



# AI-Driven Digital Marketing in Egyptian Startups: Opportunities and Challenges

Heba Al-Ashry, Ahmed Elsamadicy, Hazem Rasheed Gaber

Arab Academy for Science, Technology and Maritime Transport, Egypt

Correspondence Author: Heba Al-Ashry, Arab Academy for Science, Technology and Maritime Transport, Egypt  
E-mail :heba\_alashry@aast.edu

Received date: 18 July 2025, Accepted date: 15 August 2025

**ABSTRACT:** Purpose: The study aims to investigate the Opportunities and Challenges of AI-Powered Digital Marketing Strategies for Startups in Egypt. The study focused on the factors enforcing and the factors hindering AI in digital marketing. It aimed to draw a comprehensive image of the digital marketing scene in Egypt, based on interviews with 20 marketing professionals in Egyptian technology based startups. Design/Methodology: The study adopted a qualitative approach to investigate the opportunities and challenges of AI-Powered Digital Marketing Strategies for Startups in Egypt. The study relies on the objective content analysis approach by conducting 20 interviews with professionals in the field of digital marketing who are responsible for implementing marketing strategies supported by artificial intelligence. They are carefully selected for the diversity of their views and experiences in applying modern technological tools. Findings: The findings focused on the opportunities and challenges of AI-Powered Digital Marketing Strategies for Startups in Egypt. The analysis offered two themes regarding Factors Enforcing AI in Digital Marketing and the Factors Hindering AI in Digital Marketing. The study explored the opportunities and barriers to the use of AI-powered digital marketing strategies by Egyptian startups, identifying key enablers as top management support, employee flexibility, organizational readiness, and pursuit of competitive advantage. AI faces significant challenges, including ethical concerns, data quality issues, talent shortages, and regulatory constraints. Despite these obstacles, AI holds excellent potential. It can enhance marketing effectiveness. Additionally, it can help ensure the long-term success of technology startups in Egypt.

**Keywords:** Artificial Intelligence- Enabled Digital Marketing Strategies - Technology-Based Startups - Top Management Support - Employee Flexibility - Organizational Readiness - Competitive Advantage

## INTRODUCTION

Artificial intelligence (AI) has undergone a remarkable evolution within digital marketing, fundamentally altering how businesses connect with consumers and conduct marketing activities. With rapidly evolving AI technologies, marketers can leverage advanced data analytics, automation, and personalization to engage consumers in more meaningful and impactful ways than ever (Ziakis & Vlachopoulou, 2023).

This technology is advanced enough to identify faces and objects, which has enormous implications for various business applications. For security purposes, facial recognition can distinguish individuals; on the other hand, object detection can be used to detect and analyze objects in images. AI can analyze facial expressions to tailor recommendations, though this raises privacy concerns. Some businesses, such as cosmetics and retail stores, are experimenting with facial recognition to gauge customers' moods and, in turn, advise on suitable products (Thilagavathy & Kumar, 2021).

Digital marketing, with its dynamic, real-time data, stands to benefit immensely from the potential of AI. From predictive analytics to personalized user experiences, it can redefine how businesses interact with their audience in the digital space. Digital marketing utilizes digital technology to build channels for prospective recipients, achieving the company's objectives by more effectively satisfying customers' requirements (Nalbant & Aydin, 2023). The rapid transformation of both fields requires ongoing

investigation. Incorporating artificial intelligence (AI) in marketing has significantly transformed and redefined enterprise operations, marking a new wave of innovation and growth in business strategies (Saura et al., 2021).

Technology-driven startups have the potential to significantly contribute to the economic and social progress of a knowledge-based economy. These startups often have an edge over established companies in speed, agility, and executing their business plans. In recent years, many organizations have embraced digital transformation strategies and tools to incorporate digital technology into their workforce and services (Triono, 2021). Furthermore, the increasing adoption of AI-driven business models is worth the effort to ensure the success of these digital transformation initiatives. Technologies such as natural language processing, machine learning, and deep learning are considered key components of artificial intelligence that offer extensive and diverse data analysis capabilities across various sectors, enhancing the efficiency of management, planning, and operations (Lee et al., 2023). Therefore, this research investigates the opportunities and challenges of AI-Powered Digital Marketing Strategies for Startups in Egypt.

## LITERATURE REVIEW

In this section, the concepts of the current study, which aims to investigate the opportunities and challenges of AI-Powered Digital Marketing Strategies for Startups in Egypt, are presented by reviewing previous literature on the topic.

### *AI Digital Marketing Strategies*

Artificial intelligence (AI) focuses on developing machines possessing human-like intelligence. This objective requires methods such as natural language processing (NLP), deep learning, and machine learning, which enable machines to analyze data and make informed decisions (Saura et al., 2021).

The growing prevalence of artificial intelligence (AI) enables businesses to leverage big data to enhance digital marketing strategies. AI tools help businesses select the most effective strategies under varying conditions by using mathematical algorithms. The application of AI in digital marketing enables the development of communication models for specific user groups and the accurate segmentation of the target audience based on the selected set of metrics. It is feasible to choose efficient communication models, increase customer loyalty, and optimize online interactions between businesses and customers by automating specialized marketing operations (Пономаренко, 2024). AI applications in digital marketing include content marketing, social media marketing, email marketing, and marketing communication. Understanding the role of AI in digital marketing is fundamental for professionals looking to make a significant impact in this dynamic industry, especially compared to traditional methods, which help marketers personalize campaigns and automate their vision (Apriani et al., 2024).

To understand the function of AI in digital marketing strategy, it is essential to grasp what artificial intelligence entails in marketing. AI technologies in digital marketing include a diverse array of tools and applications. These AI-driven abilities empower marketers to analyze vast amounts of data and tasks, automate repetitive tasks, personalize customer experiences, and extract practical insights to guide their marketing strategies (Sholihah & Saputra, 2022).

AI technology enables companies to examine vast quantities of data to gain insights into customer behavior, preferences, and demands (Mao & Huang, 2021). As a result, they can build more focused and personalized marketing efforts that connect with their target demographic (Cui et al., 2022). In addition, AI-powered chatbots and virtual assistants help customers throughout their purchasing journey, advancing their overall experience. By leveraging AI technology for marketing companies, they can stay ahead of the competition and optimize their business opportunities. Furthermore, AI technology can optimize forecasting and pricing strategies, recognize customer behavior trends and patterns, and advance customer relationship management systems (Apriani et al., 2024). AI's influence on digital marketing includes transforming social media analytics, developing global marketing management strategies, and altering content marketing. It is a strategic management tool for top companies, creating impactful ties and connections while transforming digital media applications. These advancements demonstrate how AI is reforming how companies approach marketing, providing insights, and optimizing previously unattainable strategies. Leveraging AI in digital marketing is critical for keeping ahead in the competitive landscape, making it an essential strategy for businesses worldwide (Ziakis & Vlachopoulou, 2023).

Artificial intelligence (AI) in digital marketing strategies is comprehensive and constantly changing, reflecting the dynamic nature of both AI technology and the marketing landscape. The adoption of AI in digital marketing emphasizes its revolutionary effects on targeting, customer engagement, personalization, content creation, and advertising efficiency. Traditional marketing frequently relied on extensive demographic data to segment audiences and customize messages. However, with the rise of AI marketers, our nails can leverage machine learning algorithms to process large volumes of data from sources such as social media, browsing history, and purchase history. AI-powered predictive analytics is another field that has seen remarkable progress. This technology uses past data to predict future trends and behaviors, enabling businesses to make informed decisions about their marketing approaches. AI-driven tools can capture patterns and trends that may be challenging for humans to detect, enabling more scooters to anticipate customer needs and adjust their campaigns accordingly (Esch & Bick, 2021).

Artificial intelligence is reshaping digital marketing strategies by automating and enhancing various aspects of customer interaction and targeted marketing. AI improves customer experiences through tools like chatbots, which provide instant,

personalized interactions, and content creation, which enables AI to drive content production, saving time while delivering tailored messages (Nalini et al., 2021). Predictive analytics enhances marketers' ability to forecast campaign outcomes and optimize customer targeting by analyzing past data. Furniture personalized by AI improves customer engagement by offering content tailored to their behavior and interests. Additionally, voice search engines and AI-driven image recognition provide valuable tools for data analysis and affected customer interaction (Thilagavathy & Kumar, 2021).

