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Utilization Of AI Technologies In Entrepreneurial Marketing: A Systematic Review

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Abstract:

This review article aims to investigate the application of artificial intelligence (AI) technologies in the field of entrepreneurial marketing in order to improve our understanding of their existing intersections and prospects. The study performed a comprehensive analysis of scholarly articles published during the past five years, focusing on the relationship between AI technology and entrepreneurial marketing. The analysis is conducted using the input-mediator-outcome (IMO) framework which offers a thorough examination of the existing body of literature and facilitates access to valuable insights for future research endeavors. The results provide valuable insights for communication scholars, entrepreneurs, and marketers about integrating AI technology into their business practices and strategic approaches, with a particular emphasis on ethical considerations and transparency. Future research should be conducted to examine AI's influence on particular sectors and how customers engage with AI-driven marketing tools.

Keywords: Artificial Intelligence, Entrepreneurial Marketing, IMO framework, Business performance, Marketing Strategies.

Introduction

Artificial Intelligence (AI) is a cutting-edge field of computer science that focuses on developing systems capable of performing tasks that typically require human intelligence. These tasks include learning, reasoning, problem-solving, understanding natural language, and perceiving the environment. The way that companies interact with their customers is being revolutionized by the integration of artificial intelligence (AI) into entrepreneurial marketing. Entrepreneurs may optimize their marketing strategies, create personalized content, and make decisions based on data by utilizing AI. Gaining a competitive edge and responding quickly to changes in the market are made possible by this technology. Accepting AI is not simply a trend; it's a vital move for business owners who want to improve their marketing and successfully face the challenges of the digital age. Integrating Artificial Intelligence (AI) technologies in entrepreneurial marketing is a transformative force, influencing strategies, outcomes, and ethical considerations across diverse business landscapes. Entrepreneurs and businesses recognize the important role of AI, adopting it to stay competitive, automate tasks, and enhance the overall efficiency of business performance. This shift is evident not only in established companies but also in innovative start-ups, where AI impacts critical tasks like pricing, promotion, distribution, and product planning (Filieri et al., 2021). In B2B contexts, AI enhances supply chain analytics, particularly in crisis management communication scenarios (Dubey et al., 2021). AI's influence extends beyond marketing, shaping market orientation towards digitalization and impacting venture creation processes. The outcomes of AI integration are diverse, revolutionizing entrepreneurial business performance by enhancing operational efficiency, customer service, and profitability. In digital marketing, AI-driven software leads to higher conversion rates, improved decision-making, and personalized customer interactions, optimizing resource allocation for strategic and creative endeavors.

Ethical considerations are paramount, with entrepreneurs navigating challenges related to data privacy and the need to balance human insights with AI's analytical capabilities. Digital orientation emerges as a crucial mediator, positively moderating the link between IT-related resources and digital marketing capabilities, facilitating effective utilization of digital transformation and literacy to enhance entrepreneurial performance within the digital economy. In essence, this systematic review aims to provide comprehensive insights into the utilization of AI technologies in entrepreneurial marketing, emphasizing inputs, outcomes, and the mediating role of digital orientation.

Emphasizing IMO framework This structured approach allows the consideration of inputs (I), including AI technologies in entrepreneurial Marketing. Mediators (M) are explored, focusing on the mediating factors that influence the integration of AI technologies into entrepreneurial marketing processes and strategies and their impact on entrepreneurial business performance and marketing strategy outcomes. Outcomes (O) are assessed, delving into the long-term implications of AI technologies for entrepreneurial marketing, envisioning future applications of AI to empower entrepreneurs, and identifying potential research directions for the evolving field of AI in entrepreneurial marketing.

Conceptualizing Entrepreneurial Marketing (EM):

Entrepreneurial Marketing (EM) is a dynamic and evolving concept, that has been shaped by various scholarly perspectives over time, emphasizing its adaptability and relevance in changing market landscapes. Gungor Hacioglu et al. (2012) highlighted EM's critical role in uncertain market conditions, especially under resource constraints, emphasizing the importance of characteristics like proactiveness and innovativeness in achieving innovative performance.

Furthermore, S. Kraus et al. (2010) broadened the scope of EM, conceptualizing it as 'marketing with an entrepreneurial mindset', applicable to both young ventures and established firms. This perspective underscores the universality of EM across different business stages. In addition, Pouria Nouri & A. Ahmady (2018) delved into the complexities faced by nascent entrepreneurs, particularly in high-tech small businesses, pointing out the diverse marketing decisions inherent in EM, such as marketing mix and market entry strategies.

Moreover, R. Becherer et al. (2008) identified a direct link between the entrepreneur's characteristics and the marketing orientation in SMEs, suggesting that the personal traits of entrepreneurs significantly impact marketing strategies. This view is complemented by Belghis Bavarsad & et. al. (2015), who demonstrated the effectiveness of EM in creating sustainable competitive advantages and fostering innovation capabilities in SMEs.

Significantly, Morris et al. (2002) provided a widely cited definition of EM, emphasizing its role in proactive opportunity identification and exploitation for customer acquisition and retention through innovative risk management and resource leveraging. This definition highlights the strategic aspects of EM in the entrepreneurial realm. Thomas et al. (2013) further proposed viewing EM as a distinct subset of marketing, focusing on the entrepreneur's unique characteristics and perspectives in seizing emerging opportunities, often through networking, to enhance customer value and brand distinction.

Reflecting the evolving understanding of EM, Alqahtani & Uslay (2020) offered a more recent definition, characterizing EM as an agile mindset focused on pragmatic resource leveraging, networking, and risk-taking to exploit opportunities for innovative co-creation and stakeholder value delivery. This perspective emphasizes the importance of flexibility and collaboration in modern entrepreneurial ventures. Additionally, Colton et al. (2010) and Sun and Lee (2022) underscored the transformative impact of Internet technologies on EM strategies, highlighting the benefits of online approaches like E-customer relationship management and the need for understanding diverse customer needs in various markets. This points to the increasing significance of digital strategies in EM, particularly in technologically turbulent environments.

In essence, EM is a multifaceted and adaptive field, characterized by its focus on innovation, risk-taking, and proactive market orientation. It has expanded to encompass a wide range of business sizes and stages, with a growing emphasis on digital strategies in response to technological advancements and market volatility. The evolution of EM underscores its critical role in mod-

ern business practices, where agility, customer orientation, and innovative approaches are key to achieving sustainable competitive advantages. This evolution reflects a shift from traditional marketing paradigms to more entrepreneurial and flexible strategies, suited to the dynamic and often unpredictable nature of today's business environment. As such, EM continues to be an essential topic for scholars and practitioners alike, offering insights into the nexus of entrepreneurship and marketing in an increasingly interconnected and digital world.

AI & Entrepreneurial Marketing Strategies

AI applications in marketing encompass a range of tools, such as CRM systems, chatbots, personalization tools, predictive analysis, image recognition, and sentiment analysis, as highlighted by Peyravi, Nekrošienė, and Lobanova (2020). These tools play a crucial role in enhancing the customer journey for businesses. Chen, Esperança, and Wang (2022) have demonstrated that the utilization of AI contributes to improved firm performance compared to scenarios where AI is not employed. Beyond marketing, companies leverage AI tools for diverse purposes, including processing legal data to save time and resources (Perifanis & Kitsios, 2023). Some businesses use AI to analyze competitors, identify trends, and structure strategic plans, gaining a competitive edge through insights derived from online content (Perifanis & Kitsios, 2023). Additionally, AI aids in assessing employee efficiency (Chowdhury et al., 2023) and identifying trusted suppliers in the marketplace by extracting information from digital platforms (Al-Surmi, Bashiri & Koliousis, 2022). Moreover, AI facilitates tracking customer behavior and digital footprints for a better understanding of customer needs and enhancing conversion rates (Perifanis & Kitsios, 2023). In conclusion, while AI tools offer significant opportunities for business improvement, their implementation requires careful consideration of potential challenges. They are increasingly employed across organizations, providing automation, resource savings, and efficiency gains. Businesses must stay informed about these technologies to harness their full potential, recognizing that, alongside their benefits, there are noteworthy negative aspects that require attention.

