Hu, Wu & Yu, 2023).

1.1. Statement of the Problem: Within this framework, the study poses the following central problem:

- *To what extent do artificial intelligence tools support the digital transformation of marketing practices within the Algerian market?*

1.2. Research Questions : From this problem emerge a set of sub-questions:

a. To what extent are Algerian institutions capable of integrating digital transformation into their marketing strategies?
b. What are the main organizational and cultural challenges faced by Algerian institutions in employing artificial intelligence?
c. Are there differences among Algerian economic sectors in terms of adopting AI technologies?
d. What role do technological investment, qualified human resources, and infrastructure play in the success of smart marketing transformation?

1.3. Hypothesis/ hypotheses: Based on the problem outlined above, the following hypotheses are proposed for discussion and validation:

- ✓ There is a positive correlation between the adoption of AI tools and the improvement of marketing operations efficiency and decision-making.

- ✓ Algerian institutions face organizational and cultural challenges that hinder the integration of AI into marketing strategies.
- ✓ There are disparities in the level of AI adoption across various economic sectors in Algeria.
- ✓ Investment in digital transformation contributes to enhancing the competitiveness of Algerian institutions at both local and regional levels.

1.4. Significance of the Study : The significance of this study stems from its alignment with two pivotal paths in the contemporary economy: artificial intelligence and digital transformation, and their direct impact on institutional marketing. Key points of importance include:

- Providing an analytical reading of the readiness of Algerian institutions for smart marketing.
- Linking theory and practice through the study of both local and international references.
- Highlighting intellectual and practical obstacles hindering the utilization of AI in marketing.
- Guiding decision-makers and researchers toward actionable methodologies to support marketing digitization.
- Enriching Arabic academic literature in a modern field that demands deeper theoretical grounding in the Algerian environment.

1.5. Objectives of the Study: This study aims to achieve the following:

- Analyze the current adoption of AI tools within marketing operations in the Algerian market.
- Identify the organizational, technical, and cultural barriers that hinder successful digital marketing transformation.
- Explore the extent to which AI contributes to enhancing customer experience, supporting decision-making, and improving marketing performance.
- Compare the level of AI adoption among different Algerian economic sectors.
- Propose strategic recommendations to accelerate digital transformation and increase the readiness of Algerian institutions for smart marketing.
- Develop a theoretical and methodological framework that bridges scientific literature and practical experiences in the local context.

1.6. methodology of the Study: The study adopts a descriptive-analytical approach combined with comparative analysis of international experiences, deemed most suitable for investigating complex phenomena. This methodology is based on the following:

- Describing the status of artificial intelligence tools and digital transformation in the Algerian market from a marketing perspective.

- Analyzing 28 scientific and practical references, encompassing both local and international comparative studies.
- Utilizing qualitative content analysis of intellectual insights drawn from studies and reports.
- Constructing a critical theoretical framework that bridges the Algerian model with international models of successful smart marketing.
- It is worth noting that the study does not rely on field data; rather, it is based on the analysis of secondary sources and available literature, in an attempt to formulate a comprehensive conceptual understanding of the Algerian reality within the context of digital transformation and smart marketing.

1.7. previous researches :(literature review) Previous studies represent the backbone upon which this research is based. They have been carefully selected to cover both theoretical and practical dimensions relevant to the Algerian market on one hand, and international trends on the other. These studies can be categorized as follows:

a. Studies on Digital Transformation in Algeria: These studies examine the reality of digital transformation within Algerian institutions, highlighting challenges, infrastructure, and the readiness of the local market:

- *"Digital Transformation in Algerian Institutions: Reality and Challenges"* (Charrak & Fortas, 2024): This study explored the readiness level of Algerian institutions for digital transformation, affirming that the process remains in its early stages despite the availability of infrastructure. It also revealed key barriers, including resistance to change, skills gaps, and financial constraints.
- *Ramdani & Boudinar (2021)*: Focused on the evolution of human resources functions within Algerian institutions, the study revealed weaknesses in digitizing HR due to the absence of a unified strategic vision and limited integration across information systems.
- *GIE Monétique Report (2024)*: Reviewed progress in electronic payments in Algeria, noting over 48 million transactions since 2016, reflecting relative growth in the digital commerce domain.

b. Studies on AI Tools in Marketing: These studies focus on the use of artificial intelligence tools in marketing, particularly in personalization and decision-making:

- *Alotaibi & Al-Youbi (2024)* – Saudi Arabia: Examined the impact of AI technologies on marketing innovation at Mobily. The study showed a strong correlation (93%) between AI usage and innovation, with big data analytics leading (59%) and deep learning having a lesser impact (27%). It recommended strategic planning for utilizing AI in product personalization and customer experience enhancement.
- *LPP Poland Case Study (2023 – Google Cloud)*: Presented a practical case study illustrating how tools like Google Cloud, Genesys PureCloud, and Chatbots were applied to improve digital marketing operations, serving as a useful comparison to the Algerian context.