### ***Tech-Based Startups***

Technology-based startups primarily focus on utilizing innovative technologies to create new products or services, often disrupting traditional industries. These startups are typically centered around technological solutions, whether software, hardware, or new technological processes. The core objective of tech-based startups is to bring novel ideas to market, often by developing scalable and repeatable business models. Unlike traditional businesses that may rely on established markets and practices, technology startups frequently encounter high levels of uncertainty when testing new technologies and exploring untapped markets, as their business models are often more flexible and adaptable, with an emphasis on rapid innovation, customer feedback, and iteration (Devanda & Utama, 2023).

Tech startups take on serious risks, particularly during the initial years, when limited resources, market uncertainties, and competitive pressures are the most significant risks of failure. About 90% of these startups face challenges in their early stages. Shared resources, networking, and incubation can reduce these risks by providing early-stage startups with the basic support they need to navigate initial challenges. These mechanisms help startups reduce operational costs, access resources, and build social capital through networks, which are critical for their development (Karani & Mshenga, 2021). Business incubation centers are key to supporting startups through mentorship, workspace access, and strategic guidance. All these effectively process principles into usable business solutions. Incubators provide flexible operational frameworks and adaptable resources that support growth and scalability, helping startups adapt to changing demands (Trivedi & Asrani, 2019).

Internal technological capabilities and entrepreneurship are essential for the innovation and growth of tech-based startups and their marketing scopes, particularly in technology-centric economies. Startups focus mainly on technological competitiveness, such as through patents, to achieve significantly better innovation outcomes. This shows the importance of investing in technological assets for long-term sustainability (Ahn et al., 2022).

Having an in-house R&D department does not necessarily guarantee increased innovation. Thus, a startup's success in this area depends more on technological capabilities than on organizational structure alone. Therefore, it refers to a need to balance entrepreneurial drive with core competencies and build an environment that supports and amplifies technological innovation. Tech-based startups in developing economies often rely on external and organizational factors such as government support, infrastructure, and market conditions. In comparison, developed economies are more about individual factors, especially the quality and expertise of the founding team, as these ecosystems possess a more developed support system (Rammer et al., 2021). This distinction highlights the significance of context-specific approaches in determining startup success: developing economies prioritize strengthening external support systems, such as government funding and infrastructure, while developed economies leverage entrepreneurs' personal competencies. Strategies that work in one economic context may not be necessary (Sharma, 2024).

Technology startups are innovative, scalable, disruptive, and high-risk. They aim for rapid growth and often require significant funding, as well as attracting specialized talent in areas such as software, data science, and artificial intelligence. Technology startups are key drivers of economic growth, creating new jobs, diversifying the economy, and stimulating innovation. However, in emerging economies, these companies face significant challenges, including a lack of funding, weak infrastructure, regulatory hurdles, and limited market readiness. In advanced economies, the ecosystem for these companies receives greater funding and infrastructure support, accelerating their growth. Despite the challenges facing technology companies in the country in developing the ecosystem (Rammer et al., 2021).

Technology-based startups focus on modern technologies and innovations to develop new products or services. This type of company is characterized by rapid growth and the ability to expand significantly using the least possible resources. These companies operate in an unstable environment and pose a high risk due to significant uncertainty. Still, they seek to achieve the best possible value at the lowest possible cost. Startups usually rely on modern technologies and target markets that enable rapid growth and high profitability. They are generally innovative companies that provide new or improved solutions in many fields (Jurgelevičius & Kučaidze, 2020). Technology startups are geared toward rapid innovation and leverage the surrounding technological environment to develop products that can revolutionize markets. One of the characteristics of these companies is their ability to expand rapidly, a fundamental distinction that sets them apart from traditional companies that may restrict their growth (Ajah et al., 2022).

Startups have high flexibility in adapting to rapid changes in the business and technology environment, which makes them attractive to large companies seeking innovative partners to stimulate growth and development. Through the open innovation model, large companies can access new technologies or innovations at a lower cost than developing them internally. These startups also provide opportunities to establish innovative strategic companies with large companies to expand markets and create new

technologies that enhance the competitiveness of large companies because they are considered engines in various industries, as they understand how to stimulate technological transformations that lead to improving operations and products and changing the way services are provided in multiple sectors (Jha et al., 2024).

### ***Technology-Based Startups in Egypt***

Egypt has witnessed remarkable development in the organization of its technology-based startup ecosystem in recent years, and these companies have become an essential part of the country's entrepreneurial environment. Several factors make Egypt an attractive destination for investing in startups, according to the flat6Labs report. Startups provide talented developers, technology specialists, and entrepreneurs, which is considered one of the most prominent positive points of working in Egypt. With a population of more than 98 million, half of whom are under 30, entrepreneurial opportunities are increasing significantly, contributing to the rise of the spirit of initiative and the trend toward entrepreneurship as an alternative to traditional jobs (Aziz, 2022).

The Egyptian government has adopted several initiatives to support technological innovation and entrepreneurship. These initiatives include the Digital Transformation Plan 2000, the Egyptian Information Society Initiative 2003, and the ICT Strategy 2007-2010. The Technology Incubator Program was established in 2006 by the Information Technology Industry Development Agency and expanded in 2010 to include other cities, such as Alexandria and Assiut. In addition, the Technology Innovation and Entrepreneurship Center was established to support emerging companies in the field of information and communications technology (Sharma, 2024).

One of the most prominent examples of technology incubators in Egypt is the INTIAC program, which is affiliated with the Academy of Scientific Research and Technology. This program is the most enormous umbrella for establishing and managing technology incubators within the Egyptian entrepreneurship and innovation system. The Intlaq program was established to transform innovations and research outputs into competitive technology companies through cooperation with research groups and centers, government departments, and the private sector. These incubators contribute significantly to enhancing the country's ability to innovate and supporting the knowledge economy (Mohamed et al., 2024).

In 2017, Misr Gas Business Investment Company was established to support entrepreneurship by launching the "Your Idea, Your Company" program, a business acceleration initiative that helps Egyptian entrepreneurs build start-up companies capable of competing globally (Sharma, 2024). These companies rely on new technologies and innovation to create competitive advantages in local and global markets. Technology plays a vital role in this process, providing essential resources such as funding, mentoring, office space, and technical support to startups. These incubators are often closely linked to universities, government initiatives, and private-sector companies, helping startups move from initial ideas and research outputs to emerging technology companies capable of competing in the global economy (Leitão et al., 2022).

Based on the sub-indicators of the Business Environment Index and institutional and individual factors, policymakers in Egypt now have a clearer understanding of the need to focus on the sub-indicator related to startups' mindset and to identify the two pillars of networks and risk acceptance. The two main components of networks, as known in the framework of networks, include the potential access to the Internet and the ability of entrepreneurs to access and mobilize resources and opportunities. Thus, the links between different entrepreneurs affect the framework of networks and Internet connectivity is crucial (Ali et al., 2021).

## **RESEARCH GAP**

The published literature regarding artificial intelligence and its application in digital marketing has been centered on big business or developed economies, despite the topic attracting more attention. Thus, there is a large knowledge gap regarding the potential, challenges, and real applications of AI-based marketing strategies in developing economies like Egypt. This study addresses Egypt's distinct ecosystem marked by infrastructural and regulatory gaps. Furthermore, current studies have tended to focus on quantitative methods, giving little insight into the day-to-day experience, opinions, and outside issues encountered by marketing professionals within technology-based firms.

The previous studies lacked the conclusive quantitative analysis of digital marketing adoption and its opportunities and challenges in Egypt; thus, this study explores the experiences of Egyptian startup-employed digital marketing professionals in this new sector. The current investigation is concerned about how AI is being integrated into their profession, its advantages which they have realized, and the particular organizational, technical, and cultural challenges they have been facing. By collecting subjective, context-dependent information which has been hitherto underemphasized in regional and international studies of AI in marketing, it moves beyond scholarly discourse. The findings of the current study shed the light on the importance of integrating AI into startup marketing strategies.

### **Research Contribution**

- This investigation of the opportunities and challenges of AI-Powered Digital Marketing Strategies for Startups in Egypt contributes to the limited qualitative research into AI-based digital marketing among Egyptian startups, offering contextual data that is useful for comparative international studies and regional policies.