Methodology

In the existing literature review to develop a conceptual integration across a fragmented field of AI technologies in entrepreneurial marketing, we used a systematic review methodology to present AI's impact on entrepreneurial marketing. There is no general overview of the current utilization of AI technologies in entrepreneurial marketing, which would focus on its strategic usage, as well as its contribution to providing solutions to entrepreneurial marketing. entrepreneurs need a better understanding of AI and how to adapt it to their marketing strategies. Current research aims to contribute to and answer these questions: 1) What is the current utilization of AI technologies in entrepreneurial marketing? 2) how does AI adoption influence specific marketing processes and strategies within entrepreneurial settings? Analysis of academic literature, articles, publications, case studies, and relevant web sources accomplished, we performed three steps based on the Prisma method: data collection, data analysis, and reporting of the results. Each step is described in detail below.

Research questions:

• How does entrepreneurship adopt AI technologies in the context of entrepreneurial marketing?

 • How do AI technologies interact with marketing tools and strategies?

• How AI technologies input variables were adopted in the marketing process and strategies

• What are the mediating factors that contribute to the successful implementation of AI in entrepreneurial marketing?

• What are the outcomes of AI adoption in entrepreneurial marketing?

Data Collection and Data Identification

In the search for relevant studies, we focused on identifying papers concerning AI technology adoption and development in entrepreneurial marketing published over the past 5 years (2019-2023). Specifically, we focused on the starting year of 2019, as it represents the year that most empirical studies focus on analyzing the utilization of AI technologies in entrepreneurial marketing and begin to investigate the effectiveness of AI adoption in entrepreneurial marketing tools and strategies over the stages of entrepreneurial marketing activities.

Database Selection

Secondly, to ensure a rigorous systematic search, the **Database Selection** was based on academic journals available on Google Scholar, Egyptian Knowledge Bank (Sage, Proquest, Emerald), and Research Gate, the most comprehensive database of peer-reviewed journals in the social sciences. As a result, we ensured that only top-tier journals were included in the review with a significant surge in publications related to Industrial Marketing Management, Business Administration, and Economics and Business, showcasing the diverse facets of AI applications in entrepreneurial marketing.
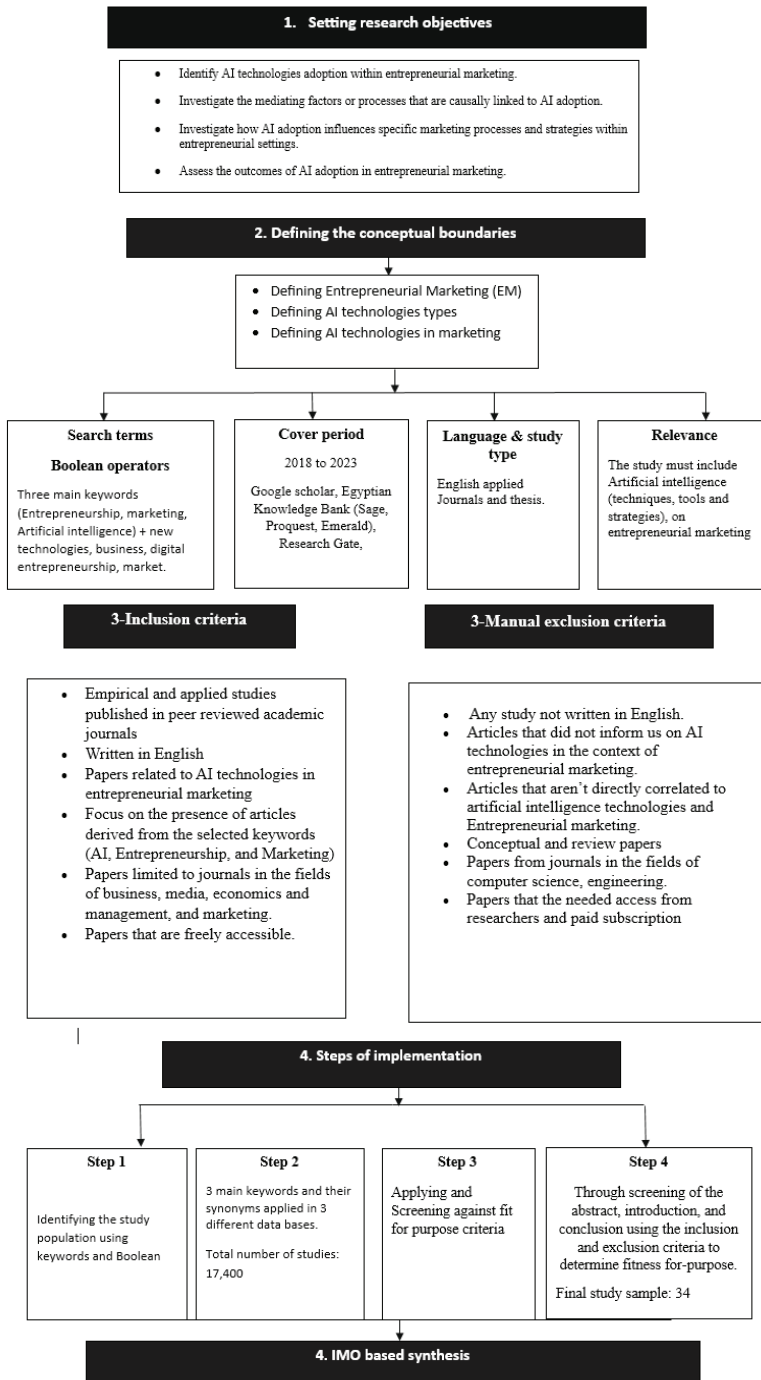
1. Setting research objectives

- Identify AI technologies adoption within entrepreneurial marketing.
- Investigate the mediating factors or processes that are causally linked to AI adoption.
- Investigate how AI adoption influences specific marketing processes and strategies within entrepreneurial settings.
- Assess the outcomes of AI adoption in entrepreneurial marketing.

2. Defining the conceptual boundaries

- Defining Entrepreneurial Marketing (EM)
- Defining AI technologies types
- Defining AI technologies in marketing

Search terms **Boolean operators**	**Cover period**	**Language & study type**	**Relevance**
Three main keywords (Entrepreneurship, marketing, Artificial intelligence) + new technologies, business, digital entrepreneurship, market.	2018 to 2023 Google scholar, Egyptian Knowledge Bank (Sage, Proquest, Emerald), Research Gate,	English applied Journals and thesis.	The study must include Artificial intelligence (techniques, tools and strategies), on entrepreneurial marketing

3-Inclusion criteria

- Empirical and applied studies published in peer reviewed academic journals
- Written in English
- Papers related to AI technologies in entrepreneurial marketing
- Focus on the presence of articles derived from the selected keywords (AI, Entrepreneurship, and Marketing)
- Papers limited to journals in the fields of business, media, economics and management, and marketing.
- Papers that are freely accessible.

