

From ideation to execution: Unleashing the power of generative AI in modern digital marketing and customer engagement- A systematic literature review and case study

Sayed Salih ^{a,*}, Omayma Husain ^{b,c}, Refan Mohamed Almohamedh ^d, Hayfaa tajelsier ^e, Aisha Hassan Abdalla Hashim ^a, Hashim Elshafie ^f, Abdelwahed Motwakel ^{a,d}

^a Department of Electrical and Computer Engineering, Faculty of Engineering, International Islamic University Malaysia, Kuala Lumpur, 53100, Malaysia

^b Department of Information Technology, University of Khartoum, Khartoum, Sudan

^c Faculty of General Education, Hamdan Bin Mohammed Smart University (HBMSU), Dubai, United Arab Emirates

^d Department of Management Information Systems, College of Business Administration in Hawtat bani Tamim, Prince Sattam bin Abdulaziz University, Saudi Arabia

^e Unit of Common Preparatory Year, Prince Sattam bin Abdul Aziz University, Al-Kharj, Saudi Arabia

^f Department of Computer Engineering, College of Computer Science, King Khalid University, Abha, Saudi Arabia

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ABSTRACT

Generative Artificial Intelligence (GAI) is revolutionizing digital marketing by auto-content creation, personalized customer experience, and data-driven decisions. This study conducts a systematic literature review and case study analysis to explore GAI applications, benefits, and challenges in modern digital marketing. Drawing on an extensive analysis of academic journals and industry publications, the current research examines leading GAI software such as ChatGPT, DALL-E, MidJourney, Jasper.ai, and Synthesia based on how they aid in content creation, visual design, and video production. The research also provides real-world case studies in multiple industries, such as retail and fashion, food and beverages, and travel and tourism. The case findings illustrated how GAI augments marketing automation, facilitates customer engagement, and amplifies brand engagement, resulting in greater customer satisfaction, higher conversion rates, and better campaign performance. Although it has several benefits, the adoption of GAI is hampered by several critical barriers, such as data privacy, ethical risks, worker resistance, quality control issues, and infrastructure constraints. This research pinpoints these essential challenges and offers practical solutions. It provides actionable insights for businesses seeking to leverage GAI for competitive advantage in the evolving digital landscape by bridging the gap between theory and practice. The findings contribute to the growing discourse on AI-driven marketing strategies and lay the foundation for future research on GAI's long-term impact on consumer engagement and brand loyalty.

1. Introduction

GAI refers to a branch of AI focused on creating content such as text, images, music, or videos by learning patterns from existing data. It uses advanced models to generate outputs that resemble human creativity, often simulating tasks like writing, designing, and problem-solving. These systems rely on complex algorithms to understand context, learn from data, and produce coherent and meaningful results in response to specific inputs [1]. GAI has swiftly become one of the most disruptive technical innovations, altering the domain of content

generation and customized digital experiences [2]. GAI's capabilities (Fig. 1) have exceeded prior predictions, showcasing significant advancements in the automation and enhancement of creative processes [1]. Furthermore, as noted by Cui, while traditional digital marketing tools require extensive human intervention for innovative processes, GAI offers a paradigm shift by autonomously generating content, visuals, and videos that align with brand strategies and audience preferences [3].

In the B2C sector, GAI has significantly transformed operations via applications like real-time tailored marketing, AI-powered customer

* Corresponding author.

E-mail addresses: Salih.sayd@gmail.com (S. Salih), omaymahusain@gmail.com (O. Husain), r.almohamedh@psau.edu.sa (R. Mohamed Almohamedh), h.abdalrahman@psau.edu.sa (H. tajelsier), aisha@iiu.edu.my (A. Hassan Abdalla Hashim), hashim530@gmail.com (H. Elshafie), am.ismaeil@psau.edu.sa (A. Motwakel).

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support chatbots, and immersive virtual shopping experiences. These improvements highlight GAI's growing impact and essential role in creating contemporary company strategies [4]. Meta's introduction of GAI tools highlights the growing integration of AI in the customization of content for digital advertising. In May 2023, the company launched three AI-driven solutions designed for a select group of marketers to enhance and streamline the advertisement development process [5]. These tools enable marketers to generate numerous ad copy variations, create tailored backgrounds through text prompts, and automatically adjust visual content to different aspect ratios for smooth adaptation across diverse platforms [6]. Nonetheless, incorporating these sophisticated instruments presents obstacles, including ethical dilemmas, quality assurance issues, and technical and organizational challenges, as many businesses struggle with the technical aspects of integrating GAI into their existing systems and workflows [7,8].

Furthermore, the virtual marketing environment is changing rapidly with new, emerging technologies such as voice search, augmented reality (AR), virtual reality (VR), and AI-driven chatbots like ChatGPT and Google Bard, which are real-time and personalized customers. All such technological breakthroughs are transforming industries such as retail and tourism through immersive buying experiences and mandating marketers to adapt and change their reactions to them [9]. Fig. 1 below emphasizes the transformative role of GAI in automating and optimizing customer engagement in digital marketing.

The main aim of this study is to assess the current reviews and literature concerning GAI's uses and its possible effects across digital marketing and customer engagement in several domains. This will be achieved through a systematic review and a bibliometric analysis of source material. The outcomes of this study will facilitate a more profound comprehension of GAI's potential influence across diverse domains, pinpoint the most promising future uses of AI, and highlight areas necessitating more investigation.

1.1. Research Gaps

The utilization of generative AI for personalized content creation is an extensively examined topic in the literature. A significant survey is the research undertaken by Kumar et al. [10], which performed a comprehensive review of the implementation of AI in marketing. Their findings indicated that GAI can enhance personalization on a broad

scale; nevertheless, the study was limited to textual content, neglecting multimedia elements crucial to modern digital marketing. Another recent survey [11,12] investigates the integration of GAI into marketing communication tactics to enhance consumer interactions, augment brand value, and provide personalized experiences. The research emphasizes the development of customized content in many media, including text, photos, audio, and video. It examines the application of AI-driven chatbots, virtual assistants, and real-time campaign optimization for fluid client engagement and data-informed decision-making. However, the study did not thoroughly explore the particulars of generative models and their impact on content creation in marketing communications.

Additionally, the review of [13] offers a preliminary exploration into how GAI and ChatGPT influence both theoretical frameworks and practical approaches throughout various stages of building digital advertising campaigns. It examines their impact on creating digital marketing campaigns from both conceptual and applied perspectives. Their investigations on GAI's influence on customer engagement and satisfaction have predominantly been theoretical or anecdotal, with a scarcity of case studies.

Conversely, a study of [14] investigated the diverse applications of GAI in digital marketing campaigns, highlighting its potential to transform customer interactions and content creation. The research primarily focused on personalization as a key element in this transformation. Still, it did not comprehensively analyze the actual case evidence about their usefulness in meeting marketing objectives.

According to Wang et al. [15], the majority of research has concentrated on conventional digital technologies, including rudimentary automation tools, keyword-driven algorithms, and rule-based systems, which are constrained in their capacity to produce creative and individualized content. Additionally, the recent studies of Sedkaoui et al. [16] indicated that limited research has explored how GAI via customized prompts might transform these elements by allowing marketers to produce exceptionally personalized, visually striking, and engaging materials previously unachievable with older technology.

Additionally, there is a lack of sector-specific case studies investigating how businesses integrate GAI into real-world marketing campaigns, especially in companies where real-time customization and interactive participation are essential [17]. For example, the retail sector increasingly utilizes GAI for tailored product suggestions, AI-generated

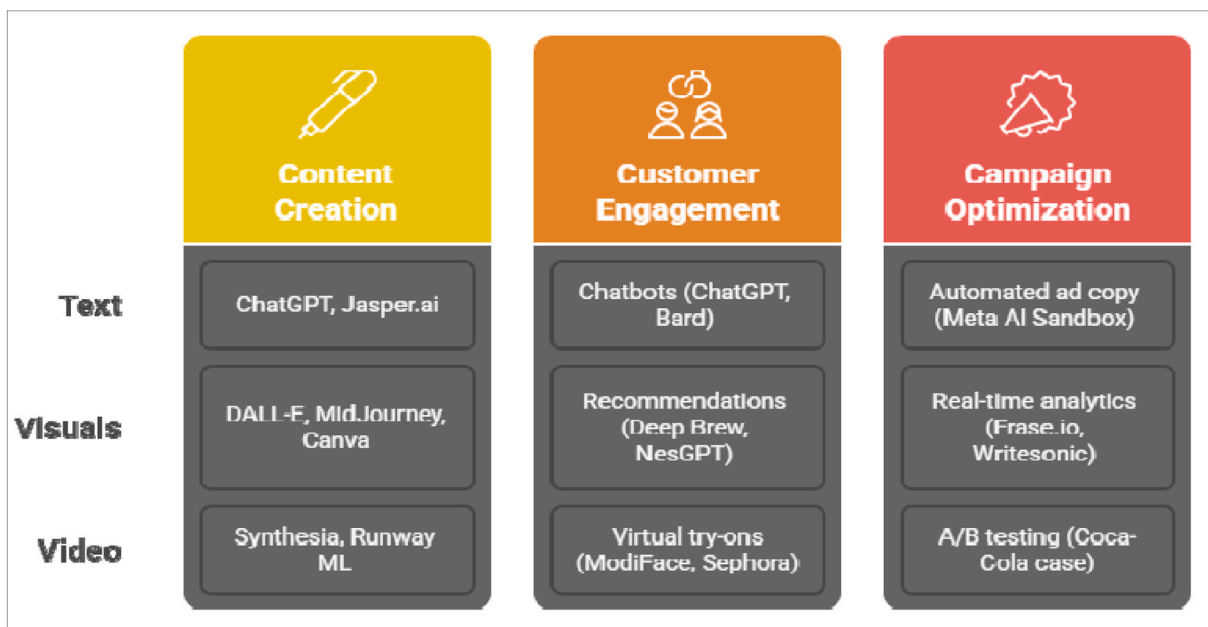


Fig. 1. Role of generative ai in modern marketing workflows.

ads, and automated client engagements, while in the food sector, marketers are utilizing GAI for menu recommendations and targeted promotions; however, research on their effects on customer behaviour, brand loyalty, and purchase intent is limited [18].

1.2. Related studies

1.2.1. GAI in marketing communication

Kumar et al. [19] did a thorough review of how AI is being used in marketing. Their research emphasized the significance of generative AI (GAI) in augmenting personalization and facilitating communication at scale. The primary strength of this body of work is its focus on the efficacy of personalization strategies in engaging varied consumer segments. Nevertheless, the study only looks at text and not at multimedia elements like images, audio, or video, which are becoming more and more important in modern marketing campaigns. In the same way, other studies [11,12] looked into how GAI helps with marketing communication strategies, especially by making content more relevant to each person and optimizing campaigns in real time. They showed how to use chatbots, virtual assistants, and making decisions based on data. The strength here is that GAI has a lot of potential for interacting with customers. However, these studies are mostly theoretical and do not have real-world proof from case studies or industry-specific uses.

1.2.2. GAI for customer engagement

GAI's impact on creating digital marketing campaigns was examined in recent research [13], which also examined how it can improve customer satisfaction and engagement. This work's dual emphasis on conceptual and applied perspectives of campaign development is its contribution. However, there was little evidence derived from practical applications, and the findings were mainly anecdotal. On the other hand [14], looked into a variety of GAI applications in digital marketing campaigns. They offered information on how GAI can revolutionize customer interaction and personalization. This work's focus on real-world applications is its strength, but it lacked a thorough examination of case data to support these assertions. GAI's impact on creating digital marketing campaigns was examined in recent research [13], which also examined how it can improve customer satisfaction and engagement. This work's dual emphasis on conceptual and applied perspectives of campaign development is its contribution. However, there was little evidence derived from practical applications, and the findings were mainly anecdotal.

1.2.3. Sector-specific case studies

A few studies have tried to look into GAI in particular fields. For instance Ref. [17], looked at its application in retail, and [18] concentrated on the food and beverage industry. These pieces offer insightful perspectives on automation and personalization in specific contexts. Their ability to draw attention to practices unique to a given industry is their strength. They do not however address cross-sector applicability, and little is known about the effect on long-term customer loyalty and behavior. In a similar vein [14], offered some insights into case evidence but did not thoroughly examine how well GAI worked to accomplish quantifiable marketing goals. Numerous studies highlight the potential of GAI in automating content generation and improving customer interactions. However, they offer scant insights into real challenges, including integration difficulty, legal limits, and resistance from both enterprises and consumers [20,21]. Finally, the literature rarely explores practical strategies for overcoming these barriers, leaving a gap in understanding how organizations can successfully navigate challenges related to GAI transparency, bias mitigation, and workforce adaptation [7].

This research aims to address these gaps by conducting a targeted systematic literature review on the integration of GAI in digital marketing and customer service. Unlike broader or tool-specific studies, this study focuses on GAI to analyze its impact, challenges, and role in

enhancing marketing and customer interactions. Table 1 summarizes the related work and research gap.

1.3. Motivation

According to Ref. [22], 2024 represented a critical period when the worldwide community acknowledged the potential of Gen AI and started utilizing it to produce significant business value. In harmony with such a transformation, an online survey conducted by McKinsey & Company survey between February 22 and March 5, 2024, received feedback from a group of 1363 representing a range of regions, industries, organizational sizes, and job roles. Of these respondents, 981 mentioned that GAI had been adopted in at least one function in their companies, and 878 mentioned that their companies regularly utilized Gen AI in at least one function [22].

A recent report reveals that 74 % of marketers plan to expand their use of AI as GAI-created content experiences tremendous growth in the digital marketplace. Projections estimate that the market will grow from \$5.2 billion to \$16.9 billion by 2028, underscoring the increasing reliance on AI-driven solutions in content creation, automation, and audience engagement [23].

Despite these advancements, challenges remain. Boston Consulting Group (BCG) report in October 2024 revealed that 74 % of companies face difficulties in realizing and scaling value from GAI initiatives, underscoring the critical importance of effective implementation strategies [24]. These difficulties often stem from integration complexities, workforce adaptation, data privacy concerns, and the need for robust AI governance frameworks. Overall, 2024 has been a pivotal year for generative AI in marketing, with increased adoption and investment alongside ongoing efforts to overcome implementation challenges. Fig. 2 below illustrates the key trends for GAI in marketing during 2024, focusing on increased adoption, investment, and ongoing implementation challenges (see Fig. 3).

1.4. Contributions

By providing a methodical framework for examining its advantages, difficulties, and adoption tactics, this study contributes to a better understanding of GAI's function in digital marketing and customer service. By integrating bibliometric analysis, case studies, and recommendations, this research contributes to both academic discourse and real-world business applications, helping companies navigate the AI-driven marketing landscape effectively. The primary contributions of this study are.

- This study provides a detailed comparison between traditional digital marketing tools and GAI-powered solutions. It highlights how GAI-driven marketing outperforms conventional methods in content efficiency, campaign personalization, and automated customer engagement.
- It fills the gaps in prior research, particularly regarding real-world implementations and effectiveness, by presenting empirical findings from industry-specific case studies.
- It offers tailored GAI toolkits, including sample prompts for marketers to enhance content creation, branding strategies, and campaign management.
- It introduces a new conceptual framework for GAI adoption in digital marketing. This framework links inputs, processes, barriers, and outcomes, offering a structured model that can guide both future research and managerial practice.
- This study examines key obstacles hindering the widespread adoption of GAI and proposes actionable insights for marketers, business leaders, and AI developers on leveraging GAI for optimized marketing workflows.
- It provides a foundation for further academic research and industry innovation in AI-powered marketing.

Table 1
Summary of related work and research gap.