- The adopted thematic content analysis offers a good understanding regarding the most important obstacles and main areas of future potential, which can guide future AI adoption policies in comparable settings in other domains and countries.
- The targeted findings of this investigation may offer practical guidance to marketers and business owners wanting to leverage AI for marketing, improved with a combination of automation, customization, and human intuition. Recommendations include obtaining sponsorship from top management, inspiring employee flexibility through education, providing high-quality and impartial information, and addressing moral and privacy concerns. policy hurdles, and committing to the necessary hardware and skilled manpower to make the adoption of AI possible.
- The research demonstrates the worth of qualitative, interpretive analysis in uncovering nuanced views about the digital transformation phenomenon, particularly concerning under-researched sectors and areas, through objective content analysis through intensive interviews.

## RESEARCH METHODOLOGY

The research method of this study is intended to assess the future and limitations of AI-Powered Digital Marketing Strategies for Startups in Egypt via a convenience sampling to obtain valid views from founders, marketers, and AI developers. The research follows an inductive research method to formulate a theory from the collected data rather than testing previously formulated hypotheses. A qualitative design is chosen to determine in-depth the digital marketing strategies in startups within the Egyptian market. For data collection, in-depth interviews are held with a purposeful, non-random sample of 20 marketing professionals responsible for digital marketing activities in technology startups. These participants are selected by using a convenience sampling technique that ensures exposure to individuals based on their direct involvement in AI-based marketing strategies. To represent a more comprehensive picture of the ecosystem, efforts were made to guarantee diversity in roles, gender, and startup size. This provides an indication of the scenario at a point in time concerning AI application in digital marketing and challenges and opportunities facing this industry in today's marketing scenarios. This research tool is highly suitable for the study's aim of gaining a thorough understanding of the prospects and challenges of AI-Powered Digital Marketing Strategies for Startups in Egypt.

## QUALITATIVE ANALYSIS FINDINGS AND RESULTS

The study intends to investigate the opportunities and challenges of using artificial intelligence-supported digital marketing tactics based on Egyptian technology. The researcher used a variety of exploration techniques. Interviews were one of the main methods used to get primary data from a group of experienced professionals to get their opinions regarding the variables included in the study. Twenty in-depth interviews with digital marketing experts from tech startups were part of the data collection procedure. These interviews provide early insight into the procedures these businesses used that led them to incorporate AI into their digital marketing plans, as well as the anticipated outcomes of implementing these technologies. The NVivo software was used to document the extracted results.

This research is appropriate for content analysis since it enables the researcher to examine texts and determine the most prevalent themes and patterns, which are then used to draw conclusions about the usability of AI-powered digital marketing strategies in Egyptian technology companies. The study's objective is to investigate the usability of AI-powered digital marketing strategies for emerging companies, and twenty interviews with digital marketing specialists in these companies were conducted.

**Table 1: Interviews Information**

Interview	Interviewee Role	Interview Duration	Interview Date	Sector / Industry
Interview (1)	CEO and Founder	1 hour and 16 minutes	26 <sup>th</sup> of May 2024	E-commerce
Interview (2)	Co-founder	1 hour and 8 minutes	28 <sup>th</sup> of May 2024	FinTech
Interview (3)	Co-founder	1 hour and 21 minutes	30 <sup>th</sup> of May 2024	SaaS / Marketing Tech
Interview (4)	Marketing Manager	58 minutes	30 <sup>th</sup> of May 2024	Healthcare Tech
Interview (5)	AI tools developer	1 hour and 1 minutes	2 <sup>nd</sup> of June 2024	AI Solutions
Interview (6)	Marketing team member	1 hour and 22 minutes	5 <sup>th</sup> of June 2024	E-commerce
Interview (7)	Co-founder	52 minutes	6 <sup>th</sup> of June 2024	EdTech
Interview (8)	Co-founder and CEO	1 hour and 38 minutes	10 <sup>th</sup> of June 2024	Logistics Tech
Interview (9)	Marketing Manager	1 hour and 25 minutes	25 <sup>th</sup> of June 2024	Real Estate Platforms
Interview (10)	Marketing Manager	1 hour and 4 minutes	27 <sup>th</sup> of June 2024	Retail Technology
Interview (11)	Marketing team member	1 hour and 13 minutes	27 <sup>th</sup> of June 2024	Digital Services
Interview (12)	Web developer	1 hour and 9 minutes	1 <sup>st</sup> of July 2024	Freelance Platforms

<b>Interview (13)</b>	Content Creator	48 minutes	17 <sup>th</sup> of July 2024	Creative / Design
<b>Interview (14)</b>	CEO and co-founder	57 minutes	29 <sup>th</sup> of July 2024	Data Analytics
<b>Interview (15)</b>	Marketing team member	1 hour and 3 minutes	15 <sup>th</sup> of Aug. 2024	SaaS
<b>Interview (16)</b>	R&D team member	1 hour and 5 minutes	15 <sup>th</sup> of Aug. 2024	AI Research
<b>Interview (17)</b>	Marketing Specialist	1 hour and 17 minutes	28 <sup>th</sup> of Aug. 2024	AgriTech
<b>Interview (18)</b>	Marketing team member	52 minutes	5 <sup>th</sup> of Sep. 2024	Health Services
<b>Interview (19)</b>	Marketing team member	1 hour and 7 minutes	22 <sup>th</sup> of Sep. 2024	EdTech
<b>Interview (20)</b>	AI developer	1 hour and 48 minutes	7 <sup>th</sup> of Oct. 2024	AI Tools / SaaS

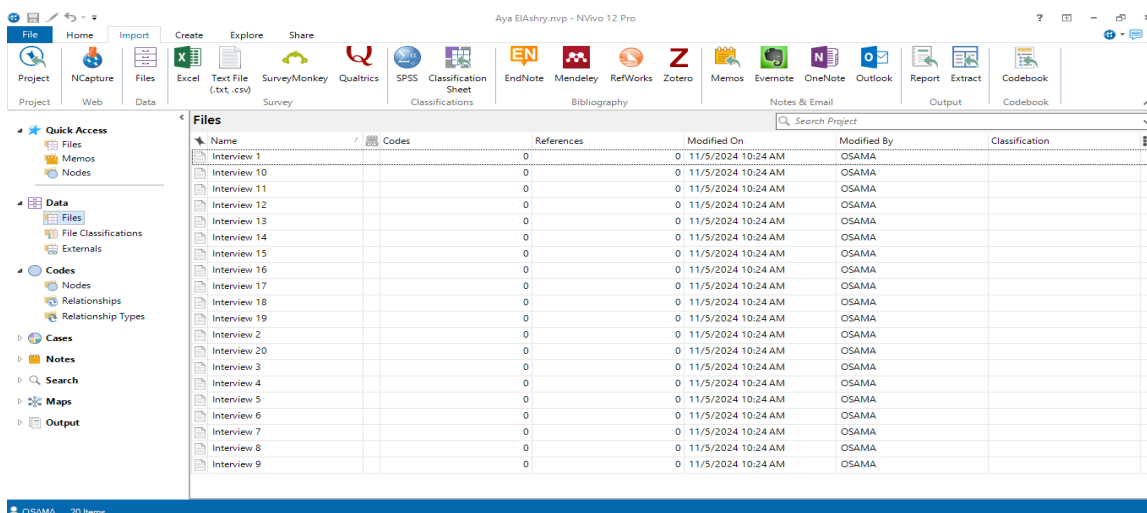
Interviews are considered a crucial technique in qualitative research, as they are especially useful for examining intricate and subtle topics. Because interviews enable marketing professionals to share their personal experiences and insights about AI-enabled digital marketing tactics, they were selected as the primary data-gathering strategy in this study. Participants can express their opinions in depth thanks to the interview's flexibility, which also helps identify the variables driving their use of AI and the larger environment in which these digital marketing methods are used (Padros and Johnson, 2020). The interview questions that were asked of the interviewees and that align with the research goal are listed in Table 2 (Appendix A).

### Thematic and Content Analysis Process

Thematic analysis is a qualitative research method that uses the exploration of patterns or themes within data sets. This method provides flexibility that allows researchers to customize and decode research objectives (Braun and Clarke, 2023). Thematic analysis is used to explore the opportunities and challenges of using artificial intelligence-supported digital marketing tactics based on Egyptian technology through 20 interviews with marketing professionals. Thematic analysis helps in using accurate insights into the challenges and opportunities facing companies. The thematic analysis process follows six steps: identifying data, creating initial codes, searching for themes, reviewing themes, defining and naming themes, and writing the final report (Varma et al., 2022). However, content analysis is a research method that uses text analysis to identify key themes. It can be useful when there is a large amount of textual data. The text is divided into meaningful units and classified to discover patterns and study cases (Braun and Clarke, 2023). Artificial intelligence in startup companies. Content analysis is suitable for this type of research as it enables the researcher to identify key themes and draw conclusions from the data. This is done using the NVivo program.