3-Manual exclusion criteria

- Any study not written in English.
- Articles that did not inform us on AI technologies in the context of entrepreneurial marketing.
- Articles that aren't directly correlated to artificial intelligence technologies and Entrepreneurial marketing.
- Conceptual and review papers
- Papers from journals in the fields of computer science, engineering.
- Papers that the needed access from researchers and paid subscription

4. Steps of implementation

Step 1	**Step 2**	**Step 3**	**Step 4**
Identifying the study population using keywords and Boolean	3 main keywords and their synonyms applied in 3 different data bases. Total number of studies: 17,400	Applying and Screening against fit for purpose criteria	Through screening of the abstract, introduction, and conclusion using the inclusion and exclusion criteria to determine fitness for-purpose. Final study sample: 34

4. IMO based synthesis

Figure 1. Systematic review process

Data analysis

This section outlines the application of some conditions in detail. first, **keywords selection:** we used three main keywords (AI, Entrepreneurship, and Marketing) utilizing a Boolean search approach that entailed connecting the terms 'AI * AND Entrepreneurial Marketing'', and diverse synonyms with 'Entrepreneurial Marketing,' such as (marketing automation, business), AI Technologies for Entrepreneurs, and AI and marketing entrepreneurial, artificial intelligence "strategy". This method aimed to identify articles aligning with the initial boundary conditions for inclusion in the review.

screening and selection process

- Initial search: 17,400 papers

- Criteria for inclusion: Focus on AI technologies in entrepreneurial marketing, with AI adoption as the independent variable

- In-depth selection process: Ensures a curated sample for understanding AI in entrepreneurial marketing

- Selection criteria: Prioritize empirical and applied studies in English-language, peer-reviewed journals

- Excluded diverse empirical studies due to access restrictions (e.g., IEEE Xplore database)

- Sample size after selection: 52 papers

- Other AI-related terminologies: AI Tools for Data-Driven Marketing, Personalized Marketing, and Marketing Automation.

- Coverage of entrepreneurial marketing, small and medium enterprises marketing, and startup business activities.

- Manual screening of abstract, introduction, and conclusion for suitability.

- Exclusion criteria: Lack of insight into AI technologies in the entrepreneurial marketing context.

- Exclusion of articles focusing on integrating Emotional Intelligence with AI in marketing without direct correlation to entrepreneurial activities

- Exclusion of articles primarily concentrating on entrepreneurial orientation toward digitalization without significant correlation to AI technologies.

Selection criteria:

Inclusion criteria

- Empirical and applied studies published in peer-reviewed academic journals.

- Written in English

- Papers related to AI technologies in entrepreneurial marketing.

- Focus on the presence of articles derived from the selected keywords (AI, Entrepreneurship, and Marketing)

- Papers limited to journals in the fields of business, media, economics and management, and marketing.

- Open access full-text papers.

Exclusion criteria

- Any study not written in English.
- Articles that did not inform us about AI technologies in the context of entrepreneurial marketing.
- Articles that aren't directly correlated to artificial intelligence technologies and Entrepreneurial marketing.
- Conceptual and review papers
- Papers from journals in the fields of computer science, and engineering.

Sample Classification:

As a result of the manual exclusion criteria, 34 articles remained out of 52 papers that focused on the identification of AI technologies adoption within entrepreneurial marketing, according to the Systematic review process guided by De Mol et. al. 2015().

We found that the research on AI technologies in entrepreneurial marketing has evolved across multiple academic fields, notably entrepreneurship, management, economics, and business. Fig. 1 illustrates the trajectory of this development, tracing the initial papers back to 2019. These early works explored the utilization and emergence of artificial intelligence in marketing. The temporal analysis of articles published from 2019 to 2023 reveals a dynamic pattern due to the dynamic evolution occurring in Artificial Intelligence (AI) functionalities in the marketing field and its beginning to explore its impact on the development of disruptive innovation to enhance innovation capabilities in the digital era. The year 2019 marked the onset with 3 articles, followed by a slight increase to 4 in 2020. However, a remarkable surge occurred in 2021, with a substantial total of 13 articles, indicating a noteworthy upswing in research activity. The trend experienced a minor dip in 2022, with a frequency of 5 articles, possibly suggesting a temporary stabilization. The subsequent year, 2023, witnessed a significant resurgence with 9 articles published.
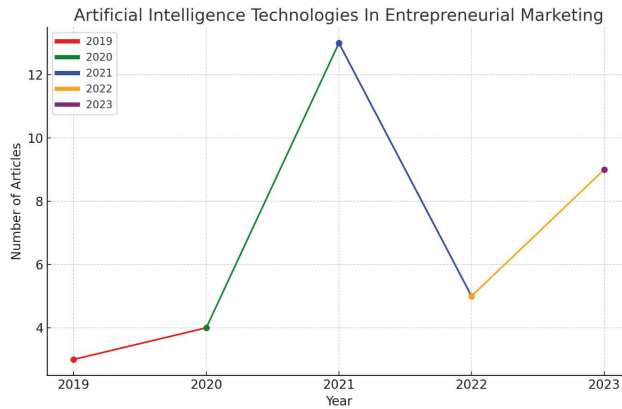
Fig. 2. Time frame of selected research on AI technologies in entrepreneurial marketing

Moreover, the provided data from 2019 to 2023 reveals a dynamic landscape that explodes in diverse areas like Industrial Marketing Management, Entrepreneurship & Innovation, and broader business and economic themes. In the year 2019, articles touched upon Economics and Applied Informatics, underscoring the interdisciplinary nature of the inquiry. The subsequent years witnessed a significant surge in publications related to Industrial Marketing Management, Business Administration, and Economics and Business, showcasing the diverse facets of AI applications in entrepreneurial marketing. Notably, the year 2021 marked a pivotal moment with an intensified focus on Management and Economy, Entrepreneurship & Innovation, and a general emphasis on Business. The field of Business and Management continued to dominate in 2022 and 2023, where an array of articles explored topics such as Economics and Management, Marketing, and broader themes in Economics and Business. The cumulative total of articles over this period underscores the central role of Business and Management in the evolving landscape of AI technologies within the realm of entrepreneurial marketing.

Abbreviation	Full Title
EAJMR	East Asian Journal of Multidisciplinary Research
ADJGIEF	Annals of "Dunarea de Jos" University of Galati Fascicle I. Economics and Applied Informatics
IJCHM	International Journal of Contemporary Hospitality Management
IMM	Industrial Marketing Management
ICMT	In COVID-19, Technology and Marketing book
ISM	International Sales and Marketing
TFSC	Technological Forecasting and Social Change
TIJAM	TADULAKO INTERNATIONAL JOURNAL OF APPLIED MANAGEMENT
IMDS	Industrial Management and Data Systems
JAFEB	Journal of Asian Finance, Economics and Business
JBME	Journal Bisnis Manajemen dan Ekonomi
IJCIS	International Journal of Computational Intelligence Systems
JEEEE	Journal of Entrepreneurship in Emerging Economies
TQM	The Tqm Journal
IJEBR	International Journal of Entrepreneurial Behavior & Research
LUP	Lund University Publications
JSM	Journal of Strategy and Management
JBR	Journal of Business Research
AP	Atlantis Press
SOP	Science Open Preprints
GJFSM	Global Journal of Flexible Systems Management
JRFN	Journal of Risk and Financial Management
JMP	Jurnal Minfo Polgan
JPNR	JOURNAL OF PHARMACEUTICAL NEGATIVE RESULTS
IJBM	International Journal of Business and Management
GJMB	Global Journal of Management and Business
JR	Journal of Retailing
HJ	Heliyon Journal

Table 1. Overview of journals from the selected studies.

Theories of the reviewed studies:

The review revealed multiple theoretical frameworks associated with entrepreneurship, marketing, and technology adoption that have been hampering the development of AI Technologies In Entrepreneurial Marketing. Ritala et al. (2021) delve into Corporate Entrepreneurship Theory to understand the role of individual entrepreneurial behavior within organizations. Furthermore, it incorporates the Resource-Based View (RBV) Theory, highlighting the significance of a firm's unique resources and capabilities for competitive advantage, especially in the context of IT-related resources, digital marketing capabilities, and business performance (Ranjan, P., 2023). Effectuation Theory guides the exploration of how entrepreneurs make decisions in uncertain environments, particularly relevant to marketing automation technology adoption (Mero et al., 2020). Moreover, the study explores the relationships between entrepreneurial orientation, digitalization strategy, and disruptive innovation by referencing Mintzberg's description of entrepreneurial organizations, Miller's dimensions of entrepreneurial orientation, and the innovation dilemma the-

ory (Unknown source). It also applies the Technology Acceptance Model (TAM) to understand technology adoption factors, including perceived usefulness and ease of use, along with the Status Quo Bias (SQB) Theory to account for perceived uncertainty in adoption (Chatterjee et al., 2021).