The Covered areas	[15]	[16]	[17]	[18]	[20, 21]	[10]	[11, 12]	[13]	[14]	This Study
In-depth review of Generative AI applications in marketing, customer engagement, and content creation	x	x	x	x	x	✓	✓	✓	✓	✓
Comparison between traditional digital marketing tools and GAI-powered solutions	✓	✓	x	x	x	x	x	x	x	✓
Analysis of real-world implementations through industry-specific case studies	x	x	✓	✓	x	x	x	x	x	✓
Development of tailored GAI toolkits with sample prompts for marketers	x	✓	x	x	x	x	x	x	x	✓
Examination of key obstacles to GAI adoption and proposed actionable insights	x	x	✓	✓	✓	x	x	x	x	✓
Establishing a foundation for further academic research and industry innovation	✓	✓	x	x	✓	x	x	x	x	✓

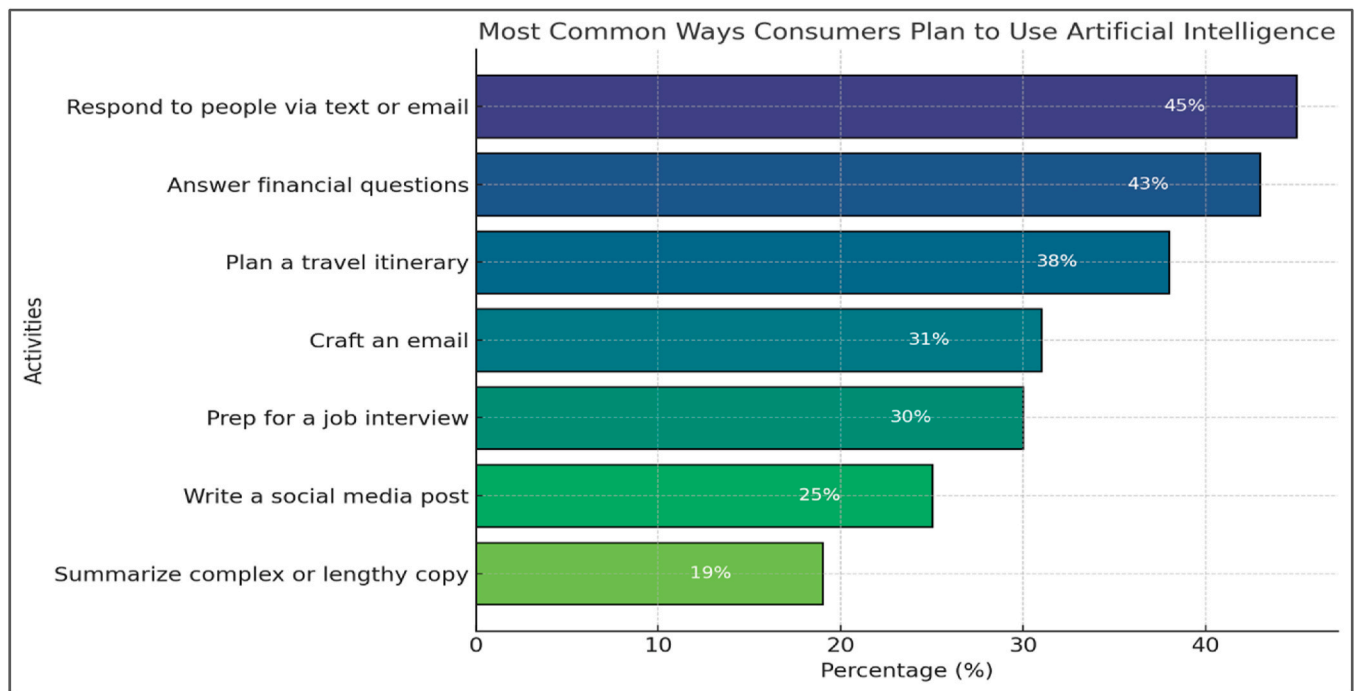


Fig. 2. Top GAI activities usage and their corresponding percentages of consumers.

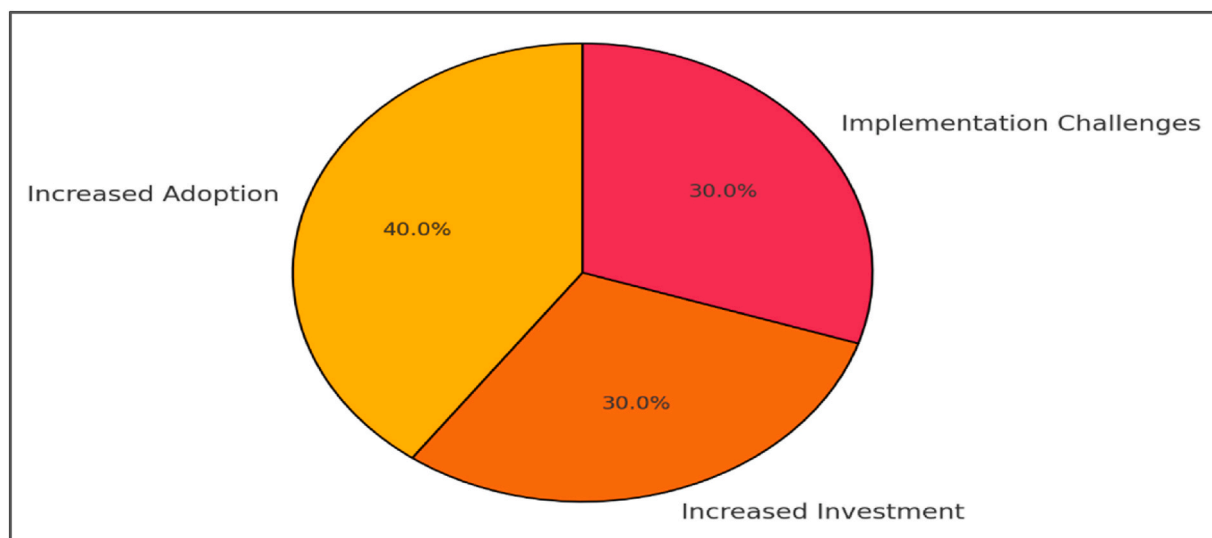


Fig. 3. Generative AI in marketing: key trends in 2025 (based on authors' analysis).

The paper’s structure is methodically organized into seven sections, beginning with an introduction, related work, and research contribution. Section 2 presents the background, followed by the research methodology in Section 3. The research questions are detailed in section 4. Section 5 unfolds an extensive discussion of these findings. Section 6 suggests directions for future research. Finally, section 7 is the concluding section.

2. Background

2.1. Applications of GAI tools in digital marketing transformation

Advanced artificial intelligence software such as DALL-E and ChatGPT is increasingly utilized to enhance picture creation and advertisement copy, enabling companies to streamline creative processes and maintain brand uniformity [25]. Likewise, marketers can use tools such as Synthesia and ElevenLabs to enable hyper-personalized video and audio marketing content, making brand communication more engaging to produce AI-created video ads with virtual characters and voiceovers, with options for script creation and translation [26]. Regarding electronic mail marketing, tools like Copy.ai enable marketers to develop highly personalized marketing campaigns through messages crafted according to segmented groups and behaviour [27]. MidJourney, an AI-powered picture creation tool, allows marketers to generate photorealistic and personalized images for branding and advertisement and, in the process, enriches picture creation in marketing programs [28]. In addition, Canva Magic Studio brings in capabilities for converting text into pictures and enables marketers to effectively develop unique advertisement content with little graphical expertise [29]. Canva enables advertisement creatives to be personalized according to behaviour and boost engagement through real-time delivery of relevant messages contextually. Overall, these AI-facilitated improvements enhance marketing effectiveness, allow a high level of personalization, and make programs practical and applicable to target groups. Table 2 below presents primary GAI tools that transform digital marketing and its diverse applications by enhancing content creation, personalization, and customer engagement (see Table 3).

2.2. Customer engagement before and after GAI

Before the emergence of GAI, customer engagement was predominantly understood as a psychological condition based on interactive encounters between customers and businesses, resulting in behaviours that transcended mere transactions, including advocacy and co-creation [30,31]. Vivek et al. [30] characterized customer engagement as a multifaceted construct that includes cognitive, emotional, and behavioural components, resulting in loyalty, satisfaction, and competitive advantage. The main goal of customer engagement is to cultivate a sense of connection and loyalty between customers and a business. GAI has revolutionized customer engagement by enabling dynamic, data-driven interactions that engage customers actively in participating in and advocating for the brand’s products, services, or values [32,33]. Key advancements include.

- **Hyper-Personalization:** GAI models trained on unstructured data via deep learning provide context-sensitive content (e.g., personalized suggestions, virtual assistants). For instance, GAI-driven chatbots such as ChatGPT facilitate user engagement through human-like conversation, augmenting interactive marketing experiences.
- **Efficiency and Scalability:** GAI automates content creation and data analysis, decreasing operational expenses, including automated code generation and marketing copywriting applications.
- **Augmented Data Utilization:** Smart data and IoT facilitate GAI in integrating varied datasets (e.g., purchase history and social media

Table 2
The primary GAI tools in transforming digital marketing.

GAI Tools	Transformation	Example of Its Application
OpenAI’s ChatGPT and GPT-4	Brainstorming ideas, stimulating creativity, creating marketing content, developing personalized solutions	Used by Khan Academy’s GPT-4-based Khanmigo for personalized, interactive learning experiences for students and teachers.
OpenAI’s DALL-E 2	Creating custom images and art based on prompts	generate visuals for ads across social platforms, improving the efficiency of marketing campaigns.
Meta’s AI Sandbox	Creating different variations of copy, generating backgrounds through text prompts, image cropping	Jones Road Beauty used AI Sandbox to generate multiple ad versions faster, enhancing creative cycles and marketing agility.
Midjourney	Creating images based on text prompts	PrimeCare uses Midjourney-generated art for blog posts, elevating the visual appeal of its content.
Jasper.ai	Generating marketing content such as blog posts, product descriptions, company bios, and ad copy	Goosehead Insurance used Jasper.ai to create blog articles for their learning centre, email campaigns, and repurposed social media content, maximizing engagement and marketing efficiency.
Peppertype.ai	Creating short-form contextual copies and generating product descriptions	Over 800 businesses leverage it for rapid and efficient content creation, improving productivity in generating marketing assets.
Copy.ai	Crafting ad copy and other marketing content	Airtable uses Copy.ai to develop and refine engaging ad copy for their campaigns, enabling scalability and efficient marketing.
Canva’s Magic Write	Assists in creating visually engaging marketing materials like flyers, social media posts, and infographics	Enhancing design productivity and reducing the need for expert graphic designers.
Synthesia	Creating AI-powered video content with virtual avatars for campaigns	Used by companies to produce engaging products, enhancing the multimedia content strategy.
Writesonic	Writing marketing content, product descriptions, and SEO-optimized articles	generate compelling product descriptions and promotional materials, improving search engine visibility and attracting customers.

engagement). For example, IoT devices gather real-time behavioural data, which GAI evaluates to anticipate client requirements.

3. Methodology

This study conducted a systematic review according to the systematic review protocol, searching two academic databases, Semantic Scholar and Google Scholar, for literature published between January 2020 and January 2025 to identify studies and reviews investigating the use of GAI in digital marketing and customer service. According to the authors [34–37] the systematic review process involves several necessary steps, including developing the research question, creating a systematic search strategy, screening the studies identified, assessing their quality, extracting data of relevance, synthesizing the results, and analyzing the findings. All these steps were conducted stringently to guarantee the review’s validity, reliability, and strength, as shown in Fig. 5 below (see Fig. 6).

Table 3
Inclusion and exclusion criteria.

Criteria	Inclusion Criteria	Exclusion Criteria	Rationale
Publication Period	Studies published between January 2020–January 2025.	Studies published before 2020	To ensure recent advancements in GAI and digital marketing are covered.
Language	Only English-language publications	Non-English studies were excluded.	To ensure consistency and avoid translation bias.
Topic Relevance	Studies specifically focusing on GAI in digital marketing and customer service.	Studies unrelated to marketing, advertising, content creation, or customer engagement (e.g., AI in healthcare, legal, finance, or industrial automation).	This is to ensure the study remains within the marketing and customer engagement domain rather than broad AI discussions.
Publication Type	Peer-reviewed journal articles, conference papers, book chapters, and systematic reviews. Reputable industry reports (McKinsey, Deloitte, BCG) were also included if they provided empirical data.	Blogs, opinion pieces, news reports, whitepapers from GAI vendors, and non-peer-reviewed publications.	Peer-reviewed studies ensure academic rigor, credibility, and replicability, while industry reports add practical insights into real-world adoption.
Methodological Rigor	Studies with clear methodology, empirical data, and theoretical grounding, including quantitative, qualitative, or mixed-method approaches.	Papers that lacked empirical data, clear methodology, or theoretical contribution.	Ensures the study is scientifically robust, drawing from methodologically sound research rather than anecdotal evidence.
Case Studies & Industry Applications	Research that included real-world implementations of GAI tools in digital marketing campaigns, customer engagement, advertising, and content creation.	Studies that did not focus on real-world case studies or lacked business relevance.	To bridge the gap between theory and industry practice, providing tangible insights for businesses adopting GAI.
Access Restrictions	Studies are accessible through Google Scholar and Semantic Scholar.	Subscriptions or restricted papers that could not be accessed were excluded.	Ensures accessibility of high-quality, openly available research

3.1. Occurrence and cluster analysis

VOSviewer is a software meant to create and visualize user-friendly bibliometric maps, as developed by Ref. [38]. Fig. 4 illustrates the co-occurrence and cluster analysis of keywords within the literature, indicating thematic distinctions and interconnections among subjects pertinent to the revolutionary potential of generative AI in digital marketing and customer engagement. The network comprises 11 elements, 34 linkages, and a total link strength of 115, structured into three separate clusters, effectively illustrating the relationships and interactions among essential subjects including research key words:

Generative AI, Digital marketing, customer engagement, visual design, video production, social media campaigns, E-commerce, AI-Powered chatbots, integration challenges, customer engagement, AI-powered automation, and ChatGPT.

At the core of the network, “Generative AI” and “Digital Marketing” will serve as two focal points, signifying a central issue for study. These nodes exhibit robust connections to other terms with significant linkages to Visual Design, Video Production, and Social Media Campaigns. This indicates their broad significance and potential classification as a fundamental pair in this domain. A notable cluster pertains to digital marketing, which is intricately linked to customer engagement and AI-powered automation, indicating the incorporation of GAI tools. Moreover, Integration Challenges represent a substantial obstacle to adopting GAI technologies, associated with additional elements such as AI-powered chatbots and E-commerce, underscoring enterprises’ technological, organizational, and ethical difficulties when integrating GAI into their operations.

3.2. Research questions

This study aims to provide a deep understanding of GAI in modern digital marketing and customer service and provide insights for businesses navigating GAI adoption. To achieve this, the study is guided by the following research questions.

RQ1: How can GAI be utilized to transform digital marketing, particularly in content creation, visual design, and video production, compared to previous generations of digital technologies?

This question explores how GAI surpasses traditional digital marketing tools in enhancing creativity, efficiency, and personalization across various media formats. Additionally, it examines sample prompts that demonstrate GAI’s capabilities in generating marketing content and optimizing strategies.

RQ2: What insights can be gained from a case study on implementing GAI in a specific sector or campaign to improve customer engagement and satisfaction?

By examining real-world applications, this research question aims to identify how GAI enhances customer interactions, brand loyalty, and overall marketing effectiveness.

RQ3: What are the barriers to adopting GAI tools in digital marketing and customer service industries, and how can organizations address them effectively?

This question investigates the key ethical, technical, organizational, and cultural challenges businesses face when integrating GAI into their operations and potential strategies to overcome them.