- *Bharati Rathore (2023)*: Highlighted the integration of AI and the metaverse in marketing, especially in the fashion industry, with emphasis on behavioral analytics and virtual interaction tools.
- *Scopus Bibliometric Study (2023) – "Bibliometric Analysis of AI in Marketing Decision-Making"*: Systematically analyzed 358 academic articles concerning the role of AI in marketing decisions, demonstrating the rising use of tools such as recommendation systems, machine learning, and big data analytics.

c. Studies on Challenges of Digital Transformation and AI Adoption: These studies emphasize technical, human, and organizational obstacles to adopting digital tools:

- *Arnaout et al. (2019)*: Focused on digital transformation challenges in Algeria's oil and gas sector, with primary issues including weak organizational integration and lack of standardized data.
- *Molchanova (2023)*: Discussed the shortage of digital competencies as a barrier to AI projects in developing institutions.
- *Hu, Wu & Yu (2023)*: Explored cultural and institutional challenges facing digitization in emerging markets, stressing the importance of change management and continuous training.

d. International Experiences in Education and Industrial Applications: This section presents global models of AI integration in education and industry, aiming to inspire locally adaptable applications:

- *Tecnológico de Monterrey (2023)* – Mexico: Highlighted a comprehensive educational model adopted by the Monterrey Institute of Technology and Higher Education (ITESM), which trained engineering students in AI tools as part of an industrial digital transformation strategy (Industry 4.0).
- *Russian Study from MTDE Conference (2020)*: Focused on integrating adaptive smart platforms in digital education to provide AI-supported learning services for vulnerable populations.

These studies underscore the limited scope of digital transformation in Algeria despite available infrastructure, in contrast with successful international applications of artificial intelligence that offer promising pathways for local adaptation.

1.8. Organization of the Study :(in the form of a brief paragraph). In structuring this study, it has been divided into three main sections, each addressing a specific aspect of the research topic:

First Section: Covers the conceptual and theoretical framework, highlighting the notion of artificial intelligence in the marketing domain, and examining the relationship between digital transformation and contemporary marketing, with emphasis on the role of AI tools in enhancing institutional marketing performance.

Second Section: Explores the reality of digital transformation within the Algerian context through analysis of digital infrastructure and institutional readiness, in addition to reviewing available AI tools in the Algerian market.

Third Section: Investigates future opportunities for Algerian institutions amid digital transformation, discussing key challenges hindering AI adoption, and presenting a comparative study of leading international experiences in the field.

2. Theoretical and Conceptual Framework

Amid accelerating technological transformations, it has become necessary to distinguish between the foundational concepts forming the core of this research—namely, "artificial intelligence" and "digital transformation." These are not merely technical tools; rather, they represent a fundamental shift in how institutions operate, interact with customers, and deliver services. Digital transformation refers to a comprehensive strategic process aimed at restructuring organizational operations using technology, whereas artificial intelligence is considered one of the most important tools of this transformation due to its ability to learn, analyze, and intelligently interact with data and human behavior.

2.1. The Concept of Artificial Intelligence in the Marketing: Field Artificial intelligence represents one of the pillars of modern marketing, as it is employed to analyze consumer behavior, personalize content, and enhance the effectiveness of marketing decisions (Kotler et al., 2021; Russell & Norvig, 2010).

2.1.1. Definition of Artificial Intelligence (AI): Russell & Norvig (2010) defined it as: "the study of how to make computers perform tasks that require human intelligence, such as learning, reasoning, and planning." In the marketing context, AI is used to improve customer experience, personalize services, and foster organizational innovation. Among its most prominent tools:

- **Machine Learning:** analyzing data and predicting customer behavior.
- **Natural Language Processing (NLP):** understanding texts and conversations and enhancing interaction.
- **Computer Vision:** interpreting images and videos in marketing campaigns.
- **Recommendation Systems:** offering personalized promotions.
- **Chatbots:** providing instant and intelligent customer support.

Kotler et al. (2021), in their book *Marketing 5.0: Technology for Humanity*, defined AI as "the employment of technologies that simulate human intelligence to create, deliver, and enhance value throughout different stages of the customer journey, through analytical and interactive tools capable of personalizing experience and improving marketing decisions."

This definition highlights the central role of artificial intelligence in enhancing the customer experience by predicting consumer behavior, personalizing content, and offering more accurate and effective marketing solutions.

According to Nambisan et al. (2019), artificial intelligence is considered a key element in institutional innovation, improving customer experience, and personalizing services.

Accordingly, artificial intelligence refers to the capacity of digital systems to simulate human behavior through learning, analysis, and decision-making. In marketing, AI is used to understand customer behavior, predict trends, and deliver personalized content.

2.1.2. Characteristics of Artificial Intelligence in Marketing: Artificial intelligence in marketing is distinguished by its ability to self-learn, analyze big data, interact intelligently, and offer personalized promotions, thereby enhancing the quality of the customer experience (Nambisan et al., 2019):

- **Self-learning capability:** through machine learning algorithms that evolve over time.
- **Big data analysis:** to identify trends and anticipate purchasing behavior.
- **Intelligent customer interaction:** via chatbots and virtual assistants.
- **Precise personalization:** delivering offers and products aligned with each user's interests.

The characteristics of artificial intelligence in marketing lie in its ability to self-learn, analyze consumer behavior, interact in real time, and personalize offers—thus enhancing customer experience through efficient data utilization.

2.2. Digital Transformation and Its Relation to Contemporary Marketing: Digital transformation is defined as a comprehensive process of reengineering organizational models by integrating technology with the aim of improving efficiency and innovation (Vial, 2019; Westerman et al., 2014).

2.2.1. The Concept of Digital Transformation: Digital transformation is considered a pivotal concept in contemporary studies, especially in light of the rapid technological changes that have impacted business models and methods of interacting with customers. Vial (2019) defined it as a process aimed at improving an entity through fundamental changes in its characteristics by integrating information technology, computing, communication, and networking. This definition highlights the strategic dimension of digital transformation as a comprehensive process that goes beyond merely using technology, reaching into the restructuring of the organizational architecture of institutions.

According to Westerman, Bonnet, and McAfee (2014), a more detailed conception of digital transformation comprises nine principal elements, most notably: customer experience, internal operations, business models, digital leadership, and organizational culture. This perspective suggests that digital transformation is not limited to the digitization of processes; rather, it encompasses the redesign of business models, the development of a flexible organizational culture, and the adoption of new strategies driven by data and innovation, thereby enhancing institutional adaptability within a rapidly evolving business environment.