### Analysis of the Interview Results

In this figure, we present the results of the data analysis collected from 20 in-depth interviews with photography professionals responsible for digital photography in startups. The main objective is to discover the main themes and patterns that characterize the practices, challenges, and strategies in digital settlement, which refers to the process of completing financial transactions electronically, particularly payments between businesses, customers, or partners, within the context of startups. Thematic analysis and content analysis were used as the main tools for analyzing qualitative data and managing, organizing, and analyzing the data. The NVivo program was used, which supports thematic and content analysis through tools that help in coding and classifying data efficiently. The analysis process began by identifying the data, then converting the interviews into Word documents and basing them on NVivo, which allowed for a comprehensive review of the data and a clear understanding of it.



**Figure 1 : Files importing Process into NVivo 12**

The second step involved **generating initial codes**. Here, relevant segments of the interview data were systematically coded, capturing key ideas and identifying any patterns or connections between different data extracts. This process laid the foundation for developing broader themes, as shown in Figure 2.

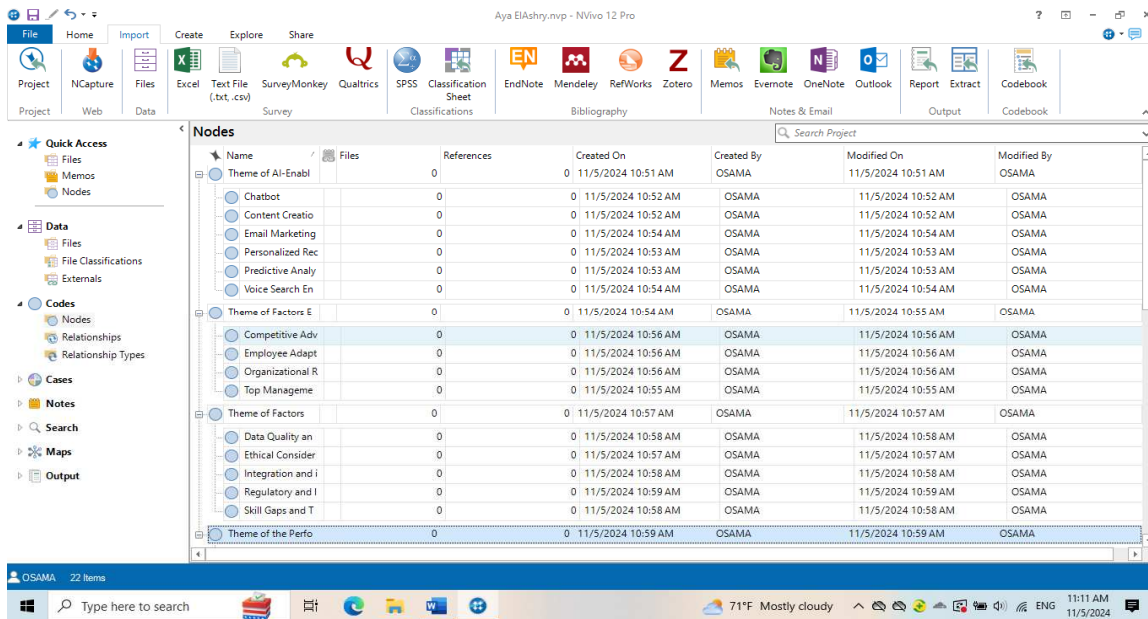


Figure 2 : Generating Themes and Codes Process

In the third step, potential topics were identified using NVivo visualization tools such as Word Cloud and topic maps. The word cloud displayed the top 150 terms that appeared at least three times in the data, with the largest words being characterized by their high frequency. These visualizations helped uncover prominent topics and understand participants’ interests. All extracted topics will be reviewed in the following sections based on word frequency analysis as shown in the table.

Table 2 : Interviews Word Frequency Table

Word	Length	Count	Weighted Percentage (%)
Marketing	9	84	2.21
Tools	5	43	1.13
Data	4	42	1.10
Customer	8	39	1.03
Use	3	33	0.87
Company	7	31	0.82
Also	4	27	0.71
Digital	7	26	0.68
Content	7	25	0.66
Helps	5	22	0.58
Related	7	22	0.58
Customers	9	21	0.55
Using	5	20	0.53
Technologies	12	19	0.50
Analysis	8	18	0.47
Help	4	18	0.47
Services	8	18	0.47
User	4	18	0.47
Way	3	18	0.47
Email	5	17	0.45
Engagement	10	17	0.45

Tool	4	16	0.42
Platform	8	15	0.39
Recommendations	15	15	0.39
Team	4	15	0.39
Voice	5	15	0.39
Well	4	15	0.39
Better	6	14	0.37
Market	6	14	0.37
Need	4	14	0.37
Personalized	12	14	0.37
Used	4	14	0.37
Example	7	13	0.34
Performance	11	13	0.34
Predictive	10	13	0.34
Search	6	13	0.34
Employees	9	12	0.32
Enhance	7	12	0.32
Get	3	12	0.32
Main	4	12	0.32
One	3	12	0.32
Support	7	12	0.32
Usage	5	12	0.32
Artificial	10	11	0.29
Challenge	9	11	0.29
Companies	9	11	0.29
Competitive	11	11	0.29
Creation	8	11	0.29
Development	11	11	0.29
Effectively	11	11	0.29
Intelligence	12	11	0.29
Many	4	11	0.29
New	3	11	0.29
Point	5	11	0.29
Providing	9	11	0.29
Quality	7	11	0.29
Satisfaction	12	11	0.29
Startups	8	11	0.29
Time	4	11	0.29
Website	7	11	0.29
Work	4	11	0.29

Application	11	10	0.26
Campaigns	9	10	0.26
Clients	7	10	0.26
Enabled	7	10	0.26
Make	4	10	0.26
Management	10	10	0.26
Provide	7	10	0.26
Readiness	9	10	0.26
Service	7	10	0.26
Users	5	10	0.26
Another	7	9	0.24
Applications	12	9	0.24
Applying	8	9	0.24
Chatbots	8	9	0.24
Concerns	8	9	0.24
Experience	10	9	0.24
Healthcare	10	9	0.24
Problem	7	9	0.24
Products	8	9	0.24
Provided	8	9	0.24
Startup	7	9	0.24
Technology	10	9	0.24
Top	3	9	0.24
Aim	3	8	0.21
Based	5	8	0.21
Challenges	10	8	0.21
Chat	4	8	0.21
Chatbot	7	8	0.21
Feature	7	8	0.21
Features	8	8	0.21
Image	5	8	0.21
Increase	8	8	0.21
Industry	8	8	0.21
Medical	7	8	0.21
Might	5	8	0.21
People	6	8	0.21
Solutions	9	8	0.21
Systems	7	8	0.21
Understand	10	8	0.21
Additionally,	12	7	0.18

Analyze	7	7	0.18
Audience	8	7	0.18
Business	8	7	0.18
Driven	6	7	0.18
Engines	7	7	0.18
Field	5	7	0.18
First	5	7	0.18
Improve	7	7	0.18
Information	11	7	0.18
Now	3	7	0.18
Platforms	9	7	0.18
Regulations	11	7	0.18
Results	7	7	0.18
Still	5	7	0.18
Strategies	10	7	0.18
Accurate	8	6	0.16
Advanced	8	6	0.16
Automated	9	6	0.16
Behavior	8	6	0.16
Believe	7	6	0.16
Critical	8	6	0.16
Day	3	6	0.16
Deal	4	6	0.16
Depend	6	6	0.16
Effective	9	6	0.16
Egypt	5	6	0.16
Ensuring	8	6	0.16
Especially	10	6	0.16
Face	4	6	0.16
Human	5	6	0.16
Importance	10	6	0.16
Improvement	11	6	0.16
Including	9	6	0.16
Inside	6	6	0.16
Integration	11	6	0.16
Issue	5	6	0.16
May	3	6	0.16
Needs	5	6	0.16
Personalize	11	6	0.16
Privacy	7	6	0.16

Processes	9	6	0.16
Reach	5	6	0.16
Real	4	6	0.16
Recognition	11	6	0.16
Target	6	6	0.16
Targeted	8	6	0.16
Training	8	6	0.16
Able	4	5	0.13
According	9	5	0.13

Figure 3, derived from the word frequency analysis, visually represents this stage of the thematic analysis process. The word cloud highlights the most frequently mentioned terms, showcasing the key topics discussed by the interviewees.