3.3. Data source

The field of GAI in digital marketing and customer support is evolving rapidly. Google Scholar and Semantic Scholar databases were utilized for systematic literature retrieval of this study. The selection of databases was according to the following: Firstly, Google Scholar covers a broad range of scholarly literature and uses sophisticated ranking algorithms based on citation frequency and keyword salience to facilitate retrieval of highly cited and impactful research, making it an essential platform to obtain the latest research on GAI in digital marketing and customer service [39,40]. At the same time, Semantic Scholar is designed explicitly for AI-aided literature finding and employs advanced AI algorithms to rank papers in relevance, citations, and influential contribution, with a bias towards high-quality studies that have a valuable contribution to the research field [41]. Secondly, as opposed to

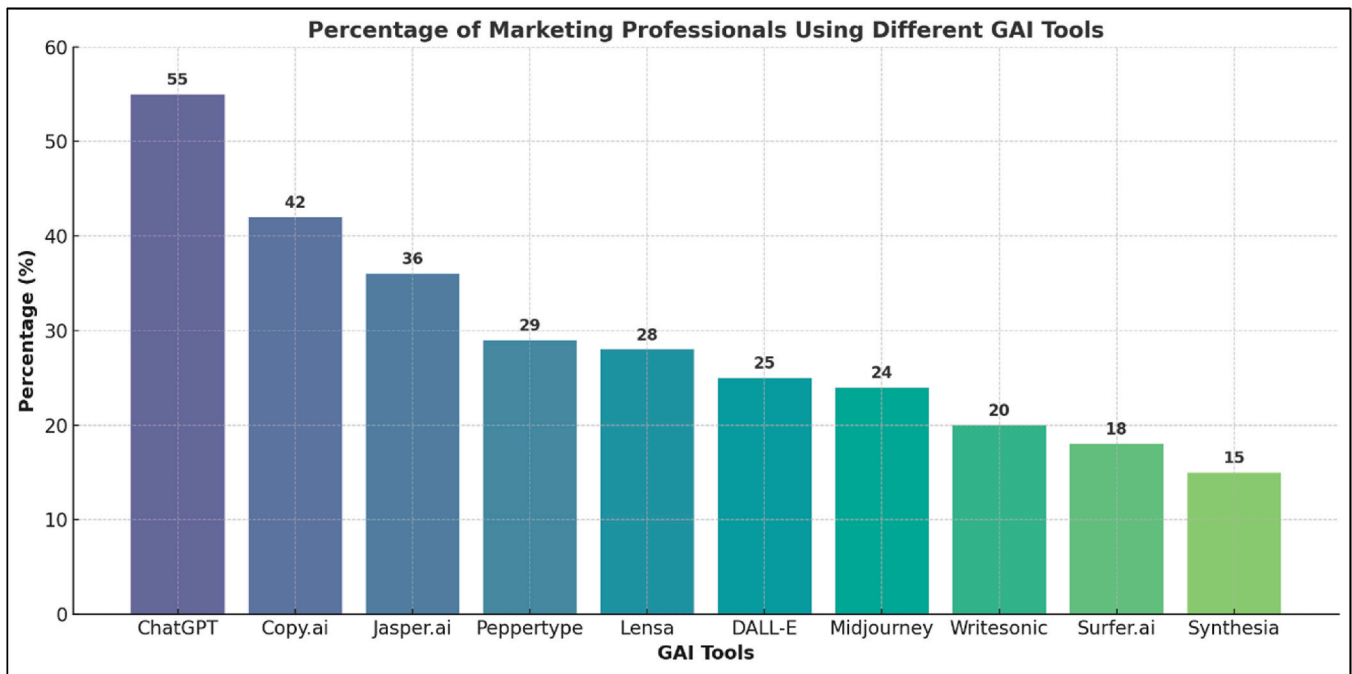


Fig. 4. Percentages of marketing professionals using different GAI tools.

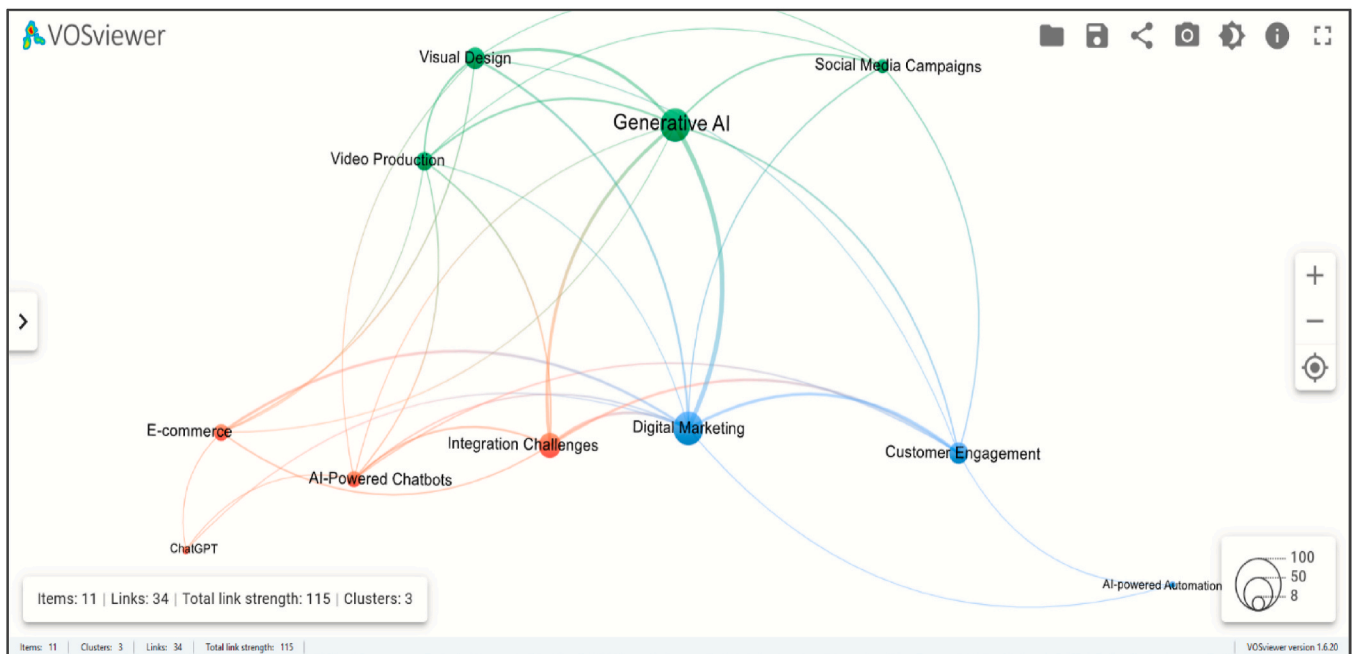


Fig. 5. Co-occurrence and cluster analysis of the keywords.

some commercial research databases (e.g., Web of Science or Scopus), Google Scholar and Semantic Scholar cover a high percentage of open-access literature, making relevant studies more universally accessible to a more significant number of individuals without paywalls from institutions [42].

3.4. Search strategy

The authors compiled published articles for the last three years, from January 2020 to January 2025, focusing on various aspects of GAI implementation in digital marketing. This timeframe captures GAI tools'

rapid evolution, such as ChatGPT post-2022 advancements. The search concluded on January 2025 after retrieving results from both databases. The exact search strategy for Google Scholar and Semantic Scholar was implemented using Publish or Perish Version 8 (Fig. 7), yielding 100 records from Google Scholar and 174 records from Semantic Scholar (see Fig. 8).

Research string (RS) = TITLE-ABS-KEY ((GAI OR AI) AND (GAI for digital marketing OR adoption of GAI in digital marketing) OR (GAI in customer enjoyment OR GAI for content writing) OR (visual design with GAI) OR (video production with GAI) OR (GAI adoption challenges in digital marketing and customer engagement OR GAI prompts in digital

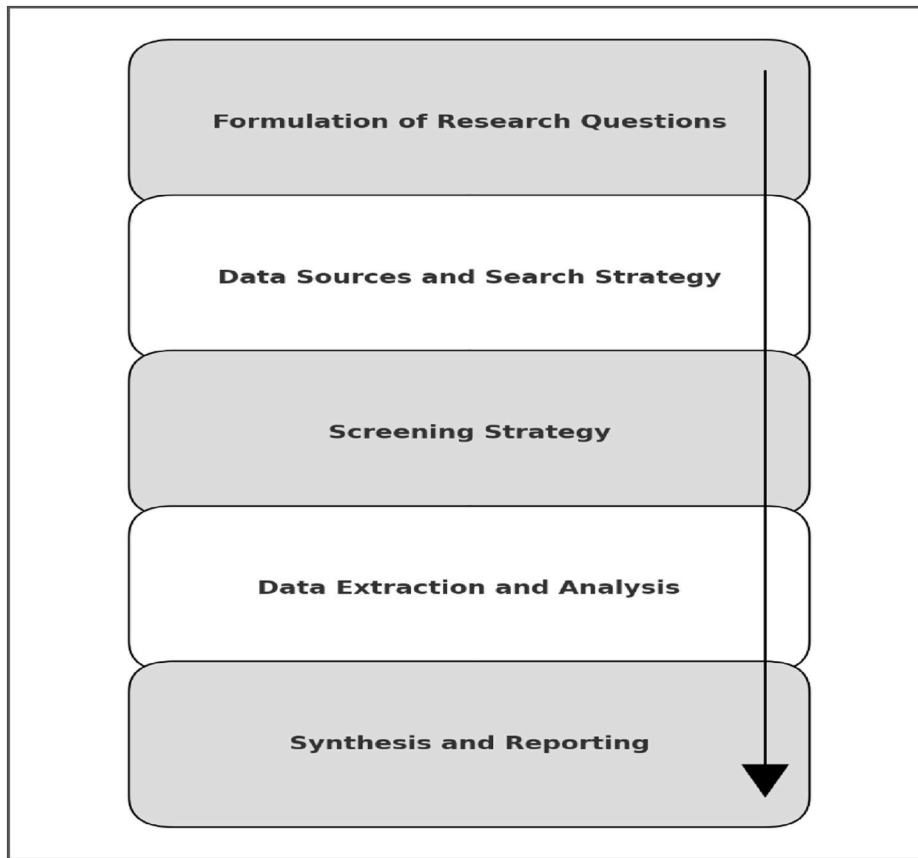


Fig. 6. Systematic literature review process: source [34,35].

Search terms	Source	Papers	Cites	Cites/y...	h	g	h,no...	h,ann...	hA	acc...	Search date	Cache date	Las...
✓ GAI in Digital Marketing and C...	Google Scholar	100	3922	1961.00	21	62	18	9.00	18	28	1/25/2025	1/25/2025	105
✓ GAI in Digital Marketing and C...	Semantic Scholar	174	1917	273.86	21	42	14	2.00	15	26	1/25/2025	1/25/2025	0

Cites	Per year	Rank	Authors	Title	Year	Public
0	0.00	51	A Maryniak, ...	ChatGPT in supply chain management—a research model	2024	Śląsk
0	0.00	52	A Jokela	Business adoption of generative AI: identifying and overcoming key challenges	2024	
0	0.00	53	RMA Esteves	Applications, Challenges, and Ethical Implications of Generative AI: A Systematic Review	2024	
0	0.00	54	S İgğözar, E Fendo...	Innovative applications in businesses: An evaluation on generative artificial intelligence	2024	Amfite
0	0.00	55	QR Limantara	Exploring the Role of Generative Artificial Intelligence in Crafting Brand Experiences: Insights from Selected Case Studies	2024	Interna
0	0.00	62	D Patil	ChatGPT And Similar Generative Artificial Intelligence In Art, Music, And Literature Industries: Applications And Ethical Cha...	2024	Music,
0	0.00	66	LEA Steen, SR Vevele	Generative Artificial Intelligence Use in Financial Institutions Drivers, Barriers &Future Development	2024	
0	0.00	77	R Raman, VK Nair, ...	Generative AI Research: ChatGPT Research in the Asia-Pacific Region—Demographic and Thematic Trends	2024	Learn
0	0.00	78	R Abreu, L Martinez	CHARTING THE CHATGPT COURSE: A QUANTITATIVE STUDY OF MANAGEMENT STUDENTS' STANDPOINTS ON AI IN EDUCA...	2023	ICERIZC
0	0.00	79	A Altamimi	Harnessing the integration of chat GPT in higher education: the evaluation of stakeholders sentiments using NLP techniques	2024	Discov
0	0.00	88	M Mazumder	Application of Generative AI in Big Data Visualization for Enhancing International Business Decision-Making	2023	
0	0.00	89	A Haleem, M Javai...	Intelligent Pharmacy	2024	resarc
0	0.00	92	D Mladenović, M ...	Synthetic WOM? The Emergence of Generative Artificial Intelligence-Induced Recommendations	2024	Journal
0	0.00	93	YN Wan	Language Differences in Online Complaint Responses between Generative Artificial Intelligence and Hotel Managers	2024	Inform
0	0.00	97	I Pawelozsek, N K...	THE NEW FRONTIER OF CUSTOMER SERVICE IN INDUSTRIES: AN INTRODUCTION TO GENERATIVE AI	2024	ijaia.ja
0	0.00	98	A Danwishi, AE Has...	Empowering Education with Generative Artificial Intelligence: Opportunities and Challenges	2024	... for A
0	0.00	100	M Misanchuk, J H...	ChatGPT in STEM Teaching: An introduction to using LLM-based tools in Higher Ed	2024	

Fig. 7. Publish or Perish filtering results from databases.

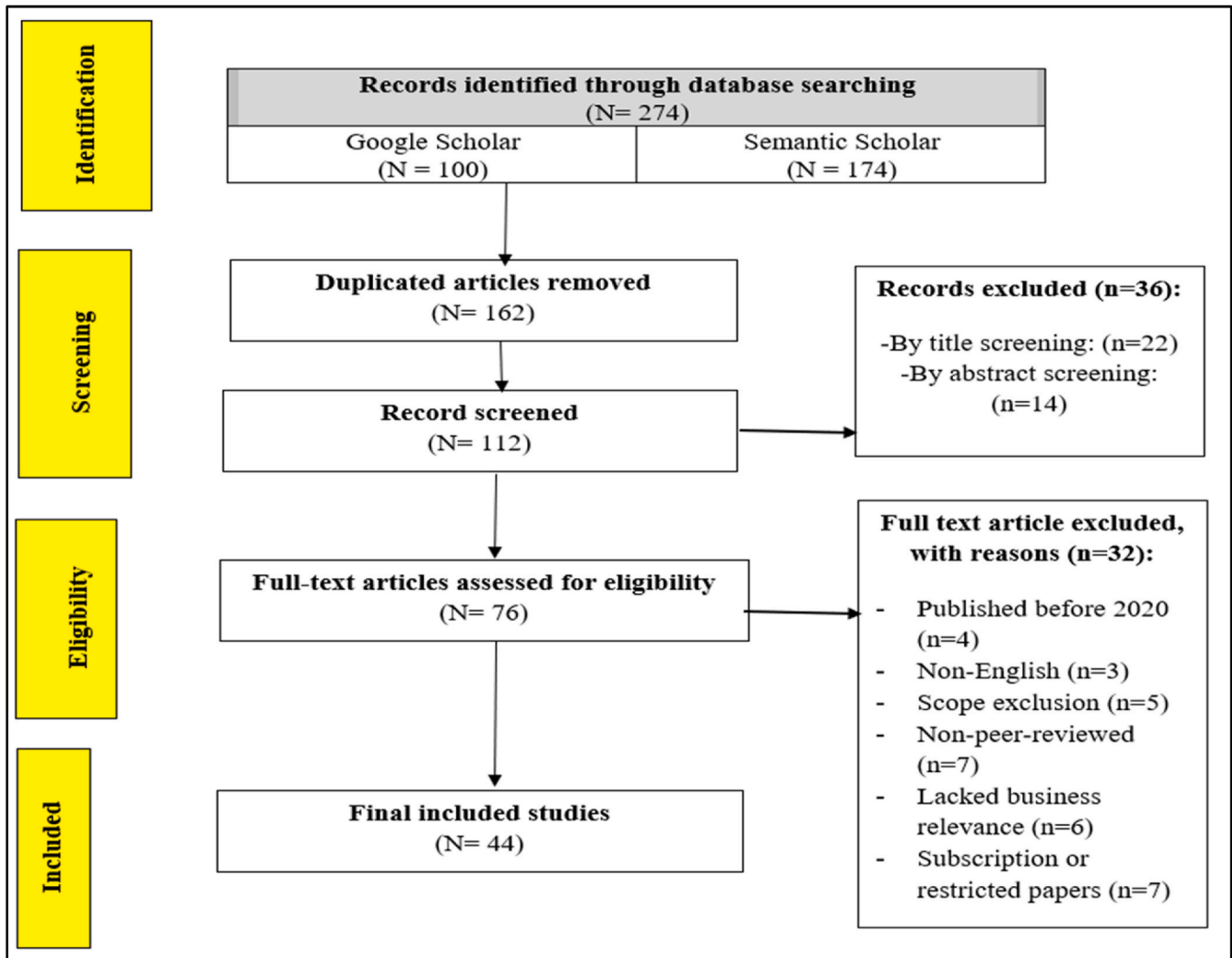


Fig. 8. PRISMA flow chart for literature analysis.

marketing) OR (GAI implementation in deferent sectors)).

