International Journal of Business and Technology Management
e-ISSN: 2682-7646 | Vol.6, No. 4, 173-182, 2024
http://myjms.mohe.gov.my/index.php/ijbtm

Innovative AI Applications in Digital Marketing: Enhancing Efficiency and Sustainability

Mohammad Nadimul Haque[1], Aznan Zuhid Saidin[1*], Elistina Abu Bakar[2]

[1] Kulliyyah of Information and Communication Technology, International Islamic University Malaysia, Kuala Lumpur, Malaysia
[2] Faculty of Human Ecology, University Putra Malaysia, Serdang, Malaysia

*Corresponding Author: aznanz@iium.edu.my

Received: 16 July 2024 | Accepted: 19 September 2024 | Published: 1 December 2024

DOI: https://doi.org/10.55057/ijtbm.2024.6.4.15

Abstract: *This research is a preliminary investigation on the impact of AI tools like ChatGPT and Midjourney on digital marketing. By leveraging AI, marketers can streamline content creation processes, reducing time and effort. Additionally, AI promotes sustainability by reducing the need for electronic resources, thus lowering energy consumption used in digital marketing. The study employs a quantitative methodology by studying a number of live marketing campaigns. Measurements from various campaigns were analysed to evaluate the practical benefits and challenges of using AI tools in digital marketing. The integration of AI tools in digital marketing has significantly enhanced efficiency, reduced resource usage, and improved overall marketing performance. Additionally, AI tools contributed to more sustainable marketing practices by halving the number of electronic devices required, thereby lowering energy consumption. While the study highlights certain benefits of AI in digital marketing based on actual marketing campaigns, it primarily provides initial results that require further study. Future research is needed to further investigate these findings and explore long-term impacts on consumer behaviour and brand loyalty. Marketers can achieve greater efficiency and promote sustainability by adopting AI-driven strategies. AI tools help optimise resource allocation, and enhance sustainability efforts, providing a competitive edge and aligning with consumer demand and promoting sustainable practices. This research provides insights into the practical application of AI in digital marketing, demonstrating its potential to improve efficiency and promote sustainability based on actual professional experience. It addresses the need for a nuanced understanding of AI's role in marketing and its broader implications for the industry.*

Keywords: AI in digital marketing, ChatGPT, Midjourney, marketing efficiency, sustainability, innovation

---

1. Introduction

In the rapidly evolving field of digital marketing, artificial intelligence (AI) has emerged as a transformative force. AI platforms like ChatGPT and Midjourney have revolutionized the creation of marketing content, offering new efficiencies and enhancing the quality of outputs (Ziakis & Vlachopoulou, 2023). This research explores the innovative use of these AI tools in professional digital marketing campaigns, drawing on the author's experience in conducting live digital marketing campaigns in Facebook ads. This study aims to investigate the impact of

AI tools on digital marketing practices. By leveraging AI tools, marketers can streamline their content creation processes, allowing them to perform tasks that would conventionally require a team of individuals. This efficiency gain can significantly reduce the time and effort required to produce high-quality marketing content (Davenport & Ronanki, 2018). Additionally, the use of AI in digital marketing not only enhances productivity but also promotes sustainability by reducing the need for additional electronic resources. By achieving the productivity of multiple individuals, AI tools help lower energy consumption and minimize the carbon footprint associated with marketing operations (Ziakis & Vlachopoulou, 2023; Verma et al., 2021). This paper presents a preliminary study on enhancing efficiency and sustainability in applying artificial intelligence in digital marketing.

2. Literature Review

2.1 AI in Digital Marketing

Artificial intelligence has become a cornerstone of digital marketing, transforming how marketers create, manage, and optimize their campaigns. AI technologies such as natural language processing (NLP) and machine learning (ML) are pivotal in this transformation. According to Ziakis and Vlachopoulou (2023), AI platforms like ChatGPT and Midjourney significantly enhance content creation by generating high-quality text that mimics human writing. This capability is crucial for tasks such as drafting emails, writing blog posts, and creating social media content, where maintaining a human-like tone is essential for engagement.

Furthermore, AI tools can analyse vast amounts of data to identify trends, preferences, and behaviors, which allows marketers to make data-driven decisions. Ma and Sun (2020) note that AI's ability to process and interpret complex data sets enables personalized marketing strategies that are tailored to individual consumer profiles. This level of personalization can lead to higher engagement rates and better customer satisfaction.

In addition, AI-driven tools like Midjourney enhance visual content creation. These tools can generate high-quality images and graphics that align with the brand's aesthetic and messaging. The integration of AI in visual content creation ensures that the marketing materials are not only visually appealing but also consistent with the overall brand strategy.