Finally, the researchers employ the S-O-R (Stimulus-Organism-Response) Model to establish dimensions of AI marketing technology experience as stimulus variables (Yin, et al., 2021). These diverse theoretical frameworks collectively contribute to a comprehensive analysis of entrepreneurship, marketing, and technology adoption in various organizational contexts.

Theoretical Frameworks for AI Adoption in Entrepreneurial Marketing

Framework	Focus	Key Points	Relevance to AI Adoption
Corporate Entrepreneurship Theory	Internal factors	Role of individual entrepreneurial behavior & champions within organizations.	Understanding driving forces and initiatives for AI adoption.
Resource-Based View (RBV) Theory	Internal factors	Significance of unique resources & capabilities for competitive advantage, including IT resources & digital marketing skills.	Identifying necessary resources and capabilities for successful AI implementation.
Effectuation Theory	Decision-making under uncertainty	How entrepreneurs make decisions with limited information, particularly relevant for AI adoption with inherent risks.	Understanding how entrepreneurs approach and manage the uncertainties associated with AI adoption.
Entrepreneurial Orientation Frameworks	Internal & external factors	Relationships between entrepreneurial orientation, digitalization strategy, and disruptive innovation.	Exploring how an entrepreneurial mindset and digital focus can drive AI adoption and lead to innovation.
Technology Acceptance Model (TAM)	External factors	Perceived usefulness and ease of use of technology as key drivers of adoption.	Assessing the perceived value and usability of AI technology for entrepreneurial marketing.
Status Quo Bias (SQB) Theory	External factors	Explains resistance to change due to perceived uncertainty.	Identifying and addressing factors hindering AI adoption due to fear of the unknown.
S-O-R (Stimulus-Organism-Response) Model	Experience-based factors	Dimensions of AI marketing technology experience as stimulus variables influencing further adoption.	Understanding how prior experience with AI can influence and drive further adoption within organizations.

Table 3. Overview of Theoretical frameworks used in the selected studies.

Methodologies of the selected studies

The studies employ diverse research methodologies, including (22) qualitative studies, (18) quantitative studies, and (8) mixed methods, showcasing the diversability in approaching research questions. Qualitative methods, such as semi-structured interviews and in-depth interviews, are utilized to gather rich insights from marketing professionals, industry experts, and decision-makers regarding topics like artificial intelligence (AI) tools and content marketing strategies. Quantitative approaches involve surveys and questionnaires distributed to various stakeholders, including marketing managers, SMEs, and business operators, to measure the impact of factors like marketing automation and AI on brand awareness, external branding, and decision-making processes. The selection of methodologies reflects a comprehensive and tailored approach to addressing specific research objectives across diverse domains. Some studies adopt mixed methods, combining qualitative and quantitative analyses, particularly in exploring factors influencing the adoption of AI in SMEs. Overall, the selection of methodologies reflects a comprehensive and tailored approach to addressing specific research objectives across diverse domains.

Methodologies of the reviewed studies

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22

18

● Qualitative Studies ● Quantitative Studies ○ Mixed-Methods
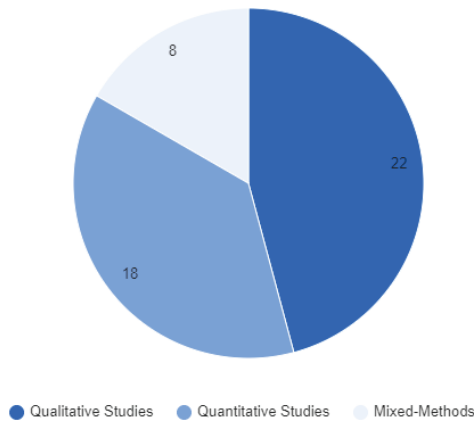
Fig. 3. Overview of the Methodologies used in the selected studies.

the Input-Mediator-Outcome (IMO) framework

The Input-Mediator-Outcome (IMO) framework, as defined in various studies, systematically evaluates the consequences stemming from inputs and the mediators that affect these relationships. While it has been predominantly applied to team processes, illustrating teams as complex, dynamic, and adaptive systems within a broader organizational context, its application is not restricted to this area alone. The framework, emphasizing the importance of the organizational milieu, allows for a meso approach, enabling its application in multiple disciplines. It has been

used to study diverse aspects like team information processing, new venture team functioning, and entrepreneurial team diversity. Despite its focused use in team dynamics, the IMO framework holds potential for broader organizational literature reviews, extending beyond the confines of team-based studies. (Paul et al., 2023)

In the context of the IMO (Input-Mediator-Outcome) framework applied to the integration of artificial intelligence (AI) technology in Entrepreneurial Marketing, the definitions of "Input", "Mediator", and "Outcome" are described as follows:

"Inputs" are the foundational elements that initiate the process of understanding how artificial intelligence (AI) impacts business, including marketing and entrepreneurship. These inputs may include the adoption of AI tools and techniques, the incorporation of AI-driven solutions into entrepreneurial ventures, and the utilization of AI technologies within marketing strategies. These multifaceted inputs influence the outcomes.

"Mediator" is an intermediary factor that operates between the initial input of AI adoption and the outcomes within marketing and entrepreneurship, clarifying the relationship and mechanisms that support how AI adoption influences various aspects of entrepreneurial marketing. A mediator helps researchers understand and explain why and how the initial inputs translate into specific outcomes.

"Outcome" represents the consequences that originate from the interaction of initial inputs and the mediating factors. These outcomes manifest as a reflection of how AI technology impacts various aspects of entrepreneurial marketing which impact business performance and digital marketing strategies.

Results about How AI technologies input variables were adopted in the entrepreneurial marketing process and strategies the mediated factors influenced the entrepreneurial marketing outcomes according to the IMO framework.
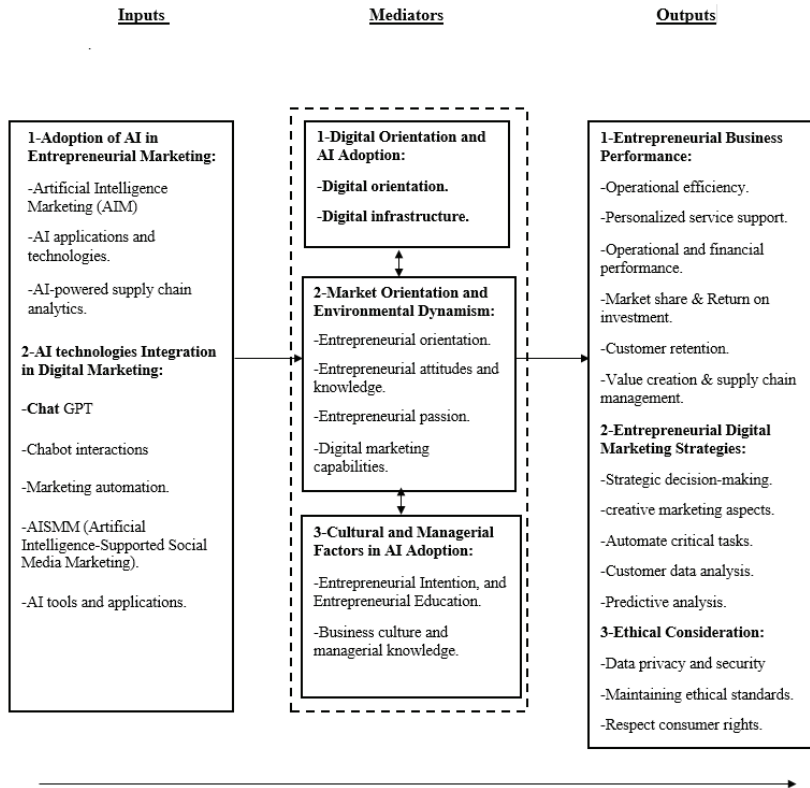

Figure 2. Overview of AI technologies input variables were adopted in the entrepreneurial marketing process and strategies the mediated factors influenced the entrepreneurial marketing outcomes.