The research query utilizes Boolean operators, including “AND” and “OR,” to strategically refine the search scope and balance between comprehensive and specific results. Results were imported into EndNote v.20 for Windows to refine the dataset, yielding 274 records. Table 2 below illustrates the systematic selection criteria used to identify relevant studies for this research, ensure the inclusion of recent, peer-reviewed, and practically relevant literature, and exclude outdated, non-academic, or irrelevant sources.

3.5. Data extraction and analysis

To ensure a systematic approach to data collection, the study followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines [36,43], which provide a structured framework for conducting systematic reviews and meta-analyses, which identified 44 articles of literature were deemed suitable for this research review. A multi-step screening process was performed (Fig. 7). After applying these processes, 44 records [7,8,10–14,16,19,20,44–78] were deemed eligible for inclusion in the systematic review.

3.6. Quality assessment

In order to be methodologically consistent and transparent, a structured quality assessment was applied to the 44 final studies that

composed this systematic review, as identified in the PRISMA flow diagram. An adapted evaluation framework was used from Kitchenham & Charters and recent SLR guidelines on AI-driven research [79,80]. A ten-item quality appraisal checklist (QA1–QA10) was developed to analyze conceptual clarity, methodological appropriateness, analytical rigor, evidence strength, transparency in reporting, and alignment with the generative AI objectives in digital marketing and customer engagement.

Each individual study was independently reviewed by two reviewers using a standardized scoring system: Yes (1 point), Partially (0.5 points), and No/Not Applicable (0 points). Total scores were then used to classify studies into three quality tiers.

- High quality: ≥ 0.7
- Medium quality: 0.4–0.69
- Low quality: < 0.4

Based on this scoring scheme, the distribution across the 44 included studies was.

- 28 high-quality studies (63.6 %)
- 11 medium-quality studies (25 %)
- 5 low-quality studies (11.4 %)

Poor-quality studies were included in the review to prevent selection

bias, although their findings were interpreted very cautiously when the studies lacked empirical foundation, specific methodologies, or detail about the characteristics of the AI model. Studies of medium quality, while usually useful, often have some small methodological shortcomings. High-quality studies showed strong methodological quality, including a clear definition of GAI tools, robust analysis, and well-supported conclusions.

Table 4 summarizes the quality assessment results through reporting the percent of studies rated as Yes, Partially, or No/NA for each of the ten appraisal questions to enhance transparency of the grading and inform interpretation of synthesized evidence.

4. Results

4.1. RQ1: How can GAI be utilized to transform digital marketing, particularly in content creation, visual design, and video production, compared to previous generations of digital technologies?

While numerous studies discuss GAI’s features or potential advantages, few systematically compare these tools to traditional methods. For instance, research [48,54,55] on GAI’s role within the media ecosystem often adopts a forward-looking perspective but rarely examines its performance relative to existing workflows, leaving a gap in practical application. Moreover, much of the previous research, such as [54,56, 81], has primarily focused on either creativity or efficiency, rarely investigating both aspects simultaneously. Earlier studies frequently examined individual tools or isolated tasks, such as using ChatGPT to generate text for blog posts [57,58]. This RQ seeks to address these gaps by adopting a comparative approach to make the findings more practical and actionable, organizing the results into three key marketing functions: content creation, visual design, and video production.

4.1.1. Content creation

As articulated by the Content Marketing Institute, content creation is a strategic methodology that entails creating and disseminating high-quality, pertinent, and consistent information to engage and keep a targeted audience, ultimately facilitating profitable consumer activities [82]. This strategy produces and distributes diverse marketing materials, such as films, photos, presentations, flyers, blogs, infographics, and social media content, to enhance customer engagement and increase sales [14].

Conventional content creation predominantly depends on human

Table 4
Quality assessment results.

QA ID	Question	Yes (%)	Partially (%)	No/NA (%)
QA1	Are the goals of the study well-defined and in line with GAI in digital marketing?	86.4	13.6	0
QA2	Is the methodology or analysis explained in detail?	75.0	18.2	6.8
QA3	Are GAI constructs, variables, or parameters defined unambiguously?	84.1	13.6	2.3
QA4	Does the study explicitly discuss the applications or benefits of GAI?	70.5	20.5	9.0
QA5	Is the dataset, sample, or evidence base adequately described?	61.4	22.7	15.9
QA6	Are the AI/GAI tools, models, or technologies clearly specified?	90.9	6.8	2.3
QA7	Are findings supported by empirical data or validated evidence?	27.3	0	72.7
QA8	Are limitations and threats to validity discussed?	54.5	18.2	27.3
QA9	Are all research questions fully addressed?	95.5	4.5	0
QA10	Are conclusions consistent with data and analysis?	93.2	6.8	0

involvement, encompassing brainstorming, research, writing, and editing [83]. Copywriters, marketers, and editors work to create high-quality material, typically necessitating multiple revisions for refinement. This procedure is laborious, particularly for extensive campaigns necessitating a variety of materials such as blog entries, advertising content, email newsletters, and social media captions. On the other hand, GAI tools like ChatGPT, Jasper.ai, and Writesonic have revolutionized content creation. These tools generate high-quality written content based on user-provided prompts, drastically reducing the time needed for ideation and drafting. They can create various types of content, from SEO-optimized articles to engaging ad copy, within minutes [59].

According to Cooper and Robert [84], GAI tools are significantly more effective at optimizing keyword usage than manual methods, resulting in a 30 % improvement in search engine rankings. An example of such a tool is Frase.io, which enables marketers to align their content with user intent, thereby fostering substantial growth in organic traffic. This platform transforms content marketing by streamlining research, creation, and optimization processes. Frase.io empowers marketers to produce data-driven, SEO-oriented content tailored to audience needs by analyzing search engine data to uncover trending topics, frequently asked questions, and competitor strategies [85].

Another example is Jasper.ai, which allows marketers to produce blog posts and product descriptions tailored to their target audience, significantly speeding up the process [86]. According to Alam, Jasper.ai enables marketers to create highly personalized content that aligns with their target audience’s preferences, resulting in higher engagement rates [87]. Similarly, Jain [88] found that the platform reduced content production time by up to 50 %, allowing marketing teams to focus on strategy and analysis rather than manual writing. Additionally, Iorliam et al. [45] highlighted Jasper.ai’s ability to generate SEO-optimized blog posts and product descriptions, which enhanced organic traffic and improved search engine rankings for many users.

Furthermore, Tools like Writesonic support e-commerce businesses by generating SEO-friendly product descriptions that boost search engine visibility and attract customers. According to Malakar [46], these tools significantly enhance productivity by automating repetitive writing tasks, allowing marketers to dedicate more time to strategic planning and creative decision-making. Furthermore, Selvi [89] found that businesses leveraging generative AI tools like Writesonic experienced improved customer engagement and conversion rates, emphasizing their value in a competitive digital market.

The author of [57] conducted a comprehensive case study on the impact of ChatGPT as a form of GAI on Instagram marketing. Their study explains how valuable AI-generated content is in enhancing engagement rates and reducing the time required to develop content to improve marketing effectiveness. They saw that posts that were generated with the help of ChatGPT not only generated more likes and comments but also prompted referential interactions with the readers, thus improving the brand’s customer loyalty and retention rates. From the examples provided, ChatGPT reveals great potential in generating content for different types of marketing communications [90]. It creates attention-catching, SEO-friendly blog posts and articles regarding topics related to its sector with the possibility of producing approaching content ideas that would interest consumers [13]. Similarly, Coca-Cola has leveraged OpenAI’s ChatGPT to develop unique and adaptable content for digital advertising, tailoring creative text to suit different markets and languages to maximize engagement across various social media platforms. By employing ChatGPT, the company generated location-specific ad copy that addressed diverse consumer interests [19]. The AI model further created targeted, brand-specific content for social media platforms like Twitter, Instagram, and LinkedIn, including posts, captions, stories, and hashtags. Nevertheless, constraints persist. Although GAI is proficient at generating preliminary drafts, human involvement is frequently necessary for refinement and adherence to brand standards.

4.1.2. Visual design

Traditionally, creating visual assets necessitates professional graphic designers' expertise and utilizing software such as Adobe Photoshop or Illustrator. This procedure may be arduous, necessitating specific expertise and substantial cooperation. GAI-powered visual design tools such as OpenAI's DALL-E, Midjourney, and Canva's Magic Write have revolutionized visual content creation. DALL-E 3 has been utilized by advertising platforms such as Omneky to create tailored images for social media campaigns, enhancing efficiency and creativity [91]. Likewise, Canva's Magic Write enables marketers to produce visually captivating content, such as infographics and social media posts with no exertion. According to a study by Brade et al. [92], marketers using Canva's Magic Write reported a 40 % reduction in the time spent creating visual content [93]. This efficiency allows marketers to focus more on strategic planning and other critical aspects of their campaigns. Compared to traditional visual design methods, MidJourney offers unparalleled speed and accessibility; it empowers marketers to create visuals on demand, enabling quicker campaign rollouts and greater flexibility [47]. Marketers can generate unique designs by entering a description of the desired image within seconds. For instance, A prompt like "A futuristic cityscape with vibrant neon lights, inspired by cyberpunk aesthetics" can yield a visually striking image tailored to the campaign's theme.

Integrating Adobe Firefly with Adobe Creative Cloud applications such as Photoshop and Illustrator illustrates the enhancement of traditional design workflows with GAI [94]. Conventional tools depend significantly on manual input and designer proficiency for tasks such as stylistic text effects or colour variations. Conversely, Firefly automates these processes, enabling designers to concentrate on more advanced creative endeavours. Research demonstrates that AI-augmented workflows promote productivity by minimizing repetitive operations and facilitating quicker iterations [94]. The study of [95] noted that conventional software such as CorelDRAW or GIMP necessitates a more significant learning curve. Still, Firefly's user-friendly interface and AI-enhanced functionalities simplify the process, rendering complex design attainable for non-experts.

DeepArt, on the other hand, converts photos into stylized artworks influenced by renowned artists, eliminating the manual labour associated with conventional techniques such as oil painting or digital reproductions [96]. Likewise, Artbreeder enables users to merge and modify photographs through sliders, providing a degree of accuracy and personalization that conventional techniques, such as photo editing with Adobe Lightroom, cannot achieve [97]. Research by Garcia et al. indicates that these AI-driven tools enable individuals with limited artistic skills to produce visually impressive results, democratizing the creative process [60]. According to Onyejelem et al., conventional instruments such as paintbrushes or rudimentary digital illustration software need considerable time and expertise. GAI platforms streamline much of the artistic rendering, lowering the creative barrier.

Fotor offers AI-powered tools to help users create marketing materials, logos, and social media graphics, catering specifically to non-designers and small businesses. According to Ref. [98], Fotor's intuitive interface and ready-made templates simplify the design process, allowing users to produce professional-quality visuals without extensive experience. Additionally, Juric found that small businesses using Fotor saved both time and costs on graphic design, helping them maintain a consistent and appealing brand presence across digital platforms [99]. In contrast, traditional tools such as Microsoft Paint or basic online editors lack the sophisticated AI features necessary for automated layouts and design recommendations. Jasper Art furthers this by integrating text-to-image generation with customizable options tailored to marketers' needs [61].

NVIDIA Canvas revolutionizes the creation of photorealistic landscapes by transforming simple sketches into detailed visuals. This process traditionally required manual effort using oil painting or specialized architectural rendering software. According to Choi, NVIDIA Canvas

significantly accelerates the design process by allowing users to create photorealistic landscapes in a fraction of the time required by traditional methods [100]. Rahaman found that the tool's AI-powered sketch-to-visual transformation significantly lowers the barrier to high-quality rendering by reducing the need for technical expertise. Unlike conventional software such as AutoCAD and Revit, which, while powerful, require extensive training and longer production times, this AI-driven approach enhances efficiency and accessibility for non-specialists [101].

4.1.3. Video production

Compared to previous generations of digital technologies, GAI has transformed video production through advanced tools like Runway ML, Synthesia, Pictory, NVIDIA Omniverse, and DeepBrain AI, offering unprecedented efficiency, accessibility, and creative opportunities. Runway ML, for example, transforms video and image editing by autonomously constructing scenes, backdrops, and effects. This task conventionally necessitates considerable manual labour and technical expertise using Adobe Premiere Pro or After Effects software. Additionally, it can automate intricate video editing tasks, including scene and visual effects generation, drastically reducing the time and expertise needed compared to traditional tools like Adobe Premiere Pro or Final Cut Pro [102].

Synthesia, on the other hand, removes the need for physical filming setups by creating realistic talking-head videos from text scripts, dramatically cutting costs while delivering high-quality output [103]. This makes it especially useful for corporate and educational content, as Bolibok stated [104]. Similarly, Pictory simplifies summarizing and repurposing long-form videos into short, engaging social media clips, automating processes that would otherwise require significant manual effort [105]. This capability is especially beneficial for content creators and marketers, who often face time and resource constraints when adapting material for multiple channels.

NVIDIA Omniverse enhances the creative workflow in 3D animation and virtual production through real-time rendering and shared virtual environments. This approach speeds up production timelines and encourages innovation in industries like gaming, film, and architecture [106]. Meanwhile, DeepBrain AI offers interactive video features that adapt dynamically to user input, addressing the rising demand for personalized and immersive video experiences [107].

Smart cropping ensures videos are optimized for various aspect ratios, such as those used on social media platforms, without compromising content integrity. In this regard, the work of [108] discussed the benefits of Adobe Sensei in offering features like automatic scene detection, smart cropping, and audio clean-up, simplifying tasks that traditionally require significant time and effort. For instance, scene detection automatically identifies and segments different parts of a video, allowing the AI to intelligently analyze and modify elements within a frame, for example, removing unwanted objects or seamlessly filling footage gaps, enabling editors to organize and manipulate their footage efficiently. Additionally, Mugubi et al. noted its audio enhancement tools that automatically remove background noise and balance audio levels, delivering professional-grade sound quality without requiring specialized expertise [62]. Adobe Sensei enables users to animate characters in real-time by mirroring a performer's movements via a webcam in animation and visual effects. These tools empower creators to produce high-quality, engaging content without requiring extensive technical or animation skills [62].

Plotagon's innovative character and scene customization tools enable marketers to create highly personalized animations that resonate with specific demographics or buyer personas. By designing characters that reflect traits such as age, style, and cultural nuances, brands can produce content that feels authentic and relatable to their target audience [109]. For example, a travel company could use the following prompt to generate an engaging tourism-related animation: "Create a 45-s animated video featuring a group of international travellers exploring a tropical destination. Showcase their excitement as they visit famous

landmarks, enjoy local cuisine, and participate in cultural activities. Ensure the characters reflect diverse backgrounds and travel styles, making the content appealing to adventure seekers and vacation planners". This approach simplifies animation and reduces production time, empowering marketers to execute compelling campaigns in increasingly competitive digital environments. Additionally, Sagala et al. noted that Plotagon's user-friendly interface allows the rapid creation of promotional videos, explainer animations, or episodic content that seamlessly aligns with a brand's storytelling objectives [110]. These videos are particularly effective on platforms like Instagram, TikTok, YouTube, and LinkedIn, where the visual appeal of animation helps brands cut through the noise and achieve higher levels of engagement.

Lumen5, a GAI-powered platform, transforms video creation for marketing by converting text-based content, such as blog posts and marketing copy, into visually compelling videos. Author [111] emphasized its versatility in producing promotional videos, social media content, and product trailers, positioning it as an indispensable resource for contemporary marketers.