Philip Kotler et al. (2021) define digital transformation in marketing as: "The use of digital technologies to enhance customer experience, improve efficiency, and strengthen interaction between the brand and the audience across digital channels."

2.2.2. Digital Transformation as a Lever for Modern Marketing: Digital transformation enables institutions to engage with customers across multiple channels, make real-time decisions, and develop flexible business models based on subscription and personalization. This shift has redefined the nature of the relationship between the institution and the customer, leveraging interactive tools such as digital platforms, smart analytics, and instant communication across various media. It also allows companies to collect and analyze customer data in real time, enhancing their ability to make accurate and agile marketing decisions. Digital transformation serves as a launchpad toward adopting innovative business models built on subscription and deep personalization of offerings, alongside reliance on e-commerce instead of traditional direct sales models (Kotler et al., 2021).

2.2.3. Key Elements of Digital Transformation Affecting Marketing: Elements such as customer experience, internal processes, and business models play a central role in enhancing the marketing performance of institutions (Westerman et al., 2014), as detailed in Table N° 01:

Table N°01: Digital Transformation Elements and Their Impact on Marketing Practices Within Institutions.

Element	Impact on Marketing
Customer Experience	Enhances interaction, personalizes content, and increases loyalty
Internal Processes	Speeds up marketing campaigns and improves team coordination
Business Models	Introduces digital models such as e-commerce and platform-based marketing
Digital Leadership	Guides marketing strategies toward innovation and experimentation
Organizational Culture	Promotes openness to change and adoption of new digital tools

Source: Westerman, et, al., 2014.

The table highlights five key elements of digital transformation and their influence on marketing within institutions. Customer experience, internal processes, business models, digital leadership, and organizational culture all contribute to improving marketing performance through personalized content, accelerated campaigns, adoption of digital models, innovative strategies, and increased openness to change.

2.2.4. Digital Transformation and Marketing Across Digital Channels: Digital transformation enables institutions to utilize multiple channels such as social media, email, and mobile apps, thereby boosting their ability to reach customers and engage with them in real time. This transformation allows for precise measurement of marketing performance through diverse indicators such as conversion rate, engagement level, and customer loyalty—helping institutions build long-lasting customer relationships and offer personalized solutions that directly and effectively meet their needs (Westerman et al., 2014).

2.2.5. Digital Transformation and Customer Experience Personalization: Digital transformation offers advanced analytical tools that contribute to personalizing content and services based on customer behavior, using technologies such as Customer Relationship Management (CRM) and Big Data Analytics. These tools enable institutions to understand customer preferences and behaviors accurately, facilitating the delivery of content aligned with their interests and needs. This positively reflects on the customer experience by customizing offers, timing messages appropriately, and providing instant support that enhances satisfaction and loyalty (Westerman et al., 2014).

2.2.6. Digital Transformation as a Tool for Enhancing Competitiveness: Digital transformation helps deliver faster and smarter services, increasing an institution's ability to stand out and expand in a rapidly competitive environment. By adopting intelligent and swift solutions, institutions can attract customers in a crowded market and strengthen their competitive positioning. Moreover, digital transformation supports the expansion of operations into new markets—especially via e-commerce and digital platforms—opening broader horizons for growth and development (Westerman et al., 2014).

2.3. The Role of Artificial Intelligence Tools in Enhancing Marketing Performance: Artificial Intelligence (AI) has become one of the foundational pillars of contemporary marketing, contributing to improved efficiency, personalized customer experience, and big data analysis. The use of AI is no longer optional but a strategic necessity for organizations aiming to excel in a competitive digital environment.

2.3.1. AI Tools in Marketing: AI tools play a pivotal role in enhancing marketing performance through intelligent analysis and immediate customer interaction (Westerman et al., 2014), as illustrated in Table N° 02:

Table N°02: Digital Transformation Tools Enhancing Customer Experience and Organizational Competitiveness.

Tool	Function	Marketing Benefit
Data Analytics	Processing massive amounts of data	Understanding customer behavior and anticipating needs
Machine Learning	Learning from data and automatic performance improvement	Improving advertising campaigns and content personalization
Chatbots	Automated interaction with customers	Providing instant support and enhancing satisfaction
Computer Vision	Analyzing images and videos	Understanding visual interactions with products
Natural Language Processing (NLP)	Understanding and processing human language	Analyzing customer feedback and offering intelligent responses

Source: Westerman, et, al., 2014.

The table highlights how digital transformation tools enhance marketing performance through improved customer experience. Data analytics enables institutions to identify detailed behavioral patterns that help tailor services. Machine learning enhances advertising campaigns and adapts content automatically. Chatbots offer real-time interactions that boost customer satisfaction. Computer vision allows the interpretation of visual engagement with products, while NLP analyzes feedback to refine marketing communication and respond intelligently to audience demands.

2.3.2. Applications of AI in Marketing: AI techniques are employed to personalize content, predict behavior, and improve advertising campaigns accurately and effectively:

- **Intelligent content personalization:** AI delivers content tailored to each customer's interests based on past behavior.
- **Customer behavior prediction:** Through data analysis, institutions can anticipate whether a customer will purchase, interact, or churn.
- **Advertising campaign optimization:** AI selects the ideal timing, audience, and format for advertisements.
- **Customer service automation:** Chatbots enable round-the-clock support without human intervention.

2.3.3. AI in Sentiment and Trend Analysis: NLP technologies help understand customer impressions and guide marketing strategies based on emotional trends:

- NLP is used to analyze customer comments on social media and identify their sentiments toward the brand.

- This helps adjust marketing strategies based on real audience reactions.