Figure 3 :Word Cloud

In the next step of the analysis, the topic study process involved collecting similar blogs to form coherent topics while distinguishing between distinct concepts. This led to the identification of two main topics that provide a comprehensive understanding of marketing practices in startups: factors that enable artificial intelligence in digital marketing and factors that hinder it.

Table 3 : Defining and Naming Themes Process

Major Themes	Sub-themes	Reference	Total
Factors Enforcing AI in Digital Marketing	1. Top Management Support	14	48
	2. Employee Adaptability	10	
	3. Organizational Readiness	10	
	4. Competitive Advantage	14	
Factors Hindering AI in Digital Marketing	1. Ethical Considerations and Privacy Concerns	9	49
	2. Data Quality and Bias	15	
	3. Skill Gaps and Talent Acquisition	9	
	4. Integration and Infrastructure Challenges	7	
	5. Regulatory and Legal Considerations	9	

Finally, **writing the report** entails compiling the final analysis, where the identified codes and themes are thoroughly explained and supported with direct quotes from the interviews. This stage integrates the findings into a coherent narrative, offering a detailed interpretation of each theme and its significance. The following subsections provide an in-depth discussion of each theme, illustrating key insights with examples and quotes from the participants.

### Theme of Factors Enforcing AI in Digital Marketing

The first theme identified in the interviews concerns the factors driving AI adoption in digital marketing within technology startups. Key enablers include senior management support, employee adaptability, organizational readiness, and the pursuit of competitive advantage. These factors are essential to successfully integrate AI into digital marketing practices and highlight the organizational conditions required for startups to innovate and enhance their marketing strategies.



**Figure 4 : Mind Map of the Theme of Factors Enforcing AI In Digital Marketing**

#### *Top Management Support*

Top management support emerged as a critical factor in the successful adoption of AI in digital marketing within tech-based startups. Interviews highlighted that when the foundation prioritizes AI, it provides clear direction and ensures the allocation of resources, budgets, and strategic focus for AI technologies. In this regard, participant 5 indicated that *"The decision to adopt AI was influenced by several factors, including top management's vision to lead in digital healthcare"*, similarly, participant 10 mentioned that *"There is no way that make our application succeed unless the AI, therefore the top management always support us to depend basically on AI-enabled digital marketing tools."* In contrast, participant 12 added that *"Top management considered the AI as a main tool that helps in data analysis, which helps our startup in different concerns internally and externally."* This highlights the important role of top management support in fostering a culture open to AI, which helps achieve competitive advantage, in addition to enhancing internal operations and external market positioning.

This support promotes smoother integration and supports innovation in digital marketing. Interviews confirmed that top management's vision and commitment to AI are pivotal to adopting AI tools, enhancing operational efficiency, and gaining a competitive advantage. Emerging leadership support enables effective AI implementation. By conducting a comparison between the word frequency of the code "Code of Top Management Support" in Table 5 with the word frequency in Table 3, it is noticed that the term "support" is among the top 20 words in Table 3, indicating high usage across themes, notably in discussions responding to leadership or implementation of AI strategy. Its 12 instances (0.32%) indicate that this theme is not absolute but rather an inherent component of broader discussions across interviews.

**Table 4 : Word Frequency Table for Code of Top Management Support**

Word	Length	Count	Weighted Percentage (%)
Leadership	10	1	0.03
Management	10	10	0.26
Top	3	9	0.24
Managing	8	2	0.05
Support	7	12	0.32
Subtotal	————	34	————

#### *Employee Adaptability*

Employee adaptability was identified as a critical factor in the successful adoption of AI in digital marketing, underscoring the need for marketing professionals to be open to learning and adapting to new technologies and AI tools. Startups with a workforce ready to embrace change and upskill are better positioned to leverage AI, leading to improved performance and innovation. In this context, participant 7 showed that *"We advance by hiring highly skilled employees who excel in both customer service and handling modern technologies, including the AI that we rely on in our work. We are the ones who need to adapt to the market's"*

needs.”, however, participant 16 mentioned that “As our organization's main idea is based on AI usage, the culture of adopting AI exists inside each of us, and each employee is trying to employ the idea of AI according to her specialty.”

Some participants noted that ongoing training and in-house workshops played a crucial role in reducing resistance to AI. Cultural acceptance of transformation enabled marketing teams to amplify innovation and adopt AI technologies, such as chatbots, predictive analysis, and content personalization, more effectively. Therefore, interview evidence highlighted the importance of hiring employees, providing training, and fostering a culture of adaptability, which has led to the success of organizations that prioritize employee AI readiness in implementing AI-driven marketing strategies.

By examining the word frequency of “Employee Adaptability,” it was noted that the word “Employees” was used 12 times (0.32%) in Table 3, indicating its frequent use across many interviews. This is evidence that human adaptability, rather than technical architecture, is the essence of successful AI implementation. The frequent use of terms such as “employee” and “adaptability” indicates an explicit acknowledgment of the human aspect of AI adoption strategy.

**Table 5 : Word Frequency Table for Code of Employee Adaptability**

Word	Length	Count	Weighted Percentage (%)
Employees	9	12	0.32
Employee	8	5	0.13
Adaptability	12	5	0.13
Subtotal	———	22	———

### **Organizational Readiness**

Organizational readiness is a critical factor in the successful adoption of AI in digital marketing. Marketing professionals highlighted that startups that are well-prepared in terms of infrastructure, training and operations are more likely to integrate AI effectively. Participant 3 mentioned that “AI offered a way to personalize experiences, target the right audience efficiently, and ultimately, fuel our ambitious growth plans. With a projected market size of 2.5 billion Dollars by 2026, we need cutting-edge tools to stay ahead of the curve.”, On the other hand, participant 12 indicated that “The organizational readiness has a significant influence in our AI usage in digital marketing, their effort has increased especially at the last few months, after AI has become an essential part inside each department of our startup.” Therefore, organizational readiness emerged from interviews through investment in training, cross-functional design, and practices of change management. Startups that had crafted an active approach towards AI, empowering staff with information, overhauling digital infrastructures, and establishing collaborative cultures, proved more flexible in applying AI for marketing success.

Evidence from interviews confirmed that having the right systems in place and the ability to manage change are essential for long-term AI adoption. Companies that invest in training and educating employees about the potential of AI are better positioned to ensure organizational readiness for a successful transition to AI-driven strategies. By conducting a comparison between the word frequency of the code “Organizational Readiness” in Table 7 with the word frequency in Table 3, it is noticed that “Company” is one of the most common words (31 times), indicating organizational dynamics is a thematic concern that keeps on resurfacing in answers. While “Readiness” and “Organizational” are less in sheer numbers, but show targeted significance in this theme, suggesting a clear recognition of the structural foundations to make AI work.

**Table 6 : Word Frequency Table for Code of Organizational Readiness**

Word	Length	Count	Weighted Percentage (%)
Company	7	31	0.82
Companies	9	11	0.29
Organizational	14	4	0.11
Readiness	9	10	0.26
Subtotal	———	51	———

### **Competitive Advantage**

Competitive advantage was identified as a key driver for adopting AI in digital marketing. The marketing specialist noted that technology-based startups are using AI to differentiate themselves from competitors by offering more personalized and efficient marketing strategies. The desire to stay ahead in a competitive market and meet customer demands is driving the integration of AI into their marketing practices. In this regard, participant 2 indicated that “In order to remain competitive in the market, companies must prioritize investing in training programs that equip employees with the necessary skills to leverage AI technology effectively.” However, participant 8 revealed that “This pushes our company to focus on AI and employ any feature that could support our goals. And by the time the usage of AI is becoming more competitive and this support us positively to work more and more on it.”