The platform further enhances its utility by supporting custom branding, enabling the integration of logos, fonts, and colour schemes to maintain consistency with a brand's identity. Moreover, as noted by Kedi et al., Lumen5's expansive library of royalty-free media simplifies the creative process, allowing users to access diverse visual assets effortlessly. He further highlights the platform's efficiency, reporting that it significantly reduces production time and costs compared to traditional video production methods [63]. For example, a fashion retail marketer could use the following prompt to generate a video: "Create a 45-s promotional video for a seasonal sale at a fashion retail store. Highlight key discounts, showcase trending outfits with stylish transitions, and include upbeat background music to engage shoppers". Similar prompt example: "Create a 30-s animated video showcasing a trendy new clothing collection. Feature diverse characters walking through a stylish urban setting, trying on outfits, and interacting with digital mirrors that suggest personalized fashion choices. Ensure the animation reflects the latest fashion trends and appeals to a young, fashion-conscious audience". This capability enables businesses to scale their content creation processes effectively and economically, meeting the demands of competitive digital marketing environments. These innovations collectively highlight GAI's transformative impact across various multimedia applications. The 4 table below summarizes key GAI tools, their applications, benefits, use case, accessibility options, and sample prompts and links to the tool to illustrate their practical use in digital marketing and multimedia projects.

4.2. RQ2: What insights can be gained from a case study on implementing GAI in a specific sector or campaign to improve customer engagement and satisfaction?

The second research question of this study explores the insights gained from implementing GAI in the Retail & Fashion, Food & Beverages, and Tourism & Travel industries, providing a comparative analysis that transcends sector-specific GAI applications. Previous research has primarily focused on GAI-driven automation in content generation and customer support [20,52,64]; however, it has not extensively explored real-world applications across different sectors. This study fills that gap by analyzing how specific industries implement GAI tools, providing concrete examples of their impact on digital marketing, GAI tools, and customer engagement. As noted by Refs. [16,65], understanding how GAI optimally functions in diverse consumer-facing industries provides a more holistic perspective on customer interaction trends and AI's adaptability. This RQ in the subsection below examines how prominent brands utilize AI to enhance consumer engagement, including GAI-generated fashion styling in retail (Sephora Case Study), personalized menus in food services (Nestlé Case Study), tailored itineraries and automation of various processes in tourism and travel (KLM, Etihad Airways and Expedia Case Study).

4.2.1. Case 1: Sephora and Unilever

The retail industry is increasingly leveraging GAI to enhance personalized marketing and customer engagement, revolutionizing how brands interact with consumers [59]. A key example of this transformation is Unilever's successful integration of GAI. This British-Dutch multinational consumer goods company owns several prestige beauty brands available in Sephora stores. This case study highlights how Unilever employed GAI, particularly ChatGPT, to drive marketing innovation and precision in its digital campaigns [112].

Similarly, ChatGPT was deployed as a virtual assistant integrated into the Sephora app and website, where it provided personalized beauty tips, answered product queries, and recommended items based on customer preferences. According to Ref. [113], this resulted in a 25 % increase in customer satisfaction scores and a 20 % boost in conversion rates through tailored recommendations. Moreover, in content repurposing, ChatGPT helps switch between blog posts or articles and infographics, newsletters, or podcasts [114]. Besides expanding the reach of marketing content, this adaptability also answers to different audience preferences, which further optimizes the use of primary content and advances overall content management. While Sephora and Unilever are separate entities, their relationship is characterized by Sephora retailing products from Unilever's prestige beauty brands.

4.2.2. Case 2: Nestlé

NesGPT, a customized ChatGPT by the multinational food and beverage company Nestlé, has utilized ChatGPT to enhance its digital marketing [115]. ChatGPT's predictive capabilities enable it to anticipate customer behaviour, assess responses to marketing campaigns, and personalize advertisements based on target groups' preferences. This application mainly focuses on extending the captioning feature and hashtag optimization. Through monitoring audience interactions, Nestlé has successfully applied ChatGPT to post content that reflects people's interests, leading to better engagement. Therefore, this approach has boosted interaction rates and visibility, proving that ChatGPT can enhance the chances of engagement and thereby build brand awareness irrespective of the demographic bracket within the various countries of the internet marketing division [13,66].

4.2.3. Case 3: Coca-Cola

Coca-Cola the pioneer food and beverage company, used GAI tools to create localized content for different markets, including culturally relevant slogans, hashtags, and visual themes [67]. This boosted engagement on social media platforms and fostered stronger connections with diverse audiences [19]. For example, Coca-Cola leveraged GAI during regional festivals to generate vibrant campaign visuals that resonated with local cultural aesthetics [3]. Additionally, ChatGPT was integrated into Coca-Cola's website and mobile app as a virtual assistant, answering customer queries about products, promotions, and nutritional information in real-time. Its ability to provide personalized responses based on user preferences improved query resolution rates by 40 % and increased customer satisfaction scores by 25 % as noted by Cillo [68].

4.2.4. Case 4: Starbucks

Starbucks has historically relied on its in-store baristas to cultivate customer interaction. Nonetheless, this strategy grew progressively tricky as many clients placed orders in advance using the company's mobile application. The scenario became increasingly intricate during the COVID-19 epidemic since the shutdown of physical stores rendered direct encounters unfeasible, limiting customer service to drive-through options and pickup orders.

According to Davenport et al. Starbucks' implementation of Deep Brew highlights the transformative potential of GAI in digital marketing and customer service. Starbucks implemented Deep Brew, its proprietary GAI and ML platform, to revolutionize customer engagement and satisfaction by personalizing the customer experience and

streamlining operations [116].

Yang et al. noted that, Unlike ChatGPT, Deep Brew focuses on tailored recommendations, and predictive analytics ensure quicker preparation and delivery times [117]. Moreover, Deep Brew's ability to adapt to customer preferences through data-driven insights enhances service personalization, delivering a seamless and tailored customer experience. Integrating Deep Brew with voice recognition technologies enables customers to place orders via virtual assistants, such as Alexa or Google Assistant, for a seamless ordering experience [117].

4.2.5. Case 5: KLM airlines, Etihad Airways, and Air India

Implementing GAI in airlines like KLM, Etihad Airways, and Air India represents a significant technological advancement to deliver real-time responses, reduce response times, and effectively meet customer expectations. According to Ref. [118], 83 % of airline customers expect replies to inquiries within 24 h with GAI chatbots.

Lately, some airlines have embraced ChatGPT to automate various processes, such as real-time flight bookings, ticket modifications, and check-ins. For example, KLM Airlines leveraged ChatGPT-powered chatbots to manage flight bookings, special requests, and flight status inquiries, leading to a 25 % reduction in call centre traffic [119]. Furthermore, Etihad Airways introduced a generative AI booking feature through the BOTIM app, enabling customers to complete bookings seamlessly in English and Arabic, enhancing inclusivity and accessibility [120]. Etihad Airways Further employed ChatGPT to handle special requests from passengers, such as meal preferences and seating arrangements [120]. On the other side, Air India implemented a ChatGPT-powered chatbot, "Maharaja," trained to handle various customer inquiries in multiple languages, improving the passenger experience through personalized and multilingual support [121,122].

4.2.6. Case 6: Levi's fashion

According to Dhama, the global fashion industry is projected to expand from \$1.5 trillion in 2020 to around \$2.25 trillion by the end of 2025, reflecting a sustained increase in demand [123]. The study of Rana et al. [69] stated that the impact of GAI on fashion will enhance the industry's ability to comprehend clients' emotions and preferences in style.

Levi Strauss & Co. (Levi's) has embraced GAI to enhance its digital marketing and e-commerce strategies. Using DALL-E 2, Levi's generated unique visuals tailored to themes such as sustainability, diversity, and modern fashion, deployed in social media posts, email campaigns, and online advertisements [124]. For example, the recent work of [51] introduced MARK-GEN. This conceptual framework utilizes GAI models to create marketing content demonstrating how image-based virtual try-on and image-to-video models can be applied to enhance marketing strategies, particularly within the fashion sector. These AI-generated visuals led to a 15 % increase in engagement rates compared to traditional campaigns reliant on stock imagery. Additionally, Levi's integrated GAI into its virtual stylist feature on its e-commerce platform, enabling customers to input preferences such as style, fit, and occasion to receive AI-generated outfit recommendations with customizable visuals [125].

4.2.7. Case 7: L'Oréal

L'Oréal is a global leader in the beauty and cosmetics industry, L'Oréal's e-commerce platforms, powered by ModiFace, offer advanced GAI-driven virtual try-ons, allowing customers to explore different makeup looks, hair colours, and skincare options through lifelike and customized augmented reality experiences [126]. According to Khalil et al., this cutting-edge feature has boosted online conversion rates by 30 %, enabling customers to confidently purchase without visiting a store for trials [127]. Additionally, L'Oréal leverages DALL-E (GAI) to deliver personalized product recommendations by analyzing user-specific details, such as skin type, tone, and individual preferences. Customers can upload selfies, which the AI processes to develop in-depth

beauty profiles, providing tailored product suggestions that enhance satisfaction and build loyalty [128]. L'Oréal also incorporates GAI-powered chatbots into its apps and websites to provide instant beauty advice. These chatbots address questions like "What's the best foundation for oily skin?" or "Which hair colour suits warm undertones?" These bots increase engagement and drive sales by offering customized recommendations and linking directly to products [129]. Beyond personalization, L'Oréal utilizes GAI to create visually engaging content, such as infographics showcasing its sustainability efforts [128]. These include initiatives like refillable packaging and eco-friendly product lines, underscoring its dedication to sustainable practices.

4.2.8. Case 8: Expedia groups, DERTOUR, and edgewater hotel chain

The application of GAI in the tourism and hospitality sectors offers valuable insights demonstrating the ability to handle routine inquiries efficiently, such as answering questions about travel packages, visa requirements, and itinerary details [130]. Expedia Groups successfully employed ChatGPT to manage customer queries about tours and destination-specific requirements, allowing human agents to concentrate on more complex customer needs [131]. Similarly, DERTOUR travel agencies integrated ChatGPT to create personalized travel plans based on customer preferences, significantly reducing planning time and improving overall customer satisfaction [132].

The hospitality sector also provides compelling examples of GAI's impact. For instance, hotels have utilized ChatGPT to streamline check-in and check-out processes, forecast occupancy rates, and manage bookings more efficiently [70]. The Edgewater hotel chain in Arizona integrated ChatGPT into its booking system, enabling the chatbot to manage over 60 % of reservations. This allowed hotel staff to focus on delivering superior guest experiences. Additionally, ChatGPT has been employed as a virtual concierge, providing guests with personalized recommendations for local attractions, dining, and services, enhancing their overall stay [8].

4.2.9. Contributions of the case studies to the proposed framework

Table 5 summarizes the contributions of the case studies to the proposed framework. Each case provides empirical insights into the structure and the nature of relationships within the framework. The Sephora and Unilever case shows how personalization through conversational AI strengthens customer loyalty; thus, supporting the appropriateness of including personalization as a core GAI process, while underlining cultural alignment as a mediating factor. Nestlé's implementation of predictive analytics provided evidence of how behaviour-driven segmentation provided stimulus for the development of a framework with data-driven core processes, while also highlighting data quality as a key moderator. Coca-Cola's localized content and real-time interaction gave evidence for the link between conversational AI and operational efficiency, as well as how cultural and ethical considerations shape the effectiveness of GAI. Starbucks' Deep Brew illustrated the role of predictive personalization in workflow efficiency, thus informing the focus on the operational outcomes layer, as well as the role of system integration as a barrier. The various airline cases provide strong support for automation as a mechanism for lowering the workload on staff and improving service responsiveness, while infrastructure reliability and multilingual capability are mediators. Levi's and L'Oréal have contributed through experiences from the power of using AI-generated visuals and virtual try-on technologies to build trust and engagement, and reinforced visual personalization as a core process, along with quality control, accuracy, and ethical transparency as moderating conditions. Finally, the tourism and hospitality industries demonstrated how GAI automates the routine interactions, though human oversight is required, which in turn validated the need for the continuous learning loop within the framework.

Collectively, the above case studies closely aligned with the components of the conceptual framework: the use of ChatGPT, DALL-E, Deep Brew, and other GAI systems across retail, fashion, food and beverage,

Table 5
Summary of GAI and their tools and prompts in transforming digital marketing workflows and production.

GAI-Tools	Digital Marketing	How it Helps with Marketing Transformation	Key Benefits	Impact	Traditional tools	Accessibility	Sample Prompt and tool link
ChatGPT	Content Creation	Brainstorming ideas, creating marketing content, developing personalized solutions	Improved creativity, time efficiency	Coca-Cola leveraged ChatGPT to generate location-specific ad copy and content tailored for Twitter, Instagram, and LinkedIn.	Microsoft Word, Google Docs (with manual brainstorming and drafting).	The free basic version, subscription-based Pro version for advanced features.	<i>“Create a social media post promoting a new product launch with a cheerful tone and a call-to-action.”</i> https://chatgpt.com/
Jasper.ai		Generating blog posts, product descriptions, and ad copy	Time efficiency, personalization	Goosehead Insurance produced blog articles, email campaigns, and repurposed content.	Copywriters and advertising agency templates.	Subscription-based, free trial.	<i>“Write a blog post on the benefits of sustainable packaging for small businesses.”</i> https://www.jasper.ai
Writesonic		Writing marketing content, product descriptions, and SEO-optimized articles	SEO optimization, productivity boost	E-commerce businesses generated compelling SEO-friendly product descriptions.	Freelance writers	Free trial with tiered subscription plans.	<i>“Generate a product description for a luxury smartwatch targeting tech-savvy professionals.”</i> https://x.gd/hTkun
Frase.io		Aligning content with user intent through SEO research and optimization	Enhanced organic traffic, data-driven insights	Produce SEO-oriented blog posts and analyze trending topics to boost search engine rankings.	Manual keyword research tools like Google Keyword Planner and SEO copywriting	Subscription-based, with pricing options for different needs.	<i>“Analyze search engine data and suggest topics for a blog on sustainable travel.”</i> https://www.frase.io/
DALL-E 2	Visual Design	Creating tailored images for social media campaigns	Enhanced creativity, time efficiency	Advertising platforms like Omneky utilized DALL-E 2 for tailored image creation, boosting creativity and efficiency.	Adobe Photoshop	Subscription-based with free credits for trial.	<i>“Generate an image of a futuristic cityscape with vibrant neon lights, inspired by cyberpunk aesthetics.”</i> https://dalle3.ai/
Canva’s Magic Write		Creating infographics and social media posts.	Time efficiency, creativity enhancement	Reported a 40 % reduction in the time spent creating visual content.	Canva’s standard templates and PowerPoint	Free and Pro version with premium features.	<i>“Design a professional infographic on sustainable energy using Canva templates and AI tools.”</i> https://www.canva.com/magic-write/
MidJourney		Generating unique visuals on demand	Unparalleled speed and flexibility	Custom visuals for campaigns, enabling quicker rollouts and greater flexibility.	CorelDRAW and Photoshop.	Subscription-based.	<i>“Create a surrealistic image of a desert with floating islands.”</i> https://www.midjourney.com/home
Adobe Firefly		Enhancing workflows by automating tasks like stylistic text effects and colour variations	Improved productivity and reduced repetitive tasks.	Integrate Firefly with Photoshop to speed up visual editing and automate stylistic elements, saving significant time.	Photoshop, and Illustrator	Included in Adobe Creative Cloud subscriptions	<i>“Create a colour gradient effect on text inspired by sunset hues.”</i> https://www.adobe.com/ae_en/products/firefly.html
DeepArt		Converting photos into stylized artworks.	Democratized creative process, time efficiency	Artists transformed simple photos into works.	Photoshop	Free and paid plans for higher resolutions.	<i>“Convert a photo into a Van Gogh-style artwork.”</i> https://www.deepartefects.com/?srsltid=AfmBOoqW81QutaRus1PyqRRQDw4BY6hPBaozYcbQInF84Ctuf3v9y8Qy
Fotor		Simplifying the creation of marketing materials, logos, and social media graphics	Time and cost savings	Small businesses producing professional quality visuals without extensive design expertise.	Adobe Lightroom and GIMP.	Free plan, with subscription for advanced features.	<i>“Create a logo for a tech startup using minimalist design principles.”</i> https://www.fotor.com/
NVIDIA Canvas		Transforming simple sketches into photorealistic landscapes	Reduced design time, accessibility	Architects and designers created realistic visuals from basic sketches.	Manual 3D modeling and environment creation using Blender or Maya.	Free for NVIDIA users with supported hardware.	<i>“Sketch a mountain range with a lake, and turn it into a photorealistic rendering.”</i> https://www.nvidia.com/en-me/studio/canvas/
Runway ML	Video Production	Automates video editing.	Time efficiency, automation of complex tasks	Filmmakers automated scene construction and visual effects.	Final Cut Pro and After Effects	Subscription-based offers free trial for limited use.	<i>“Create a dynamic action sequence with glowing neon effects in a cyberpunk theme.”</i> <i>(continued on next page)</i>