1- Inputs

The rapid evolution of Artificial Intelligence (AI) has significantly influenced various business sectors, particularly in the realm of marketing and entrepreneurship. This paradigm shift is multifaceted, encompassing the Adoption of AI in Entrepreneurial Marketing, AI Development and Use in Entrepreneurship, and AI Technologies Integration in Digital Marketing. The intersection of AI with these domains presents a transformative landscape, marked by increased efficiency, personalized customer experiences, and innovative approaches to market challenges and opportunities. The following synthesis explores these dimensions in detail, drawing insights from a range of scholarly studies that highlight the pivotal role of AI in reshaping modern business practices.

1.1 Adoption of AI in Entrepreneurial Marketing

The incorporation of AI into marketing operations and functions, as highlighted by Shaik (2023), integrated with shaping contemporary marketing strategies. This integration encompasses critical tasks like pricing, promotion, distribution, and product planning and development. Furthermore, AI contributes to the formulation of sales and marketing strategies, particularly within the realm of digital marketing, where activities such as content creation, email marketing, digital advertising, web design, chatbots, and predictive analysis are empowered by AI technologies. Building upon this, V Devang et al. (2019) emphasize how AI applications and technologies enhance the realm of 1:1 marketing, steering it away from traditional mass marketing approaches.

This shift towards AI-driven marketing strategies is not limited to established companies but also extends to innovative start-ups, as demonstrated by Filieri et al. (2021). They explore the symbiotic relationship between tourism start-ups and AI systems within their supply chain phases. These start-ups, leveraging AI, offer solutions ranging from booking and planning services to transportation services and destination experiences, all aimed at enhancing the overall tourist journey. In the context of B2B, Dubey et al. (2021) delve into the adoption of AI-powered supply chain analytics and note that organizations investing in alliance management capability often find themselves inclined to develop AI-powered supply chain analytics as part of their data-driven decision-making strategies to manage and coordinate alliances with external partners, especially during crisis management communication.

Additionally, the contribution of marketing automation as an input in B2B relationships, especially during times of crisis such as the COVID-19 pandemic, is explored by Mattos et al. (2021) emphasize how marketing automation, driven by the collection and utilization of customer data, could enhance the efficiency of marketing processes, despite physical contact restrictions. Moreover, Nilsson and Tsakmaki (2019) investigate the tangible effects of marketing automation on buying decisions in small and medium Enterprises (SMEs) operating in a B2B context, the research highlights the close relationship between marketing automation and content marketing, as both are interconnected for brand awareness and influencing purchasing decisions.

In addition to the abovementioned studies that examined the impact of AI technologies in entrepreneurial marketing through its influence on initial preferences, other studies examined AI's significant role in shaping and advancing entrepreneurship across various facets, from market orientation to venture creation, decision-making, and the fostering of innovative small businesses. Entrepreneurs, as emphasized by Firmansyah et al. (2023), strategically leverage AI technologies to strengthen their market orientation towards digitalization. This covers a variety of strategies, encompassing a deep understanding of customer needs, identifying potential competitive advantages, and the seamless coordination of internal functions, all aimed at delivering superior value to customers.

Moreover, Giuggioli et al. (2022) explore the complex mechanisms through which AI shapes the venture creation process. These mechanisms, including compression, conservation, combination, and generation, demonstrate the various ways AI has its influence, reshaping the entrepreneurial landscape. Additionally, Lavanya et al. (2021) examine the many facets of artificial intelligence in entrepreneurship, encompassing areas like personality and compatibility testing, financial decision-making, and the complexities of processing refunds and handling returns. Furthermore, AI integration within entrepreneurship extends even to small businesses, as Ahmad (2020) delves into the investigation of whether the utilization of AI in small enterprises has a measurable impact on entrepreneurial endeavors.

Li et al. (2021) shed light on the co-created value in B2B marketing, identifying four distinct types of value associated with AI integration which are the functional value, customer experience value, strategic co-planning value, and organizational learning value. They further stress that these values rely on specific digital marketing capabilities, introducing three essential sets of capabilities such as system management capabilities, commercialization-based capabilities, and interpersonal capabilities. So AI's incorporation into marketing operations, as elucidated by Shaik (2023), marks a significant leap in the way marketing strategies are formulated and executed. This integration spans essential marketing functions and activities like pricing, promotion, distribution, product development, content creation, email marketing, digital advertising, and predictive analysis. This emphasis on the adoption of AI technologies in 1:1 marketing, highlighted by V Devang et al. (2019), marks a departure from traditional mass marketing, with AI fostering consumer convenience and driving sales growth. This trend is also evident in start-ups, where AI aids in various phases of the supply chain, especially in the tourism sector, as shown by Filieri et al. (2021).

1.2 AI Technologies Integration in Digital Marketing

A group of studies examined the implementation of AI technologies in Digital Marketing Tools and Strategies in the context of entrepreneurial marketing, the importance of staying attuned to e-commerce technology trends cannot be overstated without adopting AI technologies in identifying e-commerce market opportunities. Hong et al. (2023) emphasize how e-commerce platform trends, particularly the adoption of AI and strategic promotional events, serve as a guide for identifying profitable market opportunities. This approach requires a balance between data-driven insights, obtained from AI technologies, and preserving the entrepreneurial spirit that fuels innovation which eventually influences entrepreneurial marketing decisions.

Moreover, AI's influence extends to social media marketing, as exemplified by AISMM (Artificial Intelligence-Supported Social Media Marketing). Basri (2020) underscores the transformative role of AI tools and techniques in enhancing social media marketing strategies for businesses. These AI-driven strategies encompass tasks such as audience analysis, content creation, performance monitoring, chatbot interactions, and sentiment analysis, amplifying the reach and impact of social media campaigns. Additionally,

Abrokwah-Larbi & Awuku-Larbi (2023) investigate the extent to which small and medium Enterprises SMEs harness AI's potential across diverse marketing activities, ranging from predicting customer needs and error reduction focusing on customer interactions, decision-making, brand awareness, and personalized marketing efforts. This comprehensive utilization of AI technologies within marketing strategies is further substantiated by Guerra Forero (2022), who highlights the widespread presence of AI tools and applications. These applications include vital aspects such as data analysis, customer insights extraction, content optimization, and heightened customer engagement. So, the integration of AI in digital marketing tools and strategies is a critical area of focus. Hong et al. (2023) highlight the importance of AI in identifying e-commerce opportunities, and balancing data-driven insights with entrepreneurial innovation. The role of AI in social media marketing, as discussed by Basri (2020), illustrates its usage in tasks like audience analysis and content creation. The extent to which SMEs utilize AI in various marketing activities, as studied by Abrokwah-Larbi & Awuku-Larbi (2023), showcases the broad application of AI to enhance marketing strategies and customer engagement, a theme further elaborated by Guerra Forero (2022).

Additionally, A study by Almaududi, et al.2023 conducts an exploration of the utilization of ChatGPT as a solution for enhancing operational efficiency and customer experience within the realm of entrepreneurship in which customers' familiarity and comfort with technology mediate the impact of utilization of ChatGPT in digital marketing. Furthermore, Abdelkader, (2023) extends the analysis to the nuanced impact of different business types on customer experiences, specifically examining how ChatGPT interactions influence overall satisfaction. Within the spectrum of customer experience, Abdelkader, (2023) introduces key components, including Perceived Personalization (PP), Perceived Relevance (PR), Perceived Accuracy (PA), and Perceived Convenience, that can be integrated with AI to enhance customer engagement. So, In the entrepreneurial field, AI is implemented in steering market orientation towards digitalization. Firmansyah et al. (2023) demonstrate how entrepreneurs leverage AI to understand customer needs and gain competitive advantages. Giuggioli et al. (2022) explore AI's role in the venture creation process, revealing its diverse impacts. Lavanya et al. (2021) discuss AI's application in various entrepreneurial activities, including financial decision-making and customer service. The impact of AI in small businesses, as investigated by Ahmad (2020), and the exploration of ChatGPT's role in operational efficiency by Almaududi et al. (2023) further underscore AI's significance in entrepreneurship.