Evidence from the interviews highlighted how AI helps companies enhance their marketing initiatives, improve user experiences, and reduce costs. The competitive advantage provided by AI tools was a key factor in pushing startups to adopt these

technologies. During interviews, competitive advantage was achieved through tailored marketing strategies (e.g., tailored e-mail, chatbots), real-time data analysis to track customer activity, and marketing cycle time-reducing automation solutions that maximized ROI. Accordingly, startups regarded AI not only as a back office function but also as a strategic enabler for sustained long-term survival and prosperity in competitive markets. By examining the word frequency of "Competitive Advantage," it was noted that "Competitive" appears 11 times in Table 3, and this makes it a dominant theme through responses. While "advantage" and "competition" are less frequent, they do not appear contextually clustered beneath this theme without helping to support the strategic significance participants had given to AI in achieving differentiation.

**Table 7 : Word Frequency Table for Code of Competitive Advantage**

Word	Length	Count	Weighted Percentage (%)
Competitive	11	11	0.29
Competition	11	3	0.08
Advantage	9	3	0.08
Subtotal	-----	17	-----

### Theme of Factors Hindering AI in Digital Marketing

The third topic in the analysis focuses on the challenges that hinder the adoption of AI in digital marketing within startups with technology including major barriers, ethical considerations, privacy concerns, data quality and biases, talent acquisition, integration, and infrastructure difficulties. These challenges illustrate the complexity of integrating AI tools into existing marketing frameworks and emphasize the need for careful planning and strategy to overcome sanctions. Addressing these issues is of paramount importance for startups to effectively leverage AI to realize its full potential in digital marketing.



**Figure 5 : Mind Map of the Theme of Factors Hindering AI In Digital Marketing**

### *Ethical Considerations and Privacy Concerns*

Ethical considerations and privacy concerns were identified as major barriers to adopting AI in digital marketing. Marketing professionals expressed concerns about questions of using customer data, especially considering privacy issues and data protection laws. Balancing AI practices with ethical responsibility is a key issue. For example, participant 10 revealed that *"The main challenge is related to the privacy concerns, some of the AI applications do not offer real privacy to the data stored, which put the data related to the company in a risk. Accordingly, companies should only deal with trusted applications."* Additionally, participant 12 demonstrated that *"Challenges related to privacy concerns, ethical considerations, and security are the most challenging points."* Evidence from the interviews highlighted concerns about data security, the need for strict privacy regulations, and compliance with consumer laws, especially when dealing with sensitive data. Ensuring data protection while using AI remains a key challenge for many startups.

Accordingly, interviewees cited the following specific concerns, such as ambiguity over AI platform ownership of data, lack of transparency in how personal data is processed by AI systems, weak privacy controls in some AI tools, increasing risks of leaks or exploitation, and the challenge of maintaining consumer trust despite growing awareness of digital privacy rights. In response, some startups are going back to tried AI platforms that possess built-in privacy controls and adopting ethical standards for digital campaign marketing in compliance with local as well as global data protection policies. By investigating the word frequency of "Ethical Considerations and Privacy Concerns," it was noted that the words "Privacy" (6 times) and "Concerns" (9 times) appear significantly in the entire data set, validating their thematic relevance. Other words commonly linked in Table 3 are "Regulations" (7 instances), "Security" (6), and "Ethical" (4), establishing that data ethics and privacy are a recurrent participant concern.

**Table 8 : Word Frequency Table for Code of Ethical Considerations and Privacy Concerns**

Word	Length	Count	Weighted Percentage (%)
Ethical	7	4	0.11
Privacy	7	6	0.16
Considerations	14	5	0.13
Security	8	2	0.05
Concerns	8	9	0.24
Subtotal	————	26	————

**Data Quality and Bias**

Data quality was identified as a major challenge in implementing AI in digital marketing. Marketing professionals emphasized that AI tools rely on high-quality, clean, and diverse data, and that bad or biased data can lead to inaccurate predictions and unfair outcomes. Many interviewees highlighted the difficulty of ensuring data quality, with issues such as incomplete or inaccurate data affecting AI performance. According to participant 1, *“If we rely on AI at this stage, it will only give random data results, not based on a large enough data sample for the study.”* This idea was demonstrated by participant 4, who indicated that *“One of the most difficult difficulties we’ve faced is verifying the quality of the data being utilized to train our AI systems. Without precise and trustworthy data, the success of our marketing activities may be risked.”* While participant 6 noted that *“Our AI tools are only as good as the data they’re fed, and we’ve encountered issues with incomplete or inaccurate data, which affects the performance of our AI-driven services.”* Participants noted the need for continuous improvements in the process of collecting, managing, and analyzing data to ensure that AI tools work effectively to overcome these data-related challenges to ensure reliable and unbiased AI.

To combat these difficulties, interviewees suggested investing in automated data cleansing and validation software, developing procedures for monitoring data quality in real time, and equipping staff with data literacy to provide fewer opportunities for making mistakes. By investigating the word frequency of “Data Quality and Bias,” it was noted that the words Data (42 times), “Analysis” (18), and “Quality” (11) are some of the highest frequent words in Table 3, confirming again the high relevance of data quality issues among respondent comments. Additionally, words like “Accurate”, “Inaccurate”, and “Issues” also confirm once again that problems of data are not occasional but ubiquitous and pervasive.

**Table 9 : Word Frequency Table for Code of Data Quality and Bias**

Word	Length	Count	Weighted Percentage (%)
Data	4	42	1.10
Quality	7	11	0.29
Accurate	8	6	0.16
Analysis	8	18	0.47
Issues	6	5	0.13
Inaccurate	10	3	0.08
Subtotal	————	85	————

**Skill Gaps and Talent Acquisition**

Skills gaps and talent acquisition have been highlighted as key challenges in adopting AI for digital marketing. Marketing professionals have stressed that AI technologies require specialized skills in different areas such as AI, data analytics, and machine learning. Many startups struggle to find qualified professionals. This talent shortage can delay the adoption of AI and require re-implement effective marketing strategies from interviews to ongoing training and development programs to bridge these gaps. Many startups are addressing these challenges by upskilling their existing workforce and working to hire experts who can integrate AI tools into their marketing practices. For example, participant 3 referred to *“Additionally, there’s a skill gap when it comes to AI expertise. Finding and retaining professionals who can work with these tools is crucial.”* While participant 9 indicated that *“Another barrier is the presence of skill gaps within the team, as not all employees may have the necessary expertise to fully utilize AI tools for marketing purposes.”* Moreover, participant 15 demonstrated that *“The gap in skills, AI tools are still new to the market and there is no enough information about the effective way of using AI technology.”*

These trends reveal a two-edged problem, the first is that no established reservoir of AI-capable professionals in the talent pool, however, the second is a knowledge curve that accompanies new AI devices and methods. To counterbalance this, startups are pushing back in two general dimensions, upskilling current employees through in-house training and certifications, and recruiting specialist expertise externally, where financially viable, to bridge capability gaps. This code highlights the importance of human capital build-up as a strategic response to technologically caused change, especially in sectors requiring ongoing realignment and unique skills. By analyzing the word frequency of “Skill Gaps and Talent Acquisition,” it was noted that the use of vocabulary like “Skills,” “Gaps,” and “Experts” echoes the thematic categories articulated by many respondents. The relatively lower

frequency of these words in comparison with others ("Data" or "Support") does not exclude the significance because this topic is interested in strategic facilitators to AI rather than operational outcomes.

**Table 10 : Word Frequency Table for Code of Skill Gaps and Talent Acquisition**

Word	Length	Count	Weighted Percentage (%)
Skill	5	3	0.08
Skills	6	3	0.08
Gap	3	2	0.05
Gaps	4	3	0.08
Experts	7	1	0.03
Subtotal	————	12	————

### **Integration and Infrastructure Challenges**

Integration and infrastructure challenges have emerged as significant barriers to adopting AI in digital marketing, especially for startups with limited resources. Marketing professionals have identified the complexities of aligning AI technologies with digital marketing systems, along with the technical expertise required for these tasks, as major obstacles. Some startups have faced difficulties automating processes across multiple platforms and integrating AI into their systems. The high costs of AI tools and the need for a trained team have added to the challenges. In this regard, participant 2 indicated that *“Initially, some companies were hesitant to allocate a budget for digital marketing, fearing it might not yield a positive impact on company performance and customer engagement. However, we have now overcome this issue through advanced applications.”* Additionally, participant 4 noted that *“We encountered several integration and infrastructure issues while deploying AI technologies for our digital marketing operations. We needed a trained team to deal with the new technologies, and the fees for using some of the AI tools were high.”* While participant 8 indicated that *“Other barriers that still face many companies now, especially the startups, are barriers related to the integration and the infrastructure readiness.”*

These anecdotes reveal a shared theme: AI adoption is not merely about knowledge or willingness, but readiness. Startups operate in a universe where legacy systems are complex to tweak, platform integration is spotty, AI solutions and their implementation costs are unfamiliar, and a trained workforce to operate AI infrastructure does not exist. Despite these issues, there is an attitude of optimism. Incremental progress, continued learning, and emerging low-cost solutions will prevail over infrastructure obstacles in the near term, according to some participants. By analyzing the word frequency of “Integration and Infrastructure Challenges,” it was noted that high rates of “Engagement,” “Challenge,” and “Integration” show a consistent emphasis on technical and strategic alignment. Moreover, “Infra-structure” was less common but rich in context, suggesting its critical position in enabling or hindering adoption. Despite these obstacles, many startups remain optimistic about the potential to solve structural problems over time.