Table 5 (continued)

GAI-Tools	Digital Marketing	How it Helps with Marketing Transformation	Key Benefits	Impact	Traditional tools	Accessibility	Sample Prompt and tool link
Synthesia		Creates realistic talking-head videos from text scripts	Cost efficiency, high-quality output	Educational institutions created professional videos for training and communication.	Adobe Premiere Pro	Subscription-based enterprise plans.	https://runwayml.com/ "Generate a corporate training video explaining cybersecurity best practices." https://www.synthesia.io/
Pictory		Summarizes long-form videos into short, engaging clips for social media	Automation, time efficiency	Content creators repurposed webinars and podcasts into short clips for Instagram and TikTok.	PowerPoint, Final Cut Pro	Subscription-based, free trial.	"Summarize this 1-h webinar into three 2-min clips for social media promotion." https://pictory.ai/?el=2000b&htrafficsource=pictoryblog
NVIDIA Omniverse		Real-time rendering and shared virtual environments for 3D animation and design	Enhanced collaboration, speed in production	Gaming, film, and architectural projects leveraged Omniverse for faster production timelines.	Autodesk Maya or Unreal Engine for simulation.	Free for NVIDIA users, with enterprise options available.	"Create a real-time collaborative 3D animation environment for a futuristic cityscape." https://www.nvidia.com/en-us/omniverse/
DeepBrain AI		Adapts videos dynamically based on user input	Personalized video experiences	Businesses used interactive videos for personalized customer engagement, improving click-through rates and conversion.	After Effects	Subscription-based, enterprise features.	"Create an interactive onboarding video for new users with adaptive branching options." https://docs.deepbrain.io/
Adobe Sensei		Offers automated scene detection, smart cropping, audio clean-up, and motion tracking	Streamlined workflows, and reduced manual effort.	Video editors created professional-grade content with scene segmentation, optimized aspect ratios, and noise.	Photoshop, Illustrator, and Premiere Pro.	Included in Adobe Creative Cloud subscriptions	"Automatically detect scenes and optimize this 5-min video for Instagram Reels and YouTube." https://business.adobe.com/products/sensei/adobe-sensei.html
Plotagon		Simplifies character and scene creation for targeted animations	Personalized content, time savings	Marketers created relatable characters and scenes for Instagram and TikTok campaigns, boosting audience engagement.	Toon Boom and Flash.	Free and paid plans for advanced features.	"Create a promotional video featuring characters representing diverse demographics." https://www.plotagon.com/
Lumen5		Converts text-based content into visually compelling videos	Versatility, custom branding	Marketers transformed blog posts and promotional copy into branded videos for social media campaigns.	Adobe Premiere Pro and iMovie.	Free plan with paid options for advanced features.	"Turn this blog post into a 60-s promotional video with custom branding and logo integration." https://lumen5.com/

beauty, tourism, and hospitality reflect the inputs and core processes of the framework, such as AI-driven video production, personalized messaging, automated content creation, and real-time customer interaction. The consequent benefits that come along, such as improved customer engagement, enhanced brand loyalty, campaign efficiency & speed, better audience segmentation, and reduced manual workload, relate to the intermediate outcomes of the framework. At the same time, challenges found in practice, such as privacy and security concerns, ethical risks, workforce resistance and skills gaps, quality control and brand consistency issues, cultural and linguistic misalignment, and technological constraints Further, several cases show iterative refinement and supervision, such as optimizing recommendations or improving virtual assistants, which underlines the contribution of the continuous learning loop to sustaining performance. These patterns directly inform the construction of the conceptual framework that is discussed in the next subsection, synthesizing these elements into a unified model of GAI adoption in digital marketing.

4.2.10. Conceptual framework for GAI in digital marketing

A novel conceptual framework for GAI adoption in digital marketing

is presented in this study (Fig. 9), the diagram provides a framework for understanding the ways in which ChatGPT, DALL-E, Jasper, Mid-Journey, and other (GAI) tools support digital marketing. Core operations like AI-driven video production, personalized messaging, automated content creation, and real-time customer interaction are made possible by these tools. However, a number of mediators and barriers, such as concerns about privacy and security, moral dilemmas, a lack of skills in the workforce, and cultural or technological constraints, affect how effective they are. These procedures enhance segmentation, efficiency, engagement, and brand loyalty, which promotes innovation, competitive advantage, marketing efficacy, and sustainable adoption. Ongoing improvement is ensured by a continuous learning loop that includes testing, supervision, and cooperation.

By providing a structured model that unifies adoption drivers, constraints, and outcomes into a single, cohesive system, this framework constitutes a theoretical contribution.

4.2.11. Testable propositions from the conceptual framework

A set of testable propositions has been developed to strengthen the theoretical contribution of the proposed Framework for GAI Adoption in

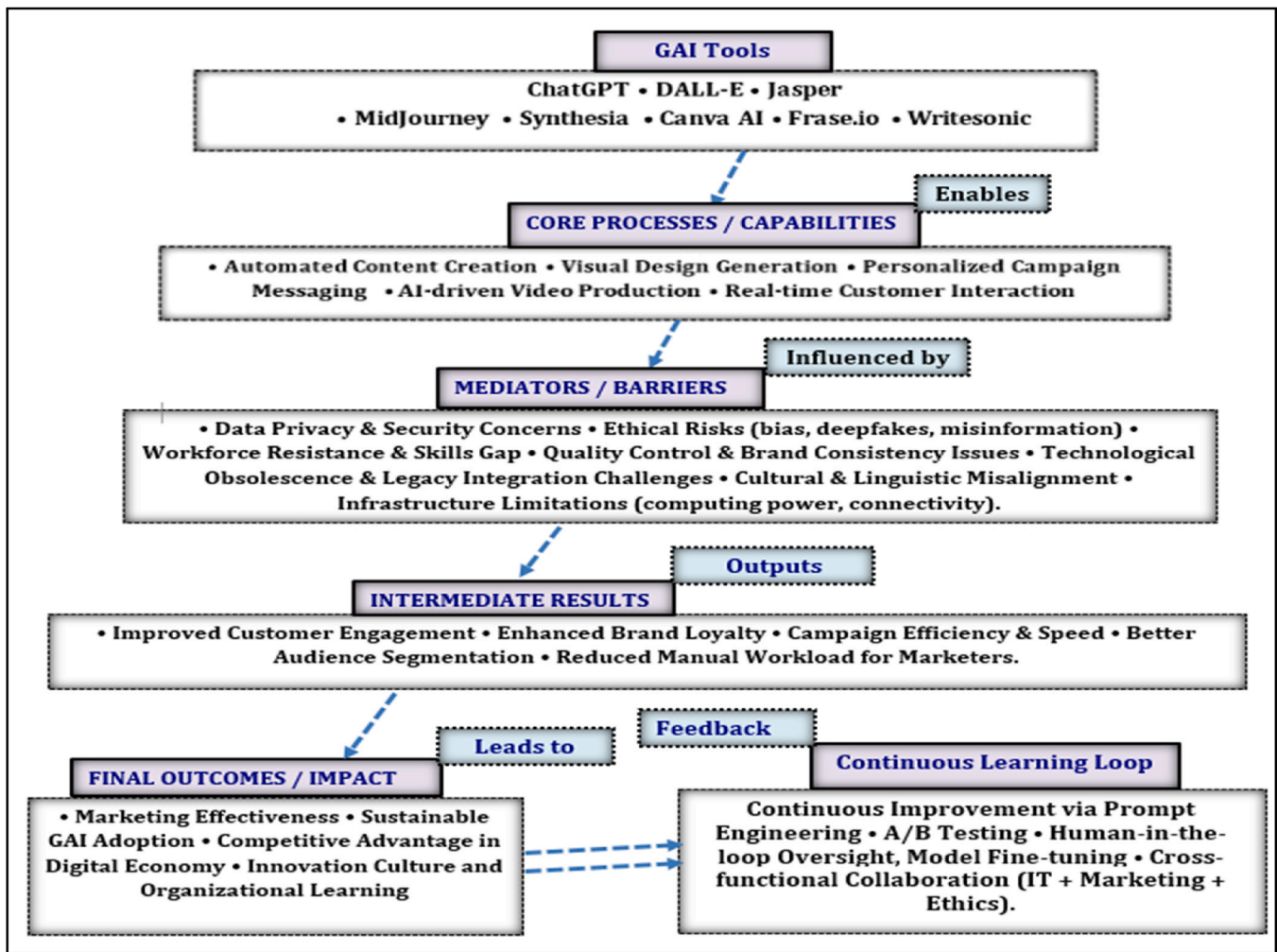


Fig. 9. Conceptual framework for GAI adoption in digital marketing.

Digital Marketing and ensure that it can be empirically validated, extended, and operationalized in future research. The propositions have been directly derived from the structural pathways illustrated in Fig. 9, including GAI tools, core processes, mediators/barriers, intermediate results, and final impacts. The testable propositions are as follows.

1 Propositions on GAI tools and core processes

It therefore suggests that the GAI tools, including but not limited to ChatGPT, MidJourney, DALL-E, Jasper, and Canva AI, facilitate core processes and capabilities such as the automated creation of content, visual design creation, personalized messaging for campaigns, AI-driven video production, and real-time customer interaction.

P1:

GAI tools adoption in digital marketing is positively related to a set of enhanced core processes and capabilities like automated content creation, visual design generation, personalized campaign messages, AI-driven video production, and real-time customer interaction.

2 Propositions on Mediators and Barriers

The framework identifies a number of organizational and environmental factors that may influence or moderate the effectiveness of GAI tools adoption, such as privacy and security concerns, ethical risks, workforce resistance and skills gaps, quality control and brand

consistency issues, cultural and linguistic misalignment, and technological constraints.

P2a:

Security and data privacy concerns negatively impact the relationship between GAI-enabled processes and improved customer engagement, and their outcomes in terms of increased brand loyalty and sustainable GAI adoption.

P2b:

Ethical risks negatively mediate the influence of GAI-enabled processes and capabilities on improved customer engagement, and their outcomes in terms of increased brand loyalty and sustainable GAI adoption. It leads to poor customer involvement and less effective marketing, thus decreasing competitiveness.

P2c:

Workforce resistance and skills gaps weaken the effectiveness of GAI-enabled processes and capabilities to diminish manual workload and improve campaign efficiency. This, in turn, impacts negatively on an organization's ability to achieve an innovation culture and sustained adoption.

P2d:

The limitations in technological and infrastructural capabilities are negatively mediating the influences of GAI-powered processes and capabilities on campaign speed, scalability, and automation, hence weakening their impacts on competitive advantages in digital marketing.

P2e:

Quality control and brand consistency issues mediate the outcomes of GAI-enabled process and capability-related factors to lower segmentation accuracy and brand loyalty, which implies a reduced marketing effectiveness.

P2f:

Cultural and linguistic misalignment negatively mediates the impact of GAI-enabled processes and capabilities on segmentation accuracy, thereby reducing the likelihood of sustainable GAI adoption across diverse markets.

3 Propositions on Intermediate Outcomes and Strategic (Final) Impact

The framework posits that enhanced customer engagement, segment refinement, lower manual workload, and speedier campaigns are the intermediary mechanisms through which GAI adoption yields long-term strategic benefits.

P3:

Intermediate outcomes, such as improved customer engagement, enhanced brand loyalty, campaign efficiency & speed, better audience segmentation, and reduced manual workload, mediate the relationship between GAI-enabled processes and final organizational outcomes such as marketing effectiveness, sustainable GAI adoption, competitive advantage, innovation culture, and organizational learning.

4 Propositions on the Continuous Learning Loop

This continuous learning loop in the framework emphasizes iterative testing, human judgment, model refinement, and interaction among different functions.

P4:

The strength of an organization's continuous learning loop-including enhancing prompt engineering, systematic testing, human-in-the-loop oversight, iterative refinement processes, and cross-functional collaboration, positively moderates the overall effectiveness of GAI tools adoption by improving output quality and ensuring ethical and responsible use, and enhancing organizational learning. This, in turn, reinforces long-term sustainable GAI adoption, innovation culture, and marketing effectiveness.

Collectively, these propositions transform the conceptual framework into a theoretically grounded set of relationships that can be empirically tested in future studies. They provide a basis for testing quantitative propositions, qualitative exploration of organizational processes, and the adoption outcomes of GAI tools.

4.3. RQ3: What are the key barriers to adopting GAI tools in digital marketing and customer service, and how can organizations address them effectively?

Previous studies emphasize the transformative role of GAI in boosting efficiency, personalization, and creativity in digital marketing and customer service. However, there is a limited exploration of the barriers that hinder its adoption. For instance, Gupta et al. [7] examined GAI's impact on marketing efficiency but did not address organizational, ethical, and technical challenges tied to its implementation. The work of Sigala et al. [71] mainly discusses ChatGPT, limiting generalizability to other GAI tools, focused primarily on the service industry, and does not deeply explore cross-industry challenges in GAI adoption. Similarly, Kshetri et al. [20] explored its influence on customer experience but did not explore strategies for overcoming workforce resistance or technical integration difficulties. While Bilgihan et al. [72] briefly acknowledged these challenges, they did not analyze their implications for adoption. Abrokwah et al. [21] focused on case studies of successful implementations but overlooked the broader organizational readiness required for GAI adoption. By addressing these obstacles, this study fills the gap by identifying barriers and proposing practical strategies, such

as workforce training programs, ethical AI frameworks, and cost-sharing models, to facilitate adoption. Hence, this pragmatic approach sets the third RQ of this study apart from existing research. Below subsection and Table 7 underscore the multifaceted barriers to the adoption of GAI in digital marketing and customer service (see Table 8).

4.3.1. Data privacy and security

Generative AI (GAI) techniques are contingent upon access to extensive client data, raising considerable privacy and security concerns. Prior research suggests that data breaches and non-compliance with privacy legislation such as GDPR and CCPA significantly hinder firms from adopting AI technologies [133].

Clients anticipate that organizations will manage their data judiciously, and any misappropriation may lead to legal repercussions and harm to reputation. Studies by Roh et al. emphasize that consumer trust is decisive in technology adoption. They found that clients are more likely to engage with organizations that demonstrate a strong commitment to ethical data management and privacy safeguards [134]. El Mestari et al. identified a trade-off between data utility and privacy preservation in AI systems. Their research noted that while data minimization techniques like differential privacy enhance security, they can also reduce the accuracy and personalization of AI outputs [135].

To address this, organizations must invest in cutting-edge privacy-preserving machine learning techniques, such as federated learning, which allows AI models to be trained on decentralized data without compromising privacy. This approach balances regulatory compliance with maintaining AI effectiveness to mitigate privacy risks and create a foundation of trust, paving the way for broader acceptance of GAI technologies.

4.3.2. Ethical considerations

One of the critical barriers to adopting GAI tools in digital marketing is the ethical dilemmas they present, including concerns over content authenticity, biases in output, and potential misuse. Oyeniran et al. [73] determined that biases in AI training data can produce discriminating or inequitable results, resulting in unforeseen ethical consequences. Biased AI-generated marketing content might marginalize specific demographic groups, compromising values of justice and inclusivity [74].