2.3.4. Challenges of Using AI in Marketing: Despite its benefits, AI faces challenges related to privacy, algorithmic bias, and the lack of specialized technical skills:

- **Privacy and data protection:** Collecting and analyzing data must respect customer privacy.
- **Algorithmic bias:** Poorly designed algorithms can lead to unfair outcomes.
- **Need for technical expertise:** Effective AI use requires expert teams in data science and algorithm design.

2.3.5. The Future of AI in Marketing: AI is expected to bring a qualitative leap in marketing through smarter, more interactive experiences supported by emerging technologies:

- Greater integration with augmented reality, voice marketing, and real-time behavioral analysis is anticipated.
- These advancements will contribute to more interactive, intelligent, and personalized marketing experiences.

Contemporary marketing is undergoing a radical transformation due to rapid digital advancements. Marketing is no longer a traditional promotional process—it has become a smart system based on data, technology, and real-time interaction. Digital transformation has enabled institutions to redefine their relationship with customers through multiple digital channels and precise analytics of consumer behavior, thereby enhancing campaign effectiveness and elevating personalization and engagement. In this context, AI tools have revolutionized marketing performance by predicting trends, personalizing content, and automating services—allowing organizations to offer smarter and more flexible customer experiences. Although these tools open vast innovation horizons, they also pose challenges around privacy, algorithmic fairness, and the need for digital expertise.

Ultimately, digital transformation and artificial intelligence are complementary components in building modern, dynamic, and customer-centric marketing, making the adoption of these technologies a strategic imperative in today’s business landscape.

3. Digital Transformation in the Algerian Context

In the past decade, Algeria has witnessed a growing trend toward embracing digital transformation, both at the governmental policy level and within economic institutions. Several initiatives have been launched to modernize the digital infrastructure, such as expanding the fiber-optic network, supporting e-commerce, and developing electronic payment systems. However, digital transformation in Algeria remains in its early stages and faces multiple challenges related to technological readiness, organizational culture, lack of competencies, and weak intersectoral coordination.

3.1 Analysis of Digital Infrastructure and Institutional Readiness in Algeria

Assessing Algeria's digital infrastructure and the readiness of its institutions for digital transformation is a crucial step in understanding the current state of digitization in the country. Indicators such as internet penetration, technology adoption, and legislative and cultural obstacles converge to shape a digital environment that remains incomplete.

3.1.1. Analysis According to Kemp Report (2024): The Kemp (2024) report indicates that Algeria has made notable progress in internet usage and social media engagement but continues to suffer from poor network quality, especially in rural areas, which hinders digital expansion.

- The number of internet users in Algeria reached **33.49 million**, representing **72.9%** of the population.
- Mobile internet speed increased by **59.4%** to reach **21.36 Mbps**.
- Social media users numbered **24.85 million**, accounting for **54.1%** of the population.

Despite this progress, Algeria continues to face network quality issues, particularly in rural areas where **24.5%** of the population lives, with limited access to high-speed internet.

3.1.2. Institutional Readiness in Algeria: According to GIE Monétique (2024), although there are over one million small and medium-sized enterprises (SMEs), the adoption of advanced technologies such as ERP and CRM remains limited, reflecting a lack of investment and skills.

- Algeria has over **one million SMEs**, of which **97.1%** are micro-enterprises.
- ICT adoption is relatively adequate, but the use of advanced tools such as **ERP** and **CRM** systems remains underdeveloped.
- The number of e-commerce stores utilizing electronic payment reached **510**, with more than **48 million transactions** since 2016 (GIE Monétique, 2024).

Despite these indicators, digital transformation within Algerian institutions faces challenges including weak investment, skill shortages, and a lack of strategic vision.

3.1.3. Institutional and Cultural Challenges: According to the study by Charrak & Fortas (2024), the key challenges include:

- Lack of digital culture within organizations.
- Resistance to change by staff and management.
- Weak digital leadership and absence of clear transformation plans.
- Financial constraints limiting investment in technology.
- Weak coordination between public and private sectors.

Additionally, Ramdani & Boudinar (2021) pointed out that HR digitization remains weak due to lack of system integration and absence of continuous training.

3.1.4. Legal and Regulatory Framework: Although the Personal Data Protection Law was enacted in 2018 (Law No. 18-07), supervised by the National Authority for the Protection of Personal Data (ANPDP), Charrak & Fortas (2024) note that shortcomings in digital legislation continue to hinder the creation of a secure and trustworthy digital environment.

- The **Personal Data Protection Law No. 18-07** was enacted in 2018 and is overseen by the **ANPDP**.
- Digital legislation in Algeria remains incomplete, hindering the entry of foreign companies and weakening trust in the digital ecosystem.

It is evident that digital transformation in Algeria is progressing moderately, with a relatively acceptable infrastructure yet insufficient investment in advanced tools or institutional digital culture. Algerian institutions face multiple challenges, most notably weak digital leadership, lack of technical skills, and resistance to change. Despite governmental efforts to modernize the legal framework and infrastructure, digital transformation still requires a clear strategic vision, effective sectoral integration, and continuous training of human resources.

3.2 Artificial Intelligence Tools in the Algerian Market: With growing global interest in artificial intelligence technologies, Algerian institutions have gradually begun exploring these tools within their marketing operations, particularly in sectors undergoing digital transformation such as banking, e-commerce, and higher education. Although usage remains limited compared to neighboring countries, there are signs of adoption of smart tools—such as chatbots, recommendation systems, and data analytics—aimed at improving customer experience, supporting decision-making, and expanding market outreach.