**Table 11 : Word Frequency Table for Code of Integration and Infrastructure Challenges**

Word	Length	Count	Weighted Percentage (%)
Integration	11	6	0.16
Infrastructure	14	3	0.08
Issues	6	5	0.13
Engagement	10	17	0.45
Challenge	9	11	0.29
Challenges	10	8	0.21
Subtotal	————	50	————

### **Regulatory and Legal Considerations**

Regulatory and legal considerations have been significant barriers to the adoption of AI in digital marketing. Startups have faced challenges navigating complex legal landscapes regarding data use, advertising practices, and AI ethics. Ensuring compliance with regulations such as the General Data Protection Regulation can be challenging, especially for companies with limited resources to stay abreast of ever-changing laws and the ability to afford AI tools. The lack of legal models for AI use and subscriptions has complicated the adoption process. In this context, participant 2 noted that *“Companies face a challenge with using AI tools because accessing these tools often requires paid subscriptions, and not all companies can afford to purchase them, especially when starting up and establishing their business.”* While participant 6 demonstrated that *“AI marketing tools do have a great role in enhancing the digital marketing efforts, although we still have a challenge related to regulations and laws that organize the process of AI usage and adoption.”* On the other hand, participant 8 mentioned that *“Finally, I see that there is lack in regulations and legal concerns that organize the AI usage.”*

The interviews suggest that the lack of established legal structures and clear regulatory guidelines for AI deployment in marketing creates uncertainty and fear among startups. All participants except one were concerned about how to use customer data

effectively without infringing on privacy laws or ethics, especially when tools are developed or hosted in jurisdictions with different regulations. Despite these concerns, most respondents agree that AI is crucial to the future of digital marketing and that overcoming regulatory uncertainty will be essential to enabling greater uptake. By analyzing the word frequency of "Regulatory and Legal Considerations," it was noted that the "Concerns" theme co-occurs with themes such as Ethical Considerations, which capture related concerns. On the other hand, "Regulations" and "Legal" concepts capture a shared impression of external limits impinging on internal choice regarding AI take-up.

**Table 12 : Word Frequency Table for Code of Regulatory and Legal Considerations**

Word	Length	Count	Weighted Percentage (%)
Legal	5	5	0.13
Considerations	14	5	0.13
Regulatory	10	1	0.03
Concerns	8	9	0.24
Regulations	11	7	0.18
Subtotal	————	27	————

### 5. Research Discussion and Conclusion

The current study aims to investigate the opportunities and challenges of AI-Powered Digital Marketing Strategies for Startups in Egypt. The results highlight the opportunities and challenges associated with integrating artificial intelligence into marketing practices. The first topic is Factors for Imposing AI in Digital Marketing, this section integrates several key enabling factors for adopting AI. Strong support from senior management, employee affordability, organizational readiness, and the drive for competitive advantage have been identified as critical factors that enhance the integration of AI into marketing strategy. Top management support ensures that adequate resources are allocated to adopt AI, while a workforce that is open to change and willing to acquire new skills enhances the third implementation of AI tools. Furthermore, organizations that are well-prepared in terms of infrastructure and processes are better positioned to adopt AI technology. The second topic explored the factors hindering AI in digital marketing. Many of the challenges to the effective integration of AI into marketing strategy include ethical concerns related to data privacy, data quality and bias, skills gaps, and the need for specialized talent. In addition to infrastructure constraints, these are major barriers to AI adoption. Startups often face difficulties finding qualified professionals with the expertise to implement AI systems effectively. AI requires an existing marketing infrastructure of significant investment and technical expertise.

This investigation analyzes the determinants of AI-based digital marketing adoption among Egyptian startups. There are significant organizational, ethical, technical, and legal obstacles balancing the significant opportunities for innovation, efficiency, and competitive differentiation. Startups that have a well-defined strategic intention, flexible human resources, good infrastructure, and visionary leadership are well-positioned to leverage the full potential of AI. Gaining these benefits, however, calls for deliberate efforts to overcome barriers, such as investing in people development, utilizing data for beneficial purposes, and staying in sync with emerging regulatory requirements. However, challenges such as ethical concerns, data quality, talent shortages, infrastructure constraints, and regulatory issues pose barriers to its widespread adoption. These challenges can be overcome by integrating AI into the marketing strategy. It holds great potential for startups to improve marketing efficiency and better meet customer needs. This ensures the long-term success of technology startups in Egypt. The following table summarizes the enablers and barriers of AI adoption.

**Table 13: Enablers vs. Barriers of AI Adoption**

Enablers	Barriers
Top Management Support	Ethical and Privacy Concerns
Employee Readiness	Data Quality and Bias
Organizational Infrastructure	Talent Gaps and Skill Shortages
Competitive Advantage	Infrastructure and Integration
	Regulatory Uncertainty

### RESEARCH IMPLICATIONS

The main objective of the study is to investigate the opportunities and challenges of AI-Powered Digital Marketing Strategies for Startups in Egypt. Based on the results, the researcher presents academic and practical implications:

By reporting an underrepresented Egyptian perspective in the literature, this study adds to the burgeoning body of research on AI adoption in marketing. Cross-region or cross-industry comparative studies and theoretical modeling in the future can be inferred from the inductive approach's grounded understanding of enablers and barriers.

The conclusions offer practical guidance to business founders with start-ups, marketing directors, and digital strategists seeking to adopt AI systems in their marketing activities. Understanding both drivers from within (e.g., management approval and employee adaptability) and forces from outside (e.g., complying with the law and infrastructure capability) empowers decision-makers to create more realistic, more informed AI deployment strategies. Research indicates a need for government and institutional support

for startups, including setting clear rules on how AI can be used, providing incentives for digital innovation, and ensuring access to funding for AI implementation. Policymakers should consider establishing regulatory sandboxes or innovation hubs where startups can experiment with AI in controlled settings.

### RESEARCH RECOMMENDATIONS AND LIMITATIONS

Based on the research results, several recommendations are presented that contribute to understanding the digital strategies supported by artificial intelligence in technology-based startups in Egypt, specifically targeting marketing specialists and entrepreneurs who manage digital marketing in startups in Egypt.

- Enhancing top management awareness of the strategic advantages of AI for online marketing has to be an urgent priority for startups in Egypt and the Arab world. It takes leadership buy-in to invest resources, develop vision, and create an innovative culture that can enable AI adoption.
- Startups need to fund continuous training programs that provide employees with the fundamental AI and digital competencies that make them adaptable. Employee readiness will be facilitated and resistance to AI adoption will be lessened by a culture of learning.
- During the integration of AI technology, startups need to audit and upgrade internal processes and digital infrastructure. This includes investing in adequate tooling, streamlining internal data systems, and making platforms compatible for marketing.
- Ethical guidelines and data governance procedures must be properly defined. To obtain the trust of clients, startups need to adhere to applicable data protection regulations and implement open data use policies.
- The talent gap can be filled with partnerships with business schools, AI training institutions, and industry leaders. New sources of talent can also be made available to startups in the form of mentorship and internships.

Accordingly, the following Figure puts the steps to the needed strategy as follows:



**Figure 6: The suggested step-by-step strategy**

The study was carried out with an eye on the usability of AI-driven digital marketing strategies for companies in a developing economy that may limit the generalizability of the results to other countries. Therefore, the future study needs to be expanded to include startups in other developing economies. The other limitation is that the study relied on qualitative analysis that may be susceptible to interpretive bias despite thorough examination. Therefore, future research is recommended to follow a different methodology that employs qualitative and quantitative data to establish a clearer picture. While informative, the sample size (n=20) may limit generalizability beyond similar startup contexts in Egypt. Accordingly, future research should attempt to utilize a larger sample size in order to make results more generalizable and accurate.