The proliferation of deceptive GAI-generated content, such as deepfakes, has exacerbated public scepticism. Eberl et al. emphasized the considerable societal dangers presented by deepfakes, especially their involvement in disinformation operations that undermine trust in digital media and institutional integrity [136]. This highlights the pressing necessity for organizations to establish ethical safeguards and verification mechanisms. Watermarking AI-generated material and utilizing blockchain-based verification might improve transparency and guarantee accountability.

The ethical deployment of GAI necessitates a dedication to justice, accountability, and transparency. Díaz et al. underscored that ethical AI frameworks must prioritize these principles to harmonize AI applications with social norms while mitigating potential harm [137]. Organizations can accomplish this by forming interdisciplinary ethics committees to supervise GAI initiatives, including ethical issues at every stage of conception and implementation.

4.3.3. Resistance to change

Resistance to change is a considerable obstacle to integrating generative GAI tools in digital marketing, frequently arising from employee apprehensions around job displacement, scepticism about the technology's trustworthiness, and a lack of comprehension of its functionalities. Ivchik et al. [138] observed that organizational inertia and cultural opposition often impede technological innovation, a notion that remains pertinent in the context of GAI. Marketing professionals may apprehend that AI-driven automation would render their creative and strategic competencies obsolete, resulting in a reluctance to embrace these solutions.

Table 6
Contributions of case studies to framework development.

Case Study	GAI Deployment	Observed Outcomes	Specific Insight Derived	Contribution to Framework Development
Sephora & Unilever (Retail & Beauty)	ChatGPT was used as a virtual assistant that provided personalized beauty advice, answered customer queries, and repurposed marketing content across different formats.	The company recorded a 25 % increase in customer satisfaction and a 20 % increase in conversion rates.	This case demonstrates that personalized conversational AI tools can significantly enhance customer engagement, trust, and purchase likelihood.	Informed the framework by establishing that personalized messaging is a core process that leads to improved engagement and loyalty. It also showed that cultural and linguistic adaptation plays a moderating role in determining how effectively personalization translates into customer satisfaction.
Nestlé – NesGPT (Food & Beverage)	Nestlé deployed a customized version of ChatGPT, called NesGPT, for predictive analytics, automated caption generation, hashtag optimization, and behavior-based content strategies.	The company achieved higher engagement rates and increased brand visibility as the tool helped align content with customer interests and online behavioural trends.	Illustrates that predictive GAI tools can enhance audience segmentation and improve the precision of marketing campaigns.	demonstrated that predictive analytics and automated content creation are core processes that support better segmentation and targeting. It also highlighted the importance of data quality and behavioural insight as mediating factors that determine how effectively predictive tools improve marketing outcomes.
Coca-Cola (Food & Beverage)	Coca-Cola used GAI to create culturally relevant marketing content for different regions and integrated ChatGPT into its website and app to provide real-time product assistance.	The company reported a 40 % improvement in query resolution and a 25 % increase in satisfaction because the tool provided fast, accurate, and personalized responses.	Demonstrates that real-time GAI support systems can significantly enhance customer service efficiency, particularly when messages are localized to align with cultural expectations.	Demonstrated that real-time interaction is a core process leading to operational efficiency and improved satisfaction. It also highlighted cultural fit, ethical sensitivity, and message accuracy as important mediating factors that influence the strength of the AI's impact.
Starbucks – Deep Brew (Food & Beverage)	Starbucks implemented Deep Brew to provide personalized drink recommendations, predict customer demand, and integrate with voice assistants for seamless ordering.	The company observed improved operational efficiency, faster order preparation, and a more personalized customer experience.	Demonstrates that predictive modelling, when integrated into everyday operations, can streamline workflows and enhance personalization.	Reinforced the link between predictive personalization and efficiency-related outcomes. It also highlighted the importance of system integration and workflow management as barriers that influence GAI adoption, supporting their placement as mediators
KLM, Etihad Airways, Air India (Aviation)	These airlines employed ChatGPT-based systems for real-time booking support, multilingual assistance, itinerary modifications, and personalized travel queries.	Airlines reported that 83 % of customer queries were answered within 24 h and call centre traffic was reduced by 25 %, significantly improving service responsiveness.	This case shows that automation and multilingual GAI tools reduce manual workload and increase accessibility for diverse customer groups.	Demonstrated that automation is a core process that leads to improved operational efficiency and reduced staff burden. It also highlighted multilingual capability, infrastructure stability, and data governance as mediating factors that moderate the effectiveness of AI-driven automation.
Levi's (Fashion)	Levi's used DALL-E 2 to generate original, campaign-specific visual content and incorporated an AI-powered virtual stylist to support users with personalized outfit recommendations.	The company achieved a 15 % increase in customer engagement due to visually appealing, targeted content and interactive styling assistance.	This case illustrates that generative visual content can substantially enhance digital engagement and stimulate interest in brand offerings.	Demonstrated that automated visual content creation is a core process that supports engagement-oriented outcomes. It also highlighted quality control and brand consistency as mediating variables that must be managed to maintain trust.
L'Oréal (Beauty & Cosmetics)	L'Oréal utilized ModiFace for virtual try-ons, DALL-E for personalized product suggestions, and GAI tools to create visually engaging sustainability content for marketing campaigns.	The company recorded a 30 % increase in online conversion rates, higher customer confidence in virtual purchasing, and increased engagement with sustainability messages.	This case highlights that high-quality visual personalization increases trust, reduces uncertainty, and reinforces brand values.	Strengthening the pathway between visual personalization and intermediate outcomes such as trust and conversion. It also justified including ethical transparency and visual accuracy as mediators, and contributed to the framework's outcome layer by demonstrating how GAI can reinforce long-term brand reputation and innovation culture.
Expedia, DERTOUR & Edgewater Hotels (Tourism & Hospitality)	Travel and hospitality firms implemented ChatGPT to manage itinerary planning, booking automation, real-time customer queries, and virtual concierge services.	These deployments improved customer satisfaction, reduced staff workload, and enabled faster and more consistent service delivery.	This case shows that routine task automation through GAI can free human staff for higher-value activities while enhancing overall service responsiveness.	Provided evidence that automation supports both customer satisfaction and operational efficiency. It also illustrated the importance of human oversight, iterative refinement, and continuous improvement, helping justify the inclusion of the continuous learning loop as a reinforcing mechanism in the framework.

Table 7
Summary of the key barriers to adopting GAI and coping strategies.

Barrier	Implication	Cope Strategies	Ref.
1. Data Privacy and Security	<ul style="list-style-type: none"> - Non-compliance with privacy laws (e.g., GDPR, CCPA). - Privacy-preserving techniques 	<ul style="list-style-type: none"> - Implement advanced privacy-preserving methods like federated learning. 	[133]
		<ul style="list-style-type: none"> - Ensure compliance with privacy regulations. - Foster consumer trust through transparent and ethical data handling. - Regularly audit systems to address vulnerabilities. 	[134] [135]
2. Ethical Concerns	<ul style="list-style-type: none"> - Biased outputs - Misuse of GAI (e.g., deepfakes), and lack of transparency - Generated content may marginalize specific demographics or perpetuate disinformation. 	<ul style="list-style-type: none"> - Develop ethical AI frameworks focusing on fairness, accountability, and transparency. - Use watermarking and blockchain for content verification. - Form ethics committees for oversight. 	[73]
		<ul style="list-style-type: none"> - Conduct regular audits to detect biases. - Conduct training programs to highlight GAI's role in augmenting creativity. - Use change management frameworks (e.g., Kotter's model) to facilitate adoption. - Promote stakeholder involvement and emphasize the collaborative benefits of GAI tools. 	[74] [137]
3. Resistance to Change	<ul style="list-style-type: none"> - Employee apprehensions about job displacement - Marketing professionals perceive GAI as a threat to creative and strategic roles rather than a supportive tool. 	<ul style="list-style-type: none"> - Conduct training programs to highlight GAI's role in augmenting creativity. - Use change management frameworks (e.g., Kotter's model) to facilitate adoption. - Promote stakeholder involvement and emphasize the collaborative benefits of GAI tools. 	[138]
		<ul style="list-style-type: none"> - Introduce rigorous quality control processes. - Human oversight is employed to validate AI-generated content. - Fine-tune GAI models to align with brand tone and values. - Combine AI outputs with human oversight to maintain quality and brand integrity. - Implement ongoing monitoring and refinement mechanisms. 	[140] [141] [75] [76]
4. Quality and Brand Alignment	<ul style="list-style-type: none"> - Produce content with errors, irrelevance, or inconsistencies that do not align with brand identity - Content may fail to resonate with target audiences due to inadequate contextual understanding. 	<ul style="list-style-type: none"> - Invest in modular and scalable technologies to future-proof systems. - Allocate resources for continuous training and system upgrades. - Foster partnerships with technology providers for seamless updates and integrations. - Cultivate adaptability within teams. 	[142] [2] [143]
		<ul style="list-style-type: none"> - Firms struggle to allocate resources for updates, training, and integration of new tools, risking competitive disadvantage. 	[144] [78] [145]
5. Technological Obsolescence	<ul style="list-style-type: none"> - Firms struggle to allocate resources for updates, training, and integration of new tools, risking competitive disadvantage. 	<ul style="list-style-type: none"> - Invest in modular and scalable technologies to future-proof systems. - Allocate resources for continuous training and system upgrades. - Foster partnerships with technology providers for seamless updates and integrations. - Cultivate adaptability within teams. 	[144] [78] [145]

Table 7 (continued)

Barrier	Implication	Cope Strategies	Ref.
6. Cultural and Regional Nuances	<ul style="list-style-type: none"> - GAI tools may lack cultural nuance and regional specificity, reducing relevance for diverse global audiences. - Inadequate localization capabilities hinder effective engagement in global markets. 	<ul style="list-style-type: none"> - Train models on diverse datasets that represent cultural and linguistic nuances. - Prioritize robust localization strategies for different markets. - Conduct regular audits for cultural relevance and inclusivity. - Engage local experts in content development. 	[147] [49] [148] [149]
		<ul style="list-style-type: none"> - Many organizations do not understand GAI's potential benefits for enhancing marketing and customer service. - Insufficient skills among employees and decision-makers impede effective adoption and limit GAI usage to niche applications. 	[9] [156] [157] [50] [159]
7. Awareness and Knowledge Gaps	<ul style="list-style-type: none"> - Real-time responsiveness is crucial in marketing, but infrastructure deficiencies can delay content generation and diminish customer experience. - Insufficient computing infrastructure, particularly in developing regions. 	<ul style="list-style-type: none"> - Raise awareness through workshops, case studies, and success stories. - Offer training programs to build employee proficiency. - Partner with AI vendors to gain tailored guidance. - Share examples of successful GAI integration in similar industries. 	[9] [156] [157] [50] [159]
		<ul style="list-style-type: none"> - Partner with Cloud-based AI services. - Collaborate with AI technology providers and digital marketing platforms that offer AI-as-a-Service (AaaS) like OpenAI, IBM Watson, and Salesforce Einstein. - Implementing edge computing. 	[160] [161] [162] [163] [165]
8. Infrastructure Limitations	<ul style="list-style-type: none"> - Real-time responsiveness is crucial in marketing, but infrastructure deficiencies can delay content generation and diminish customer experience. - Insufficient computing infrastructure, particularly in developing regions. 	<ul style="list-style-type: none"> - Partner with Cloud-based AI services. - Collaborate with AI technology providers and digital marketing platforms that offer AI-as-a-Service (AaaS) like OpenAI, IBM Watson, and Salesforce Einstein. - Implementing edge computing. 	[160] [161] [162] [163] [165]

Salih et al. indicated that over 40 % of employees are concerned about job displacement resulting from new technology [139], such as Enterprise Systems [140]. These challenges are especially prominent in digital marketing, where originality and customization are essential. According to Refs. [75,141], employees may perceive GAI as a danger to their positions, particularly in content generation and campaign strategy, rather than as an instrument to enhance their productivity and creativity. To surmount these hurdles, enterprises must aggressively rectify misconceptions regarding GAI. When incorporated judiciously, AI technologies can augment human creativity and improve productivity instead of displacing jobs [76]. By highlighting GAI's capacity to optimize repetitive operations and deliver data-driven insights, firms may transform the discourse from displacement to empowerment.

Furthermore, effective change management tactics are essential in mitigating resistance. Author [77] underscored the significance of training, communication, and stakeholder involvement in facilitating successful AI technology adoption. It is critical to provide employees with practical training on GAI tools in digital marketing, such as videos or graphics prompt creation tools, to comprehend how the technology might improve their performance. To mitigate objections, businesses must highlight GAI's function in enhancing human creativity and production instead of supplanting employment. Efficient change management solutions, encompassing prompt engineering training, can facilitate the shift.

4.3.4. Quality control

A significant obstacle to implementing GAI tools in digital marketing and customer engagement is preserving quality, consistency, and alignment with brand values. Although GAI technologies can generate substantial amounts of material, studies indicate that their outputs

Table 8

Key research questions for future studies on GAI in digital marketing.

Future Research Question (RQ)	Key Areas of Investigation & Expected Contributions
RQ1: How does GAI compare to traditional digital marketing methods in engagement, cost-efficiency, and ROI across industries?	Tracking engagement metrics and measuring ROI. Insights will help businesses assess AI's practical value.
RQ2: What are AI-generated content's long-term psychological, behavioral, and ethical implications on consumer trust and brand loyalty?	Studying AI's influence on consumer perception, brand relationships, and ethical risks (e.g., misinformation, bias, data privacy). Findings will inform responsible AI use.
RQ3: How can GAI integrate with AR, VR, and IoT to enhance personalized marketing and customer engagement?	Investigating AI's synergy with immersive technologies and smart IoT devices to improve customer experience. Results will shape GAI-driven marketing strategies.
RQ4: What strategies can businesses adopt to overcome workforce resistance, infrastructure challenges, and other barriers to GAI adoption?	Identifying change management approaches, cost-effective implementation strategies, and scalable GAI solutions. This will help organizations streamline adoption.
RQ5: How can GAI models be adapted to diverse cultural and linguistic contexts while ensuring sustainability and ethical compliance?	Evaluating multilingual GAI capabilities, cross-cultural marketing effectiveness, and eco-friendly AI practices. The research will enhance global GAI inclusivity.

frequently exhibit mistakes, irrelevance, or misalignment with brand identity. Li et al. [142] discovered that AI-generated content occasionally does not connect with target audiences because of insufficient contextual comprehension, resulting in diminished engagement and possible reputational hazards for companies.

Similarly, the work of [2] observed that models like OpenAI's GPT series may provide factually incorrect or contextually inappropriate content, potentially eroding consumer trust. In digital marketing, where brand voice and message consistency are paramount, such blunders can lead to material that estranges customers or undermines a company's reputation. A slight error in AI-generated advertising material might result in customer unhappiness, whilst tonal or message irrelevance can undermine brand credibility.

To tackle these issues, firms must implement rigorous quality control systems. Reference [143] asserts that human control in the AI content development process markedly enhances content quality and guarantees adherence to brand values. Human evaluators can verify the precision, tone, and pertinence of AI-generated content, reducing the likelihood of inaccuracies. Furthermore, firms can implement fine-tuning procedures to customize GAI models to their brand requirements, enhancing alignment with marketing objectives and client anticipations.

4.3.5. Increasing technological advancement

GAI tools and systems rapidly become outdated due to ongoing innovation, and this issue is especially evident in digital marketing, where the capacity to utilize advanced technologies directly influences customer engagement and campaign efficacy. Chen et al. [144] assert that digital marketing organizations that do not adapt to technological advancements jeopardize their competitive standing. This signifies forfeiting market share to competitors who utilize more advanced GAI solutions that provide enhanced personalization, predictive analytics, and client engagement.

Moreover, the rapid advancement of GAI tools presents issues about resource allocation for updates and training [78]. numerous firms have encountered difficulties in allocating adequate resources for ongoing system enhancements and employee training initiatives, which are crucial for maximizing GAI potential. This resource limitation can

hinder companies from sustaining the efficacy and pertinence of their AI-driven marketing initiatives.