In conclusion, the adoption and integration of AI across various aspects of business, particularly in marketing and entrepreneurship, signify a major shift in how companies approach their operations and strategies. AI's role in entrepreneurial marketing, its development and use in entrepreneurship, and its integration with digital marketing tools and strategies collectively demonstrate a trend toward more data-driven, efficient, and personalized business practices. These developments not only enhance operational efficiencies and marketing effectiveness but also open new avenues for innovation and competitive advantage in the ever-evolving digital landscape. The studies discussed herein offer valuable insights into this transformation, providing a comprehensive understanding of AI's growing impact in the business world.

2- Mediators

The integration of artificial intelligence (AI) technology has brought about a transformative period in the dynamic landscape of business, especially in the areas of marketing and entrepreneurship. A multitude of factors influence the adoption of AI technology, and mediators stand out as essential elements in comprehending the complex relationships involved. Mediators serve as intermediary factors, shedding light on how AI adoption affects organizational performance and entrepreneurial marketing. In this investigation of mediators, the review examined the complex network of variables that moderate the relationship between the adoption of AI and its effects, offering insights into how variables like market orientation, digital orientation, entrepreneurial orientation, and digital infrastructure influence the adoption of AI and its outcomes.

2.1 Digital Orientation and AI Adoption

Digital orientation, as defined by Ranjan (2023), represents an organization's commitment to strategically leveraging digital technologies in its operations and marketing efforts. This proactive approach towards adopting digital advancements plays a vital role in mediating the relationship between the adoption of AI technologies and entrepreneurial marketing. This mediating factor is particularly evident in how digital orientation influences the link between IT-related resources and digital marketing capabilities (DMCs), ultimately improving business performance. Furthermore, the level of digital maturity within a company, highlighted by Muhammad (2019), also acts as a mediator, emphasizing the importance of technological readiness in AI integration. Additionally, the digital infrastructure of an organization, including hardware, software, networks, and data storage, serves as a mediating factor in supporting digital operations and decision-making processes related to AI's impact on B2B marketing, as discussed by Li et al. (2021).

2.2 Market Orientation and Environmental Dynamism

Firmansyah et al. (2023) emphasize that market orientation acts as a facilitator, enabling the utilization of digital technology to enhance entrepreneurial performance within the digital economy. This mediating role extends to linking digital transformation, digital literacy, and entrepreneurial performance. Dubey et al. (2021) introduce the concept of environmental dynamism, which represents the degree of change and uncertainty in the external environment. It mediates the relationship between Alliance Management Capability (AMC) and Artificial Intelligence-powered Supply Chain Analytics Capability (AI-SCAC). This mediation unlocks new value-creation and revenue-generation opportunities.

2.3 Entrepreneurial Orientation and AI Integration

Kraus et al. (2023) highlight the significance of entrepreneurial orientation within organizations in mediating the firm's ability to achieve disruptive innovation and digital transformation, leading to improved entrepreneurial performance. Entrepreneurial attitudes and knowledge of AI are also identified as mediators in small business entrepreneurship, according to Lavanya et al. (2021) and Ahmad (2020). Additionally, Polas et al. (2021) and Giuggioli et al. (2022) emphasize the mediating role of entrepreneurial passion in connecting entrepreneurial opportunity recognition, development, exploitation, and marketing decisions with AI technology adoption in marketing strategies.

2.4 Cultural and Managerial Factors in AI Adoption

Dabbous et al. (2023) and Almaududi et al. (2023) discuss cultural and managerial factors as mediators influencing the relationships between the Performance Expectancy of AI Solutions, Entrepreneurial Intention, and Entrepreneurial Education are key mediators in Efficient Access to Information and decision-making support. The study by Eriksson et al. (2020) also underscores the importance of business culture and managerial knowledge as mediators in AI adoption, with organizational culture and leadership playing a pivotal role in shaping AI integration strategies.

2.5 System Management and Commercialization-based Capabilities

Li et al. (2021) discuss System Management Capabilities, Commercialization-based Capabilities, and Interpersonal Capabilities as mediators influencing the impact of AI on B2B marketing and collaborative value creation. These capabilities encompass AI system integration, technology reflection, commercial activities, and interpersonal relationship-building.

In addition to those mediators, several other factors come into play. Chatterjee et al. (2021) identify Perceived Usefulness, Perceived Ease of Use, and Willingness to Change as mediators in the relationship between digital transformation and corporate digital entrepreneurship. Guha (2021) emphasizes perceived ethical implications as a mediator in the adoption of AI technologies. Abdelkader (2023) explores the mediating role of familiarity with technology and demographic characteristics in customer experience and satisfaction with ChatGPT in digital marketing. The analysis reveals that digital orientation, cultural factors, and digital infrastructure, Market orientation, environmental dynamism, system management capabilities, commercialization skills, familiarity with technology, customer perceptions, ethical considerations have a mediating role in shaping the impact of AI adoption in entrepreneurial marketing.

Concept	Definition
Environmental Dynamism (ED)	Degree of change and uncertainty in the external environment, impacting the relationship between dynamic capabilities and organizational performance.
Entrepreneurial Orientation (EO)	Level of risk-taking, proactiveness, competitiveness, and innovativeness within an organization.
Market Orientation (MO)	Strategic approach focusing on understanding customer needs, competitor awareness, and internal coordination to achieve success.
AI Integration into Digital Marketing Capabilities (DMC)	Organization's skills, knowledge, and resources for leveraging digital technologies and platforms for effective marketing. Includes utilizing various tools like social media, mobile marketing, content marketing, etc., to analyze data and implement strategies for enhanced performance and customer engagement.
Digital Infrastructure	Development of hardware, software, networks, data storage, and efficient information access to facilitate digital transformation, support operations and decision-making, enhance communication, and deliver digital services across various sectors.
Cultural and Managerial Factors in AI	Organizational culture and managerial knowledge shaping AI integration strategies, decisions, acceptance, and education initiatives regarding AI solutions. Also includes efficient access to information for supporting decision-making related to AI.

Table 3. Defining the mediating factors that influence the adoption of AI technology in entrepreneurial marketing.

The integration of artificial intelligence (AI) technology has embedded several factors that influence the adoption of AI technology. The review examined the complex network of variables that moderate the relationship between the adoption of AI and its effects, offering insights into the main concepts in which variables like market orientation, digital orientation, entrepreneurial orientation, and digital infrastructure influence the adoption of AI and its outcomes. As conceptualized in the following table:

3. Outcome

The integration of Artificial Intelligence (AI) technologies into entrepreneurial ventures is a remarkable development, signifying a pivotal shift in how businesses operate and engage with their market. This comprehensive review delves into the multi-dimensional impacts of AI in entrepreneurial contexts, focusing on three critical aspects: Entrepreneurial Business Performance, Entrepreneurial Digital Marketing Strategies, and Ethical Considerations. By exploring these dimensions, we gain insights into the transformative role of AI in enhancing business operations, revolutionizing marketing strategies, and the emerging ethical challenges that entrepreneurs must navigate.

3.1 Entrepreneurial Business Performance

Although legitimacy is a commonly studied phenomenon in the Impact of AI Technologies on Entrepreneurial Business Performance, The adoption of AI in SMEs is revolutionizing the business landscape, bringing significant operational efficiency, improved customer service, cost savings, scalability, and risk mitigation. Notably, AI-driven insights are pivotal in enabling SMEs to make informed decisions and provide personalized customer experiences (Chatterjee et al., 2021). In parallel, AI-powered chatbots and virtual assistants are transforming customer service by offering immediate and personalized support, thereby enhancing customer experience (Belova, 2023). Furthermore, the utilization of Artificial Intelligence in Marketing (AIM) is a game-changer, markedly increasing profitability, market share, revenue growth, and overall returns on investment (ROI). This advancement in Artificial Intelligence in Marketing is pivotal in enhancing customer retention, acquisition, satisfaction, and experience, fostering stronger customer relationships and loyalty (Ihksan et al. (2021). Additionally, Artificial Intelligence in Marketing significantly improves business process efficiency, employee contribution, technology utilization, and complaint handling, leading to more streamlined internal operations (Abrokwah-Larbi & Awuku-Larbi, 2023).