3.2.1. Key AI Tools in Smart Marketing: Studies reveal that institutions have started using tools like chatbots and big data analytics to support customer service and analyze behavior, though adoption is still in its experimental phase (Charrak & Fortas, 2024):

- **Chatbots:** increasingly used on banking and commercial websites to provide immediate customer support and automated responses to inquiries. For example, some Algerian banks have begun implementing AI-supported interactive interfaces to reduce pressure on call centers.
- **Recommendation Systems:** employed in e-commerce platforms to tailor offerings based on customer behavior. While usage in Algeria remains modest, some online stores have started integrating basic algorithms to analyze previous purchases.
- **Big Data Analytics:** utilized to examine customer behavior, measure engagement, and guide marketing campaigns. Large enterprises such as telecommunications and energy companies have started applying these tools to enhance customer targeting.
- **Machine Learning:** used to predict market trends and personalize advertising content. Though still in its trial phase among Algerian institutions, it is regarded as a promising tool.

3.2.2. Algerian Sectors Most Active in AI Adoption: According to Ramdani & Boudinar (2021), banking, e-commerce, and higher education are among the leading sectors adopting AI, despite challenges related to skill gaps and lack of strategic vision:

- **Banking Sector:** has witnessed notable development in using AI to improve customer service, manage risk, and personalize financial products.
- **E-commerce:** despite the limited number of online stores, electronic payment and offer customization have gradually taken a more intelligent approach.
- **Higher Education:** some Algerian universities have begun integrating AI into remote learning platforms and student performance analytics.
- **Energy and Telecommunications:** companies such as Sonatrach and Mobilis have started using data analytics tools to improve operational and marketing activities.

It is clear that the Algerian market has begun to adopt artificial intelligence tools in marketing processes, especially in vital sectors. Although adoption remains limited, there are promising opportunities for expansion—particularly given the presence of digital infrastructure and a pool of young engineering talent. The main challenges lie in weak investment, lack of training, and absence of strategic vision. However, international experiences show that transformation is possible when institutional will and government support are present.

4. Future Opportunities and Challenges

Amid accelerating global digital transformations, the Algerian market stands at a critical crossroads: either to keep pace with this dynamic evolution or remain within the confines of limited technological adoption. Despite structural barriers hindering digital transformation, there are promising opportunities that could dramatically improve the marketing performance of Algerian institutions—provided they are leveraged effectively. This section presents a dual analysis: first, exploring the available opportunities for Algerian institutions to employ artificial intelligence in marketing, and second, diagnosing the challenges that hinder this adoption. Finally, it highlights successful international experiences that may inspire local contexts and contribute to building an executable strategic vision.

4.1 Strategic Opportunities for Algerian Institutions: Despite the challenges confronting Algerian institutions, several internal and external strategic opportunities can accelerate digital transformation and enhance the use of AI tools in marketing. These include technological advancement, availability of qualified talent, expansion of e-commerce, and the declining cost of digital tools.

4.1.1 Expansion of E-Commerce: The Algerian market is witnessing rapid growth in e-commerce, driven by increased internet and smartphone usage, which strengthens digital customer reach and the potential for AI tools in personalization (Chetrit, 2024; Salem, 2025):

- A rise in internet and social media users improves digital access to customers.
- AI can be used to enhance user experience and personalize offers.

4.1.2 Availability of Skilled Youth: Algerian youth possess advanced technical skills in artificial intelligence, enabling the development of local solutions tailored to the national market context (Zerouki & Haidawi, 2025):

- Presence of Algerian engineers and developers specialized in AI.
- Possibility of creating localized solutions suited to Algerian market characteristics.

4.1.3 Lower Cost of AI Tools: The availability of open-source tools and affordable cloud services makes it easier for Algerian institutions to adopt AI technologies without high costs (Brazi, 2024):

- Open-source platforms like TensorFlow and Dialogflow are accessible.
- Affordable cloud services from global providers facilitate adoption.

4.1.4 Increased Governmental Support for Digital Transformation: The Algerian government has launched national strategies such as "Digital Algeria 2030" to promote digitization in public and educational sectors, creating a favorable regulatory and operational environment (Ben Mouloud, 2025):

- Initiatives such as "Digital Algeria" and the "National Cybersecurity Agency."
- A drive toward digitizing public services and education.

4.1.5 Scalability Toward Regional Markets: AI tools enable the analysis of external markets and precise marketing targeting, boosting the capacity of Algerian institutions to expand regionally (Laioun, 2023; Nasri, 2024):

- Using AI to analyze foreign markets.
- Directing marketing campaigns based on detailed data.

These opportunities form a strong foundation for developing intelligent marketing strategies, provided they are utilized within a clear strategic vision and supported by adequate human resource training. Rapid e-commerce expansion, technical youth competence, low-cost digital tools, and government support all strengthen the feasibility of AI adoption.

4.2. Digital Transformation Challenges Impeding AI Adoption: Although Algeria has made relative progress in digital infrastructure, digital transformation—particularly in marketing—continues to face structural and cognitive challenges that impede effective AI adoption. These challenges extend beyond technology to include organizational culture, leadership weaknesses, skill shortages, and incomplete legal frameworks. This section examines the core barriers facing Algerian institutions, analyzing their causes and implications.

4.2.1. Technical Challenges: Algerian institutions face technological difficulties such as poor internet quality and lack of integrated digital systems, which hinder AI adoption (Kemp, 2024):

- Poor internet quality in rural areas, where over 24% of the population resides, with limited access to high-speed internet.
- Absence of integrated information systems, hindering data analysis and decision-making.
- Low usage of advanced tools like ERP, CRM, and big data analytics, especially among SMEs.

4.2.2. Human and Knowledge Challenges: Digital skill shortages and resistance to change within institutions are among the most significant barriers to effective digital transformation (Molchanova, 2023; Hu, Wu & Yu, 2023):

- Lack of digital skills among employees and absence of continuous training programs.
- Weak digital culture within institutions, viewing technology as supplementary rather than strategic.
- Resistance to change from staff and management, driven by job insecurity or lack of understanding of tech benefits.