Motevalli et al. found that the swift advancement of AI technologies frequently leads to compatibility challenges with legacy systems, resulting in implementation bottlenecks. Integrating powerful generative AI for real-time content creation with legacy CRM platforms may necessitate expensive modifications, discouraging enterprises from embracing these technologies. Organizations must adopt a proactive strategy to overcome these obstacles, which entails investing in modular and scalable systems, cultivating a culture of continuous learning through employee training, and implementing flexible resource allocation methods [145].

4.3.6. Cultural and regional variations

GAI methodologies are often trained on datasets that may insufficiently account for cultural nuances or geographical preferences [146]. Talat et al. [147] demonstrate that GAI models usually display subpar performance for underrepresented linguistic and cultural groups. This limitation may result in content that fails to resonate with diverse consumers, particularly in global markets.

Research conducted by Akter et al. [49] stated that the implementation of GAI tools in digital marketing and client engagement encounters numerous substantial obstacles, especially with cultural and regional differences because technologies are frequently trained on datasets that insufficiently consider cultural nuances or regional preferences, resulting in a disconnection with varied audiences. Similarly, Weidinger et al. found that AI models frequently perform poorly for marginalized language and cultural groups [148]. This constraint may yield content that fails to connect with diverse audiences, especially in global markets. A marketing campaign tailored for a Western audience may not effectively resonate with an Eastern audience due to cultural values, language, and consumer behaviour disparities.

Chi et al. indicate that cultural factors, including individualism vs collectivism, power distance, and uncertainty avoidance, substantially affect consumer behaviour and preferences [149]. Generative AI algorithms that neglect these characteristics may generate content deemed irrelevant or offensive in specific cultural contexts. A marketing message highlighting individual accomplishment may not be compelling in a collectivist society prioritising social cohesion.

The problem of language and localization is a further significant obstacle. Generative AI technologies frequently encounter difficulties with underrepresented languages in their training datasets [150]. This may result in subpar translation quality, erroneous tone, and an absence of idiomatic terms crucial for effective communication. A report by Ref. [151] indicates that businesses who inadequately localize their content may forfeit up to 40 % of their potential market share in non-English speaking areas. Likewise, Brands that prioritize localization observe a 30–60 % enhancement in engagement vs. those that depend exclusively on English content [152]. Poor localization can lead to substantial market share loss in non-English-speaking areas, constraining a company's growth potential. Companies who neglect to provide localized content jeopardize prospective clientele and encounter obstacles in global growth, as they find it challenging to engage with varied audiences and fulfil their linguistic and cultural requirements [153].

To surmount these obstacles, ethical AI frameworks with cultural sensitivity guidelines should be established to help prevent biases in AI-generated content, as recommended by UNESCO and AI Ethics Boards [154,155]. Partnering with local influencers ensures authenticity while training GAI models on diverse, region-specific datasets improves cultural relevance. Advances in multilingual AI, like mT5 and XLM-R, enhance contextual accuracy and human oversight through a human-in-the-loop (HITL) approach to refine content. Sentiment analysis and contextual AI tools further help brands tailor messaging to regional perceptions, ensuring more effective and culturally sensitive communication.

4.3.7. Limited awareness

In digital advancements, awareness denotes how enterprises and organizations understand and remain cognizant of emerging technologies like GAI [9]. Current studies indicate that knowledge is a crucial accelerator for enabling business digital transformation [156]. A key obstacle to using GAI tools is the insufficient understanding among firms regarding their potential benefits. A further significant obstacle is the educational disparity inside organizations since many employees and decision-makers lack the skills and understanding to install and administer GAI tools proficiently. Bruno and Gianluca [157] indicated that 38 % of organizations were oblivious to the potential benefits of GAI, especially in optimizing operations and improving customer experiences in the marketing and service sectors.

Smith et al. discovered that enterprises with insufficient understanding of GAI technologies were less inclined to implement solutions capable of automating and optimizing content generation, customer segmentation, and real-time engagement. Consequently, these firms frequently fall behind competitors that utilize GAI for dynamic client engagement and precisely targeted marketing initiatives [50].

To overcome this obstacle, improving awareness via education, case studies, and success stories is essential. Mariani et al. [158] highlighted the efficacy of industry-specific workshops and training programs in elucidating GAI and demonstrating its concrete advantages. Moreover, collaboration between technology providers and industry leaders might facilitate bridging the knowledge gap. Technology suppliers might give customized advisory services, illustrating the smooth integration of GAI into current marketing operations. Loureiro et al. discovered that enterprises collaborating with GAI vendors and consultants attained elevated adoption rates and realized swifter returns on an investment relative to those pursuing solo implementation; additionally, enhancing awareness via education, case studies, and industry success narratives can facilitate the closure of this gap [159].

4.3.8. Limitations of infrastructure

Full-scale implementation of GAI technologies for digital marketing and customer engagement requires immense infrastructural support in high-performance computers, reliable internet connectivity, and scalable data storage solutions. The work of [160] identified that most traditional IT systems often lack the compatibility and scalability for advanced AI tools, including generative models. This is a big hurdle for enterprises looking to onboard GAI in digital marketing, as most of their existing infrastructure might be incapable of bearing the computing power required by the tool. Training and deploying generative models typically require cloud computing platforms and high-performance GPUs, neither provided by conventional IT systems. Besides, infrastructural limitations could directly implicate the quality and speed of AI-generated content dissemination. According to Guo [161], slow processing speed and unstable networks can delay AI-generated insights and content, diminishing marketing efforts' effectiveness and frustrating customers. This is a serious issue in those industries that rely on rapid customer feedback or quick decision-making.

Overcoming such infrastructural deficiencies requires considerable investments in IT systems, cloud computing, and networks. Utilizing cloud computing services such as AWS, Google Cloud AI, and Microsoft Azure allows enterprises to obtain scalable AI functionalities without the expense of on-premise equipment [162]. Edge computing reduces latency by processing AI near the data source, improving real-time marketing applications like chatbots and personalized suggestions [163]. A hybrid model optimizes cost and performance by retaining sensitive data on-premises while employing cloud AI for resource-intensive operations [164]. Moreover, AI-as-a-Service (AIaaS) providers such as OpenAI and IBM Watson deliver scalable AI solutions, facilitating effortless AI integration for digital marketing [165].

Table 6 provides a comprehensive summary of the key barriers organizations face when adopting GAI tools, alongside effective strategies to address these challenges.

5. Discussion

The transformative potential of GAI in digital marketing and customer service has been extensively examined; nonetheless, significant gaps persist in comprehending its comparative benefits, practical applications, and adoption obstacles. This study methodically investigated these elements through three principal research questions. The following discussion consolidates essential findings, examining these aspects within the context of the GAI-driven marketing revolution.

By putting forth a Conceptual Framework for GAI Adoption in Digital Marketing (Fig. 9), this study advances theory building, whereas earlier research mainly provided fragmented or anecdotal insights. By classifying GAI adoption into four interconnected dimensions: inputs (tools and technologies), processes (organizational and technological integration), barriers (ethical, cultural, and infrastructure), and outcomes (engagement, conversion, and loyalty). The benefits identified from GAI tools, such as personalized content creation, automated message campaigns, and AI-driven customer interaction, directly map to the core process component of the framework. These were shown time and again in the literature to create improvements in intermediate outcomes around customer engagement, segmentation accuracy, and efficiency. Moreover, several barriers were identified, such as privacy and security concerns, ethical risks, workforce resistance and skills gaps, quality control and brand consistency issues, cultural and linguistic misalignment, and technological constraints. These reflect the mediating barriers integrated into the framework, which have been shown to weaken the progression from GAI-enabled inputs to desirable outcomes, reinforcing the framework's proposition that organizational and environmental factors critically shape the success of adoption. Lastly, iterative experimentation, refinement of prompts, and cross-functional collaboration are strongly reflected in the continuous learning loop in the model. Indeed, organizations are beginning to embed feedback cycles that support sustainable GAI adoption and long-term strategic impact. In addition to the development of this conceptual framework, this study presents a set of testable propositions that transform its qualitative insights into measurable pathways for future empirical investigation. By locating these propositions immediately following the framework, the study establishes a clear link between the thematic synthesis and the kinds of quantitative relationships that can be examined statistically. These propositions outline specific capabilities, outcome links, moderating effects of organizational barriers, and the strategic significance of GAI-enabled processes. Further research can build upon these foundations by operationalizing those constructs identified in this framework through SEM, regression-based hypothesis testing, and scale development. With this explicit formulation of propositions, the current study will help bridge the gap between qualitative conceptualisation and quantitative validation by providing a structured roadmap for researchers in the generation of empirical evidence that can strengthen, refine, or extend the proposed model.

The VOSviewer visualization highlights critical themes within GAI in digital marketing and customer engagement, providing unique insights that extend beyond existing research. Our analysis shows that GAI has transformed digital marketing workflows, particularly in content creation, graphic design, and video production. Tools like ChatGPT, Jasper.ai, and Writesonic automate content development, improving efficiency and engagement. Studies indicate that Jasper.ai and Writesonic enhance SEO and cut content creation time by up to 50 %, reinforcing GAI's impact on optimizing marketing strategies. Likewise, in visual design, tools like DALL-E 3, Midjourney, and Adobe Firefly help marketers create high-quality, custom images without needing to have skills in advanced graphic design. Experiments show that leveraging Canva's Magic Write reduced marketers' design time by 40 %. Coca-Cola, for instance, leveraged GAI to create localized content for regional markets, which improved customer engagement and personalization [68]. These findings reveal that GAI surpasses the earlier digital marketing technologies by facilitating streamlined creativity without sacrificing brand

consistency and enhancing efficiency.

Our survey of industry-specific use cases of GAI illustrates its transformative impact across the Retail & Fashion, Food & beverage, and Tourism & Travel industries via personalized interaction, operational efficiency, and customer delight. Prior research has mainly focused on AI's role in automation (e.g., chatbots replacing human support or AI streamlining orders). This study further analyses how GAI enhances customer engagement through personalized storytelling, interactive AI-driven marketing campaigns, and AI-curated experiences, which were previously human-led. For instance, in retail, GAI-generated fashion styling tips; in food & beverage, GAI-powered personalized menus; in tourism, GAI-crafted custom itineraries all contribute to an enhanced customer experience. Additionally, case studies illustrated significant improvement in conversion rates, response times, and brand-consumer interactions; for example, ChatGPT has demonstrated the ability to handle routine inquiries efficiently, such as answering questions about travel packages, visa requirements, and itinerary details. According to Ref. [118], 83 % of airline customers expect replies to inquiries within 24 h. With generative GAI chatbots, airlines can deliver real-time responses, reducing response times and meeting customer expectations more effectively. In retail, Unilever and Sephora employed ChatGPT assistants to provide real-time beauty guidance, which made customers 25 % more satisfied and boosted sales by 20 %. Levi's utilized DALL-E 2 to generate bespoke fashion visuals, which lifted engagement by 15 %. Nestlé and Coca-Cola enhanced their advertising and consumer engagement in the food industry. The travel industry, as KLM and Etihad Airways, employed ChatGPT chatbots to reduce call centre traffic by 25 %, and Expedia leveraged AI for hyper-personalized trip planning. These outcomes validate GAI's role in creating hyper-personalized, context-aware marketing strategies that enhance customer engagement and business productivity.

Despite GAI's transformative capabilities, its adoption faces significant technical, ethical, organizational, and regulatory challenges. Our findings indicate that data privacy concerns, ethical risks, workforce resistance, quality control issues, and infrastructure limitations are among the most pressing obstacles to GAI implementation.

Data privacy and security are paramount as firms manage GDPR and CCPA compliance while utilizing AI-driven consumer data analytics. Privacy-preserving AI methodologies, such as federated learning, can improve compliance and reduce risks, reconciling data-driven marketing with consumer trust. Ethical issues, including AI bias and disinformation, require the implementation of ethical AI frameworks that prioritize justice, accountability, and transparency, with blockchain-based content authentication as a protection against misinformation. Resistance from the workforce is challenging, as 40 % of marketing professionals express concerns about job displacement. This underscores the necessity for organized training programs and change management strategies, including prompt engineering training and stakeholder engagement, to establish AI as an augmentative tool rather than a substitute. Moreover, technological limitations, such as legacy system incompatibility and substantial computing requirements, impede the scalability of GAI; however, cloud-based AI-as-a-Service (AIaaS) solutions, including AWS, Microsoft Azure, and Google Cloud AI, provide cost-effective deployment options. Moreover, guaranteeing internationally pertinent and inclusive AI-generated content necessitates culturally adaptive AI models trained on region-specific information.

6. Future research directions

While this study has explored GAI's transformative potential, practical applications, and challenges, other essential domains remain unexamined. Several areas require deeper investigation to enhance understanding and optimize adoption strategies, and further studies should explore its relative efficacy, long-term impact on consumer behaviour, integration with nascent technologies, barriers to adoption, and worldwide relevance. Table 7 presents key research questions that

outline priority areas for future investigations, guiding the next phase of GAI research in digital marketing and customer engagement.

7. Conclusion

This study presents a systematic literature analysis on how GAI transforms digital marketing and customer service by enhancing content creation, visual design, video production, and customer engagement. Increased efficiency and innovation are evident in brands like Coca-Cola, Sephora, and Starbucks through tools like ChatGPT, DALL-E, and Synthesia.

The case studies have two purposes, even though they are illustrative rather than primary empirical research, first offer comparative insights across sectors (retail, fashion, food & beverage, tourism, and hospitality). Second, the analysis shifts from descriptive narrative to analytical generalization by mapping each case to the suggested conceptual framework. For example, the Sephora case demonstrates how GAI tools result in customized suggestions (processes) that quantifiably increase conversion rates (outputs), and the Expedia case highlights how GAI-driven automation reduces call center workload and speeds up customer response (outputs). These findings show that although industries have different priorities, adoption is nevertheless hampered by common issues like employee resistance or moral dilemmas. Thus, the case studies contribute to a cross-industry understanding of GAI's transformative role in marketing while also offering lessons specific to the sector. By combining inputs, processes, barriers, and marketing outcomes into a logical model, the suggested conceptual framework for GAI adoption in digital marketing advances theory. This framework gives practitioners a road map for successfully applying GAI in business settings and gives researchers a starting point for empirical testing.

The results highlight the necessity for practitioners to implement strong quality control procedures, ethical governance, workforce training, and culturally aware design when implementing GAI tools. The study calls for future research that uses statistical modeling, meta-analysis, and sector-specific comparative studies to expand on the descriptive findings presented here, highlighting gaps in longitudinal and quantitative evidence for researchers.

Despite offering a thorough overview, this review is constrained by its reliance on descriptive case studies and industry surveys, which reflects the nascent stage of empirical academic research in this field. However, the study bridges theory and practice by integrating real-world evidence with peer-reviewed literature, guaranteeing both academic rigor and practical relevance.

In conclusion, generative AI is a revolutionary force that is influencing how companies communicate, innovate, and compete rather than just being a small advancement in marketing technology. However, its adoption necessitates intentional tactics to strike a balance between opportunities and organizational, cultural, and ethical challenges. Thus, this review lays the foundation for further research while offering a pertinent academic and practical contribution to comprehending the function of GAI in digital marketing.

CRediT authorship contribution statement

Sayed Salih: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Omayma Husain:** Visualization, Supervision, Software, Methodology. **Refan Mohamed Almohamedh:** Supervision, Project administration, Funding acquisition, Formal analysis. **Hayfaa tajelsier:** Visualization, Validation, Resources, Methodology, Formal analysis. **Aisha Hassan Abdalla Hashim:** Writing – review & editing, Writing – original draft, Supervision, Methodology, Conceptualization. **Hashim Elshafie:** Validation, Supervision, Methodology, Funding acquisition. **Abdelwahed Motwakel:** Supervision, Resources, Project administration, Investigation, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this manuscript.

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Data availability

No data was used for the research described in the article.

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