The review revealed some articles that examined the role of entrepreneurial orientation in enhancing disruptive innovation, where firms with high entrepreneurial spirit often view digitalization strategies as limiting for disruptive innovation, suggesting a complex interplay between firm orientation and innovation approaches (Kraus et al., 2023). Alongside, the integration of AI in alliance management capabilities – referring to an organization's ability to effectively manage and coordinate alliances with external partners – is noticeably enhancing both operational and financial performance. The development of AI-powered Supply Chain Analytics Capabilities (AI-SCAC) is further leading to digitalization benefits, shifting businesses from transactional product-centric models to relational service-oriented engagements, thus securing a competitive edge (Dubey et al., 2021). The incorporation of AI-driven software in firms is also linked to higher conversion rates, improved ROI, and a better understanding of consumer data, crucial for informed marketing strategies and elevated customer satisfaction (Shaik, 2023). Moreover, the combination of digital transformation, literacy, and market orientation is significantly boosting entrepreneurial performance, thereby facilitating the effective utilization of digital advancements for enhanced performance in the digital economy (Firmansyah et al., 2023). AI's influence on business models, particularly in fostering innovation within industrial ecosystems, is impacting critical aspects such as value creation, delivery, and capture (Burström et al., 2021). The application of various AI functionalities in manufacturing shows a dynamic approach to business-model innovation, where incumbents are developing AI solutions within global networks of partners, suppliers, and customers, transforming their industrial ecosystems to adapt to the new functionalities and impacts of AI (Burström et al., 2021). Lastly, The allocation of IT-related resources toward developing digital marketing capabilities has been a cornerstone in achieving superior business performance, particularly in a landscape characterized by technological turbulence (Ranjan, 2023).

So, The incorporation of AI technologies in entrepreneurial business performance has been a significant game-changer. AI's role in enhancing operational efficiency, customer service, and internal processes has been widely acknowledged. Studies like those by Chatterjee et al. (2021) and Belova (2023) highlight AI's transformative impact in providing personalized customer experiences and improving decision-making processes. The influence of AI on profitability, market share, and overall ROI, as demonstrated in studies by Ihksan et al. (2021) and Abrokwah-Larbi & Awuku-Larbi (2023), is notable. Furthermore, the interplay between entrepreneurial orientation and innovation, as explored by Kraus et al. (2023), along with AI's integration in supply chain management and alliance capabilities (Dubey et al., 2021), underscores the vast potential of AI in enhancing business performance.in the AI-driven business landscape.

AI Technologies	Outcomes of AI in Business Performance
Adoption in Small and Medium Enterprises (SMEs)	Increased operational efficiency, improved customer service, cost savings, scalability, enhanced risk management.
AI-driven Insights	Informed decision-making, personalized customer experiences, improved strategic planning.
AI-powered Chatbots	Enhanced customer service and support, increased customer satisfaction and loyalty.
Artificial Intelligence in Marketing (AIM)	Improved profitability, market share, revenue growth, ROI.
AI in Marketing	Streamlined internal operations, boosted employee contribution, enhanced customer service support, improved overall performance.
AI Mediated by Entrepreneurial Orientation	Disruptive business innovation approaches, competitive advantage, and growth.
AI Integration in Alliance Management Capabilities	Enhanced operational and financial performance during challenging times, increased resilience and adaptability.
AI-powered Supply Chain Analytics Capability (AI-SCAC)	Digitalization benefits, shift towards relational service-oriented engagement, improved customer engagement and brand loyalty.
AI-driven Software	Higher conversion rates, better understanding of consumer data, effective marketing campaigns, increased sales.
AI Allocation to Digital Marketing Capabilities	Enhanced business performance through improved targeting, personalized experiences, automated tasks.

Table 4. Defining the outcomes that influence the adoption of AI technology in Entrepreneurial Business Performance

3.2 Entrepreneurial Digital Marketing Strategies

The rise of AI technologies and tools has catalyzed a paradigm shift in entrepreneurial digital marketing strategies. AI-driven software in firms led to higher conversion rates and an improved understanding of consumer data. This leads to better decision-making by providing insights from data analysis, thus leading to more informed marketing strategies and improved customer satisfaction (Shaik, 2023). Moreover, Valeur, (2023) emphasized that AI applications have a spherical impact on sales and marketing strategy, such as IBM Watson and Albert are invaluable, aiding in planning, executing, and reporting on campaigns, thereby offering optimization and execution capabilities crucial in today's dynamic market environment.

AI in Entrepreneurial Digital Marketing Strategies	Outcomes
AI-driven software	Leads to higher conversion rates by leveraging advanced analytics and consumer data.
AI in Decision-Making process	Enhances decision-making in marketing through data analysis, providing valuable insights for more informed strategies.
AI in Crisis Communication and Relationship Marketing	Improves B2B supply chain marketing process, especially during challenging times like the COVID-19 pandemic.
Personalized Marketing	AI contributes to personalized marketing efforts through the extensive analysis of customer data, tailoring campaigns.
Natural Language Generation (NLG) Content Automation	AI tools like NLG autonomously generate content, reducing the manual efforts required from marketers.
Marketing Automation	Automation of critical tasks such as data analysis, lead generation, and customer segmentation through AI-driven tools.
AISMM Practices	AISMM practices contribute to increased profitability, expansion of customer base, and overall improvement in marketing.
Predictive Analysis	AI-powered predictive analysis aids in marketing strategies by offering informed predictions about customer behaviors.

Table 5. Defining the outcomes that influence the adoption of AI technology in Entrepreneurial Digital Marketing Strategies

This review revealed that AI in digital marketing strategies showed a transformative power in business crisis communication strategies, as Mattos et al., (2021) revealed that Digital technologies enhance relationships in marketing, especially during COVID-19, additionally aiding in lead generation and nurturing which offer entrepreneurs strategic decision-making as a result of the big data driven by utilizing marketing automation which automates critical tasks such as data analysis, lead generation, and customer segmentation, thus allowing firms to allocate more resources towards strategic and creative marketing aspects, significantly enhancing efficiency and ROI it also ensures consistent and timely communication with leads through automated tasks like personalized emails and follow-ups. in Business-to-business communication (Nilsson and Tsakmaki, 2019).

Although some researchers capture the attention of AI's ability to personalize marketing efforts through the analysis of extensive customer data has led to more targeted and effective campaigns and marketing strategies, playing a vital role in crafting customer value and satisfaction (Muhammad, 2019). This technological advancement in AI-driven software within firms has not only resulted in higher conversion rates but has also fostered an enhanced understanding of consumer data. Such insights are instrumental in improving decision-making processes, culminating in more informed marketing strategies and elevated customer satisfaction (Eriksson et al., 2020). Moreover, Devang, et al. (2019) revealed that AI's role extends to content creation, where tools like Natural Language Generation (NLG) autonomously generate engaging content, significantly reducing the efforts required from marketers.

Furthermore, Nilsson and Tsakmaki, (2019) emphasized the impact of marketing automation influencing positively customers buying decisions in SMEs by enhancing brand awareness and improving external branding efforts in a B2B context Through tracking and analyzing customer behavior and engagement, providing valuable insights that can inform marketing strategies and improve the effectiveness of external branding efforts, thereby enabling SMEs to convey targeted messages more effectively and influence buying decisions positively.