### Appendix A

**Table 14: Interview Questions**

Part	Question
<b>Background and Adoption</b>	<ol style="list-style-type: none"> <li>1. Can you describe your current role and how long you have been with this startup?</li> <li>2. When did your startup begin using AI-enabled digital marketing tools, and what motivated this decision?</li> <li>3. What specific factors influenced your decision to adopt AI-enabled digital marketing tools?</li> <li>4. Which AI-enabled digital marketing tools are currently utilized in your startup?</li> <li>5. In what ways are these AI tools integrated into your digital marketing activities?</li> </ol>
<b>Usage and Outcomes</b>	<ol style="list-style-type: none"> <li>1. What are the primary reasons for employing AI-enabled digital marketing tools in your startup?</li> <li>2. What are the anticipated or observed outcomes from using AI-enabled digital marketing tools?</li> </ol>
<b>Perceptions and Challenges</b>	<ol style="list-style-type: none"> <li>1. For startups that have implemented AI tools, how do you assess the</li> </ol>

	<p>benefits and effectiveness of these tools in enhancing your digital marketing efforts?</p> <p>2. What challenges or barriers have you encountered in the implementation and use of AI-enabled digital marketing tools?</p> <p>3. How do factors such as organizational readiness, employee adaptability, and HR readiness impact your use of AI in digital marketing?</p>
<b>Entrepreneurial Knowledge</b>	<p>1. How does your knowledge of AI and digital marketing influence the strategies you employ and the outcomes you expect from AI-enabled tools?</p>

### Acknowledgments

We would like to sincerely thank Professor MEITE Méké, San Pedro University President, docteur SORO Lacina, head of agriculture, fishery resources and agro-industry training and research unit, and Professor BRAHIMA Koné, supervisor.

### Conflict of Interest

The authors declare no conflict of interest.

### REFERENCES:

- Ajah, E. O., Ononiwu, C., & Nche, C. (2022). Harmonizing multi-dimensional events that characterize tech start-up emergence in emerging economies: A systematic review. *Journal of Entrepreneurship in Emerging Economies*, 14(5), pp.812-850. <https://doi.org/10.1108/JEEE-11-2021-0420>
- Ali, M. A., Kabil, M., Alayan, R., Magda, R., & Dávid, L. D. (2021). Entrepreneurship ecosystem performance in Egypt: An empirical study based on the global entrepreneurship index (GEI). *Sustainability*, 13(13), p.7171. <https://doi.org/10.3390/su13137171>
- Apriani, A., Sani, I., Kurniawati, L., Prayoga, R., & Panggabean, H. L. (2024). The role of artificial intelligence (AI) and its benefits in digital marketing strategy. *East Asian Journal of Multidisciplinary Research*, 3(1), pp.319-332. <https://doi.org/10.55927/eajmr.v3i1.8075>
- Braun, V., & Clarke, V. (2023). Toward good practice in thematic analysis: Avoiding common problems and becoming a knowing researcher. *International Journal of Transgender Health*, 24(1), pp.1-6. <https://doi.org/10.1080/26895269.2022.2129597>
- Cui, H., Nie, Y., Li, Z., & Zeng, J. (2022). Construction and development of modern brand marketing management mode based on artificial intelligence. *Journal of Sensors*, 2022, 11. <https://doi.org/10.1155/2022/9246545>
- Devanda, M. D., & Utama, D. N. (2023). Group decision support model for tech-based startup funding using multistage fuzzy logic. *Informatica*, 47(6). <https://doi.org/10.31449/inf.v47i6.4569>
- Jha, S., Singh, A. K., & Basu, S. (2024). Corporate engagement with start-ups (CEWS): A systematic review of literature and future research agenda. *European Business Review*, 36(4). <https://doi.org/10.1108/EBR-03-2023-0065>
- Jurgelevičius, A., & Kučaidze, N. (2020). The development of innovative startups and tech based companies in European countries. *Economics Ecology Socium*, 4(4), pp.1-7. <https://doi.org/10.31520/2616-7107/2020.4.4-1>
- Karani, C., & Mshenga, P. (2021). Steering the sustainability of entrepreneurial start-ups. *Journal of Global Entrepreneurship Research*, 11(1), pp.223-239. <https://doi.org/10.1007/s40497-021-00279-w>
- Lee, B., Kim, B., & Ivan, U. V. (2023). Enhancing the competitiveness of AI technology-based startups in the digital era. *Administrative Sciences*, 14(1), p.6. <https://doi.org/10.3390/admsci14010006>
- Leitão, J., Pereira, D., & Gonçalves, Â. (2022). Business incubators, accelerators, and performance of technology-based ventures: A systematic literature review. *Journal of Open Innovation: Technology, Market, and Complexity*, 8(1), p.46. <https://doi.org/10.3390/joitmc8010046>
- Mao, S., & Huang, R. (2021). Complexity construction of intelligent marketing strategy based on mobile computing and machine learning simulation environment. *Complexity*, 2021(1), p.9910834. <https://doi.org/10.1155/2021/9910834>
- Mohamed, W., Rezk, M. R. A., Soliman, A., Piccinetti, L., Santoro, D., & Sakr, M. M. (2024). The role of technological incubators in fostering entrepreneurial growth: The case of Egyptian universities and research centers. *Insights into Regional Development*, 6(3), pp.85-97. <https://doi.org/10.70132/d2467724723>
- Nalini, M., Radhakrishnan, D. P., Yogi, G., Santhiya, S., & Harivardhini, V. (2021). Impact of artificial intelligence (AI) on marketing. *Int. J. of Aquatic Science*, 12(2), pp.3159-3167.
- Ponomarenko, I. (2024). Artificial intelligence in digital marketing. *Scientia Fructuosa*, 155(3), pp.58-70. [https://doi.org/10.31617/1.2024\(155\)04](https://doi.org/10.31617/1.2024(155)04)
- Rammer, C., Fernández, G. P., & Czarnitzki, D. (2022). Artificial intelligence and industrial innovation: Evidence from German firm-level data. *Research Policy*, 51(7), p.104555. <https://doi.org/10.1016/j.respol.2022.104555>
- Saura, J. R., Ribeiro-Soriano, D., & Palacios-Marqués, D. (2021). Setting B2B digital marketing in artificial intelligence-based CRMs: A review and directions for future research. *Industrial Marketing Management*, 98, pp.161-178. <https://doi.org/10.1016/j.indmarman.2021.08.006>

- Sharma, V. K. (2024). Factors determining the growth and entrepreneurial sustainability in tech-based startups in India: A quantitative investigation. *Library Progress International*, 44(3), pp.20116-20125.
- Tania, S., Listiana, E., & Afifah, N. (2023). Social media marketing and word of mouth on product purchase intentions at Bibit FinTech startup with the mediation of brand awareness. *Journal of Economics, Management and Trade*, 29(2), pp.1-15. <https://doi.org/10.9734/jemt/2023/v29i21075>
- Thilagavathy, N., & Kumar, E. P. (2021). Artificial intelligence on digital marketing – an overview. *NVEO – Natural Volatiles & Essential Oils Journal*, 8(5), pp.9895-9908.
- Trivedi, H., & Asrani, R. (2019). An analysis of factors affecting the effectiveness for Indian business incubation centers with respect to technology startups. *Think India Journal*, 22(10), pp.2200-2207.
- Van Esch, P., & Stewart Black, J. (2021). Artificial intelligence (AI): Revolutionizing digital marketing. *Australasian Marketing Journal*, 29(3), pp.199-203. <https://doi.org/10.1177/18393349211037684>
- Varma, P., Nijjer, S., Sood, K., Grima, S., & Rupeika-Apoga, R. (2022). Thematic analysis of financial technology (FinTech) influence on the banking industry. *Risks*, 10(10), p.186. <https://doi.org/10.3390/risks10100186>
- Vindrola-Padros, C., & Johnson, G. A. (2020). Rapid techniques in qualitative research: A critical review of the literature. *Qualitative Health Research*, 30(10), pp.1596-1604. <https://doi.org/10.1177/1049732320921835>
- Ziakis, C., & Vlachopoulou, M. (2023). Artificial intelligence in digital marketing: Insights from a comprehensive review. *Information*, 14(12), p.664. <https://doi.org/10.3390/info14120664>