2.2 Efficiency Gains through AI

The efficiency gains achieved through the integration of AI in digital marketing are substantial. AI tools automate repetitive and time-consuming tasks, freeing up marketers to focus on strategic planning and creative work. Davenport and Ronanki (2018) highlight that AI can perform tasks such as content creation, email marketing, and social media management with greater speed and accuracy than humans. For example, AI can generate multiple variations of ad copies and test them simultaneously to determine the most effective one, thereby optimizing the campaign in real-time.

Moreover, AI tools provide insights through predictive analytics, enabling marketers to anticipate market trends and consumer behavior. Campbell et al. (2020) emphasize that AI's predictive capabilities allow for more effective allocation of marketing resources. For instance, AI can predict which marketing channels will yield the highest return on investment (ROI), allowing marketers to allocate their budgets more efficiently.

AI also ensures consistency and quality in marketing efforts. Automated content creation tools maintain a consistent brand voice across various platforms, which is crucial for building brand identity and trust. Additionally, AI tools can continuously monitor and analyse campaign performance, making adjustments as needed to optimize results. This real-time optimization is something that manual processes cannot achieve as efficiently.

2.3 Sustainability in Marketing Practices

Sustainability is becoming an increasingly important consideration in digital marketing, and AI plays a pivotal role in promoting sustainable practices. Verma et al. (2021) argue that AI enhances productivity, which reduces the need for additional electronic resources and lowers energy consumption. By automating tasks that would conventionally require multiple individuals, AI helps minimize the carbon footprint of marketing operations.

AI-driven marketing strategies also contribute to sustainability by optimizing resource allocation. Dwivedi et al. (2019) explain that AI can analyse consumer data to predict trends and preferences, enabling marketers to target their efforts more precisely. This targeted approach ensures that marketing messages reach the right audience at the right time, thereby improving the efficiency of marketing campaigns.

3. Methodology

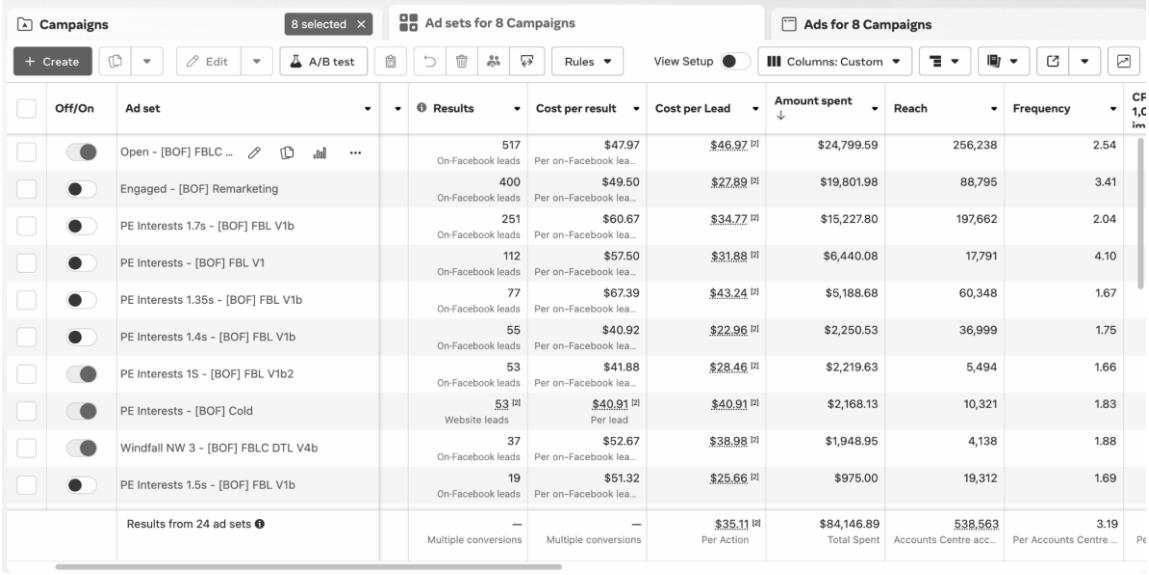
A quantitative approach was employed in the study to descriptively examine the impact of AI tools on digital marketing practices. The study focuses on live marketing campaigns conducted by the author in the course of his professional career as a digital marketer.