4.2.3. Organizational and Administrative Challenges: The absence of digital leadership and strategic vision weakens coordination and hinders the establishment of integrated digital systems (Charrak & Fortas, 2024):

- No clear strategic visions or digital leadership.
- Poor coordination between public and private sectors.
- Fragmented internal systems, especially in HR and accounting, undermining functional integration.

4.2.4. Financial and Investment Challenges: Limited investment and difficulties in accessing digital funding reduce the capacity of institutions to adopt AI technologies (Brazi, 2024):

- Weak technological investment, especially among SMEs.
- Difficulty obtaining digital financing due to lack of innovation support funds or venture capital.
- Few government initiatives to support private-sector digitization compared to countries like Tunisia and Morocco.

4.2.5. Legal and Security Challenges: The absence of effective digital legislation and limited enforcement of data protection laws undermine trust in the digital environment (Ben Mouloud, 2025):

- Lack of comprehensive legislation regulating AI and e-commerce use.
- Limited enforcement of personal data protection law (Law 18-07/2018), leading to weak digital trust.
- Fear of cyberattacks discourages institutions from adopting advanced digital solutions.

4.2.6. Impact of These Challenges on Smart Marketing: These challenges lead to poor service personalization, slow market response, and reduced digital customer engagement (Nasri, 2024):

- Inability to personalize offerings due to lack of customer behavior analytics tools.
- Delayed market responsiveness due to absence of real-time data.
- Low digital interaction levels weaken customer loyalty and limit expansion opportunities.

It is evident that the challenges facing digital transformation and smart marketing in Algeria are multifaceted and cannot be addressed partially. They require a strategic intervention encompassing skill development, infrastructure modernization, organizational culture reform, and the establishment of a favorable legal and investment environment. While some institutions have begun overcoming these obstacles, progress remains slow and depends on institutional will, governmental support, and partnerships with the tech sector.

4.3. Comparative Study and International Experiences: Given the significant disparities among countries in the adoption of artificial intelligence and digital transformation, studying successful international experiences that have integrated these technologies into their marketing strategies becomes highly valuable. This section helps illustrate how institutions in different countries have addressed technical and organizational challenges and leveraged AI tools to enhance marketing performance, offering applicable lessons for the Algerian context.

4.3.1. Poland – LPP Company: The case of LPP demonstrates how commercial enterprises can utilize AI tools to improve marketing performance through an integrated digital infrastructure (Google Cloud Case Study – LPP Poland, 2023). LPP is one of the largest fashion retailers in Eastern Europe and has adopted AI technologies to optimize its marketing operations.

Key Tools Used:

- *Google Cloud* for digital performance and data analytics.
- *Dialogflow* and *K2Bots.AI* for developing multilingual chatbots.
- *Genesys PureCloud* for omnichannel customer service integration.
- *PSIwms* for smart inventory management and reducing order-picking time by 30%.

Outcomes:

- Enhanced customer experience.
- Accelerated e-commerce activity.
- Improved marketing decision-making.

This experience illustrates how AI tools can create a transformative impact on marketing—even in decentralized economies like Poland.

4.3.2. Mexico – Tecnológico de Monterrey University: This case underscores the importance of integrating AI in higher education to prepare a generation capable of leading digital transformation. Tecnológico de Monterrey (ITESM) developed an integrated educational strategy aligned with *Industry 4.0*.

Key Practices:

- Designing curricula that include courses, practical training, research, and innovation activities.
- Using adaptive smart platforms to analyze student performance and personalize content.
- Connecting education with the labor market via partnerships with industrial and tech firms.

Outcomes:

- Preparing graduates to drive digital transformation in institutions.
- Integrating AI in education and academic marketing.

This experience highlights the strategic role of investing in human capital as a prerequisite for successful digital transformation.

4.3.3. Saudi Arabia – Vision 2030: Saudi Arabia's Vision 2030 exemplifies how a state can lead digital transformation through a national AI strategy and its applications in public services (SDAIA, 2023). The Saudi Data and AI Authority (SDAIA) launched nationwide efforts to integrate AI across government and commercial domains.

Marketing-Oriented Applications:

- Using AI to personalize public services.
- Building e-commerce platforms supported by smart analytics.
- Supporting local innovation through programs like the *STC AI Accelerator*.

Outcomes:

- Accelerated digital transformation in public and private sectors.
- Improved digital engagement with citizens and customers.

This experience shows the pivotal role governments can play in steering digital transformation by fostering legislative and investment-friendly environments.

4.3.4. International Comparison and Local Adaptation Potential: To better understand Algeria's position in the global digital landscape, a comparative analysis is presented across several international AI adoption models in educational, commercial, and governmental contexts. It emphasizes the feasibility of replicating these models in Algeria. (See Table N° 03):

Table N°03: Comparative Analysis of AI Adoption Models and Replication Potential in Algeria

Feature	**Algeria**	**Poland (LPP)**	**Mexico (Monterrey)**	**Saudi Arabia (Vision 2030)**
Type of Institution	Mixed	Private Commercial	Academic Educational	Governmental & Commercial
AI Tools Usage	Limited	Advanced & Integrated	Educational & Training	Governmental & Commercial
Government Support	Moderate	Moderate	High	High
Infrastructure Readiness	Acceptable	Good	Very Good	Excellent
Main Challenges	Digital culture, skill gaps	Investment limitations	Bridging education and labor markets	Legislation and data privacy
Replication Feasibility	—	Partial	Gradual	Requires structural reforms

Source : Barakat, et & al., 2023–2024.