Lastly, Basri, (2020) highlighted the implementation of AI-Supported Social Media Marketing (AISMM) practices is linked with several benefits, including increased profitability, customer base expansion, and enhanced marketing performance, all contributing to more effective business sales and heightened customer engagement. So, AI technologies have fundamentally altered digital marketing strategies for entrepreneurs. As highlighted by Shaik (2023) and Valeur (2023), AI-driven software has led to higher conversion rates and a more profound understanding of consumer data, fostering informed decision-making and improved marketing strategies. Mattos et al. (2021) point out AI's effectiveness in crisis communication and relationship marketing, especially during challenging times like the COVID-19 pandemic. Furthermore, the role of AI in content creation and personalizing marketing efforts, as discussed by Eriksson et al. (2020) and Devang et al. (2019), reflects the depth of AI's impact on digital marketing. These advancements underscore AI's transformative power in shaping marketing strategies that are more targeted, efficient, and effective.

3.3 Ethical Consideration

Entrepreneurs adopting AI technologies face multifaceted ethical considerations. Ukrainian entrepreneurs, for instance, encounter significant challenges related to data privacy and security when implementing AI in marketing, highlighting the paramount importance of safeguarding consumer information in the digital age (Belova, 2023). Additionally, Valeur, (2023) stated the concern extends across Europe, where the use of AI tools in marketing is increasingly shaped by ethical considerations and data privacy issues, such a trend underscores the urgent need for businesses to adeptly navigate the complex ethical landscape of AI, ensuring compliance with evolving regulations and societal expectations. Moreover, the implementation of AI technologies brings challenges including technical compatibility issues, a lack of expertise in managing AI tools, and various ethical dilemmas. These emphasize the necessity for entrepreneurs to be aware when planning to use knowledge-driven AI software and to develop both the technical skills and ethical frameworks essential for the successful integration of AI in marketing strategies (Shaik, 2023).

Moreover, Abrokwah-Larbi & Awuku-Larbi, (2023) said that there's a growing acknowledgment of the need to balance human insights with AI's analytical capabilities. This balance is crucial in formulating marketing strategies that are not only data-driven but also ethically grounded and cognizant of human values. Furthermore, Guerra Forero (2022) stated that responsible AI implementation in marketing demands careful consideration of data quality, human oversight, and ethical implications, highlighting the need for transparent and accountable AI systems that prioritize consumer rights and engender trust. Collectively, our entrepreneurial organizations should inform the consumer about the sort of data that will be acquired from them and underscore the importance of a responsible, ethical approach in AI adoption, balancing technological innovation with consumer rights, data privacy, and human-centric values.

So, the adoption of AI technologies is not without its ethical challenges. As Belova (2023) and Valeur (2023) indicate, data privacy and security are paramount concerns among entrepreneurs utilizing AI in marketing. There's a growing recognition of the need to balance AI's capabilities with ethical considerations, ensuring data privacy and upholding human values in marketing strategies. The studies by Shaik (2023) and Guerra Forero (2022) emphasize the importance of ethical frameworks and human oversight in AI implementation, advocating for transparent and accountable AI systems that respect consumer rights and engender trust.

All the results from the studies agreed that the adoption of AI technologies in entrepreneurship heralds a new era of business operation and marketing strategy. AI not only enhances business performance through improved efficiency and decision-making but also revolutionizes digital marketing strategies with its data-driven insights and personalized approaches. However, this technological advancement brings with it ethical considerations that require careful navigation. Entrepreneurs must balance the potential of AI with the responsibility of maintaining ethical standards, ensuring data privacy, and respecting consumer rights. The future of entrepreneurial mar-

keting in the AI age will be shaped by how effectively businesses harness the power of AI while navigating its ethical implications, ultimately leading to a more innovative, efficient, and ethically responsible business environment.

Conclusion

The synthesis of research on AI technologies in entrepreneurial marketing has revealed several principal findings that illuminated the transformative role of AI in reshaping modern business practices including marketing and entrepreneurship. The integration of Artificial Intelligence (AI) technologies into Entrepreneurial Marketing signifies a multifaceted impact on business operations, marketing strategies, and ethical considerations. AI's adoption has revolutionized entrepreneurial business performance, fostering operational efficiency, personalized customer experiences, and streamlined internal operations (Chatterjee et al., 2021; Abrokwah-Larbi & Awuku-Larbi, 2023; Ranjan, 2023). Moreover, mediating factors such as digital orientation, market orientation, and entrepreneurial orientation play pivotal roles in mediating the relationship between AI adoption and its outcomes (Firmansyah et al., 2023; Dubey et al., 2021; Kraus et al., 2023).

The incorporation of diverse theoretical frameworks, such as Corporate Entrepreneurship Theory, Resource-Based View Theory, Effectuation Theory, and Technology Acceptance Model, has provided a comprehensive understanding of how AI shapes entrepreneurial marketing and technology adoption (Ritala et al., 2021; Ranjan, 2023; Mero et al., 2020; Chatterjee et al., 2021). Additionally, AI-driven chatbots and virtual assistants have emerged as transformative tools for enhancing customer service and experience, further solidifying AI's role in business performance (Belova, 2023). AI's influence on entrepreneurial digital marketing strategies is evident in its ability to optimize content creation, personalize marketing efforts, and enhance lead generation, ultimately contributing to increased profitability and customer engagement (Shaik, 2023; Valeur, 2023; Devang et al., 2019).

Alongside these advancements, entrepreneurs must navigate ethical considerations related to data privacy, security, and compliance with evolving regulations (Belova, 2023; Valeur, 2023). Ethical mediating factors include the need to balance AI's analytical capabilities with human insights, ensure data privacy, and uphold consumer rights, emphasizing transparency and accountability in AI adoption (Shaik, 2023; Guerra Forero, 2022; Abrokwah-Larbi & Awuku-Larbi, 2023). As entrepreneurs continue to leverage AI, they shape the future of business operations and marketing, poised for innovation, efficiency, and ethical responsibility in the AI-driven landscape.

Also, This IMO framework assisted in providing a well-structured and organized overview of the key findings, making it accessible to practitioners, including entrepreneurs, marketers, researchers, and policymakers.

Implications and recommendations:

Implications for Practice:

Entrepreneurs and business leaders should consider integrating AI technologies into their marketing strategies to enhance business performance, streamline operations, and improve customer experiences. Ethical considerations should be at the forefront of AI adoption practices. Companies should develop transparent and accountable AI systems that prioritize data privacy and consumer rights. Additionally, Practitioners can benefit from the diverse theoretical frameworks by tailoring their strategies and decision-making processes to align with the specific theoretical perspectives relevant to their entrepreneurial context regarding developing their business model structure toward innovativeness to foster mutually beneficial value creation to their business.

Implications for Policy:

organization policymakers should actively engage in shaping regulations that govern AI technologies, with a focus on data privacy, security, and responsible AI adoption.

- Policies should encourage ethical AI practices and provide guidelines for businesses to ensure transparency and accountability in their AI systems.

Recommendations for future Research:

- Further research is needed to explore the evolving landscape of AI technologies in entrepreneurial marketing, especially in emerging areas such as AI-powered chatbots, voice search optimization, and AI-driven content creation.

- Future studies can delve deeper into the intersection of AI adoption and specific industries, considering the unique challenges and opportunities each sector presents.

- Case studies Could be conducted to investigate the impact and development of AI technologies on high-tech companies, involving interviews with high-tech marketing experts to gain insights on the effectiveness of these emerging technologies, Experimental studies should Conduct controlled experiments to assess the effectiveness of emerging AI technologies in enhancing digital marketing capabilities, such as marketing automation, chatbots, and virtual assistants by Measuring the key performance indicators (KPI) like customer response rates, conversion rates, and cost-effectiveness when using AI-driven marketing tools.

- Conducting additional investigation into customer acceptance and interactions with AI-powered marketing technologies, particularly in high-tech markets, is crucial. This research should consider demographic and educational characteristics to comprehend how various customer segments perceive and engage with personalized customer service support, personalized content,

and algorithmic recommendation systems. Furthermore, it is recommended to include a specific focus on Arabic researchers in this domain to gain insights into cultural nuances and preferences, thereby enriching the understanding of customer behaviors in the context of AI-driven marketing strategies.

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