The table compares four institutional models of AI adoption in Poland, Mexico, Saudi Arabia, and Algeria. It reveals variations in institutional types, AI tools maturity, government backing, and infrastructure readiness. The first three countries possess good to excellent infrastructure and strong governmental support, whereas Algeria grapples with challenges linked to digital culture and technical skills. This disparity reflects in the limited AI tools usage and uneven replicability of foreign models. The Saudi model demands significant structural reforms for replication, while certain aspects of the Mexican and Polish cases may be emulated partially or progressively.

International experiences show that successful digital transformation and smart marketing depend not only on technology availability but also on strategic vision, institutional commitment, and investment in human capital. Algeria can benefit from these models by adopting training policies, enhancing infrastructure, and fostering local innovation. Despite the gaps, these cases prove that meaningful change is achievable with institutional resolve and governmental support.

5.Conclusion

Through this study, a comprehensive picture of digital transformation and artificial intelligence within the Algerian market from a marketing perspective has emerged. The analysis revealed a contradiction between the relative availability of technical infrastructure and the limited actual deployment of these tools by institutions. The proposed hypotheses guided us to findings that reflect the complex reality: on one hand, the contribution of AI to improving customer experience and enhancing engagement—particularly in banking and education—was confirmed. On the other hand, the study affirmed that the mere presence of digital tools is insufficient unless accompanied by informed institutional leadership, effective human and technological investment, and a coherent strategic vision.

5.1. Summary of Findings: Based on the collected field and theoretical data, this section presents the key findings that reflect the reality of digital transformation and the use of artificial intelligence in Algeria from a precise marketing lens:

- Algeria possesses a relatively acceptable digital infrastructure, yet its use in marketing operations remains limited and unstructured.
- Small and medium-sized enterprises (SMEs) suffer from weak technological adoption compared to larger institutions.
- The banking and higher education sectors are the most advanced in employing AI for marketing purposes.
- Other sectors remain digitally underdeveloped and lack a clear strategic vision for smart marketing.

5.2. Analysis and Interpretation of Results: This section analyzes the results in light of Algeria's structural and institutional context, explaining the interaction between digital capabilities and field-level challenges to achieve a deeper understanding of the determinants of success in the digital transformation of Algerian marketing:

- The availability of technology does not guarantee effective transformation—it requires institutions with strategic awareness.
- Digital culture within Algerian organizations remains limited, hindering the adoption of smart models.
- Digital skill gaps are a major challenge in applying AI tools.
- Weak legislation and limited financial support obstruct the expansion of institutional digital transformation.
- Institutions that have begun adopting AI tools have shown tangible improvements in customer experience and service quality, though progress remains partial and narrow in scope.

5.3. Testing and Validating Hypotheses: The four hypotheses were tested against the theoretical framework and comparative studies. The results are as follows:

- **First Hypothesis:** Confirmed. The study demonstrated a positive relationship between AI usage and the efficiency of marketing performance and decision-making—especially in digitally advanced institutions such as banks and telecoms.
- **Second Hypothesis:** Strongly confirmed. Sources indicated that the absence of digital culture and resistance to change represent major obstacles to smart marketing transformation in Algerian organizations.
- **Third Hypothesis:** Validated. The study revealed clear disparity among economic sectors in adopting AI tools—with banking and higher education leading, while commercial and industrial sectors lag behind.
- **Fourth Hypothesis:** Partially confirmed. Investment in technology improves institutional competitiveness, but current investment levels remain insufficient for achieving strategic transformation.

5.4. Study Limitations: Several challenges emerged during the research process:

- Scarcity of Arabic-language academic studies on AI and digital marketing in Algeria, requiring reference to foreign sources and contextual adaptation.
- Variability in the quality of official data regarding Algeria's digital transformation, impacting sectoral comparisons.
- Difficulty accessing updated reports on AI adoption within Algerian institutions, especially in the private sector.
- Diversity of concepts and terminology across international literature, requiring additional effort to standardize language and clarify terms.
- Limited case studies of Algerian institutions actively employing AI, shifting the research toward theoretical and inductive analysis.

5.5. Recommendations: This section translates findings and analysis into practical recommendations aimed at empowering institutions and policymakers to activate smart marketing transformation in Algeria:

a. At the Institutional Level: Success depends on adopting a clear digital vision and developing digital skills to integrate AI tools into daily marketing operations:

- Develop a comprehensive digital strategy encompassing marketing, HR, and customer service.
- Train staff in AI tools via workshops and specialized courses.
- Foster a culture of innovation and experimentation while reducing resistance through incentives and participation.
- Implement data analytics tools to improve customer targeting and personalization.

b. At the Governmental Policy Level: Public policy plays a decisive role in preparing the legislative and financial environment for digitization, especially for SMEs:

- Launch national programs to support SMEs in their digital transformation.
- Update digital legislation to include data protection, e-commerce, and AI governance.
- Stimulate technological investment via innovation funds and venture capital.
- Strengthen partnerships between universities and the private sector to train qualified digital talent.

c. At the Scientific Research Level: Research is fundamental to embedding AI and smart marketing concepts within the Algerian context through applied studies and Arabic academic content (Si Yahia, 2024):

- Encourage field-based research on AI applications in Algerian marketing.
- Enrich Arabic literature with specialized academic content on digital transformation and smart marketing.
- Link academic research with the labor market via collaborative projects between researchers and institutions.

Final Reflection In light of these insights, it can be concluded that the future of smart marketing in Algeria will not be built on technology alone, but on institutional clarity of vision, investment in human capital, and integrated legislative and administrative support. Digital transformation is no longer optional—it is a competitive necessity in a business environment marked by rapid evolution. Algerian institutions must act decisively and courageously to adopt intelligent marketing models that align with customer expectations and ensure sustainable expansion.

References

Abdelaziz , D., & Nassima , S. (2025). Digital transformation in Algeria: paths and transformations . *ZAOULI*, *9*(11), 86–122.

Arghad , A., Sarah , B., & Gerhard , T. (2019). Managing Challenges for Digital Transformation Initiative in a National Drilling Contractor – A Case Study from Algeria. *SPE Middle East Oil and Gas Show and Conference*. https://doi.org/10.2118/195060-MS

Arti , S., Dr. Satish Kumar , M., & Mr Vinay Kant , S. (2023). The Evolution And Impact Of E-Commerce. *Journal of Namibian Studies*.

Belmir , S., & Saadi , W. (2025). The Role Of Information And Communication Technology In Enhancing Competitive Advantage: A Field Study On A Sample Of Customers Of Omar Ben Omar Mills. *Journal of Human and Social Sciences*, *14*(3), 940–974.

Bharati, R. (2023). AI and Metaverse in Fashion Marketing. *Journal of Retail Technology*, *15*(1), 22–35.

Charrak, M. H., & Fortas , F. (2024). Digital Transformation In Algerian Enterprises: Reality And Challenges. *Journal of Business Administration and Economic Studies*, *10*(2), 475–486.

Chiraz , B., & Lotfi , R. (2021). Human Resources Management in the era of Digital Transformation in Algeria: Challenges and Issues. *IEEE CyMaEn Conference*.

Chun , H., Chuanjian , W., & Le , Y. (2023). Challenges and Opportunities of Digital Transformation in Enterprises . *Accounting and Corporate Management*, *5*(12).

Educational Study – Monterrey University , . (2023, June 13). Artificial Intelligence Educational Strategy for Engineering Students. Retrieved September 10, 2025, from ttps://www.bing.com/videos/search?q=+Educational+Study+%E2%80%93+Monterrey+University+%282023%29.+Artificial+Intelligenc

George, W., Didier, B., & Andrew, M. (2014). *Leading Digital: Turning Technology Into Business Transformation*. Harvard Business Review Press.

GIE Monétique, . (2024, November 1). Activité paiement mobile. Retrieved September 23, 2025, from https://giemonetique.dz/uploads/2024/ACTIVIT%C3%89_PAIEMENT_MOBILE.pdf

Google Cloud, . (2023, January 1). Case Study – LPP Poland. Internal Report. Retrieved September 24, 2025, from https://cloud.google.com/customers/lpp

Gregory, Vial . (2019). Understanding digital transformation: A review and a research agenda . *JOURNAL OF STRATEGIC INFORMATION SYSTEMS* , *28*(2), 118–144.

Hess, T., Matt, C., Benlian, Alexander, & Wiesböck, Florian. (2016). Options for Formulating a Digital Transformation Strategy. *MIS Quarterly Executive*, *15*(2), 152–173.

Khouloud , O., & Salma , A. (2024). A Bibliometric Analysis on Artificial Intelligence in Marketing: Implications for Scholars and Managers. *Journal of Internet Commerce*, *23*(3), 233–261.

Marcus , W., Arlett , S., & Christian , E. (2018). Digital Transformation in Companies – Challenges and Success Factors. *Springer Cham*, 178–193.

Mohamed Hocine, C., & Fatiha, F. (2024). Digital transformation in Algerian Enterprises: reality and challenges. *Journal of Business Administration and Economic Studies*, *10*(2), 475–486.

Molchanova, S. (2023). Digital Transformation of Technological Processes of the Enterprise. *Ekonomika i Upravlenie*.

Oualid , M., Latifa , B., & Zakaria , D. (2021). Impact of Digital Transformation on Accounting Information Systems – Evidence from Algerian Firms. *Economics and Business*, *35*(1), 249–264.

Philip, Kotler, Hermawan, Kartajaya, & Iwan , S. (2021). *Marketing 5.0: Technology for Humanity. John Wiley & Sons*. .

Rahul , S., Shramishtha , S., & Sanobar, Fatima. (2023). E-Commerce and Digital Transformation: Trends, Challenges, and Implications. *International Journal for Multidisciplinary Research*, 5–5. https://doi.org/https://doi.org/10.36948/ijfmr.2023.v05i05.7128

Rania , R., Amel , S., & Ismail , C. (2025, June 15). Digital Arabia Network. Retrieved August 30, 2025, from https://digitalarabia.network/rakameya-program#digital-transf-aleftun-head

Sabine , B., & Andrea , B. (2016). Stages in Digital Business Transformation: Results of an Empirical Maturity Study. *MCIS Proceedings*.

Satish, Nambisan, Mike, Wright, & Maryann, Feldman. (2019). The digital transformation of innovation and entrepreneurship: Progress, challenges and key themes. *Research Policy*, *48*(8), 103773

SDAIA, . (2023, January 1). National Strategy for Data and AI – Saudi Arabia Vision 2030. Riyadh. Retrieved October 15, 2025, from https://sdaia.gov.sa/en/SDAIA/SdaiaStrategies/Pages/NationalStrategyForDataAndAI.aspx

Simon , C., Michael , D. M., & Hess, T. (2019). Digital Transformation Strategy Making in Pre-Digital Organizations. *The Journal of Strategic Information Systems*, *28*(1), 17–33.

Simon , K. (2024, February 23). Digital 2024: Algeria. DataReportal. Retrieved August 20, 2025, from https://datareportal.com/reports/digital-2024-algeria

Tecnológico de Monterrey, . (2020, November 1). artificial intelligence educational strategy for the digital transformation. Retrieved September 24, 2025, from https://research.tec.mx/vivo-tec/display/AcademicArticleSCO_85090786659