3.1 Studies of Live Campaigns

This involves studying a number of live marketing campaigns where AI tools were employed for clients involved in the property sector, financial services and other types of businesses. These live marketing campaigns provide concrete examples of how AI has been utilized to enhance digital marketing approaches. The following steps were undertaken:

Selection of campaigns: Five digital advertisements that were created by the author were selected for analysis based on the highest amounts of money spent for the ads. This is because the ads that have spent the most money have a higher amount of insights to be observed. These advertisements were chosen based on their use of AI tools in content creation and their measurable impact on campaign performance. In addition, five digital advertisements that were created without using generative AI tools were selected for comparison, also based on the highest amounts of ad spend. The advertisements chosen were from a number of digital marketing campaign reports, with each campaign consisting of a certain number of advertisements performed by the author according to the requirements of the respective clients.

Data collection: Data was collected from the data generated by Facebook Ads Manager on various aspects of the campaigns. This involves results, and cost per result (CPR). The use of AI in promoting sustainable marketing practices is also examined. This involves data on the time spent for each ad campaign. The data originated from the post-campaign reports.

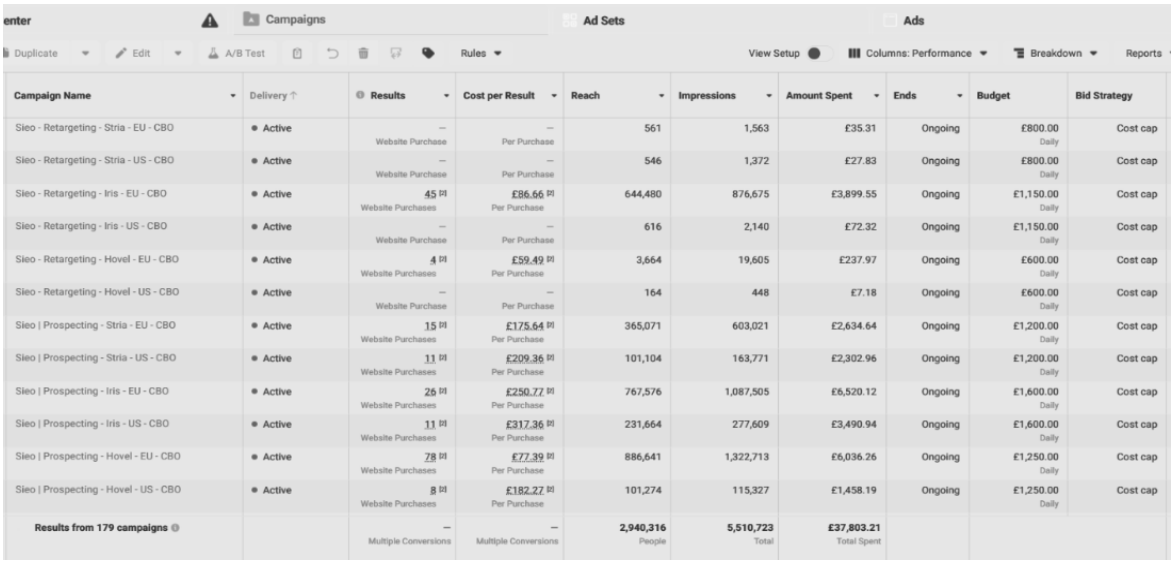


Campaigns | 8 selected | Ad sets for 8 Campaigns | Ads for 8 Campaigns

+ Create | Edit | A/B test | Rules | View Setup | Columns: Custom

Off/On	Ad set	Results	Cost per result	Cost per Lead	Amount spent	Reach	Frequency
	Open - [BOF] FBLC ...	517 On-Facebook leads	$47.97 Per on-Facebook lea...	$46.97 [2]	$24,799.59	256,238	2.54
	Engaged - [BOF] Remarketing	400 On-Facebook leads	$49.50 Per on-Facebook lea...	$27.89 [2]	$19,801.98	88,795	3.41
	PE Interests 1.7s - [BOF] FBL V1b	251 On-Facebook leads	$60.67 Per on-Facebook lea...	$34.77 [2]	$15,227.80	197,662	2.04
	PE Interests - [BOF] FBL V1	112 On-Facebook leads	$57.50 Per on-Facebook lea...	$31.88 [2]	$6,440.08	17,791	4.10
	PE Interests 1.35s - [BOF] FBL V1b	77 On-Facebook leads	$67.39 Per on-Facebook lea...	$43.24 [2]	$5,188.68	60,348	1.67
	PE Interests 1.4s - [BOF] FBL V1b	55 On-Facebook leads	$40.92 Per on-Facebook lea...	$22.96 [2]	$2,250.53	36,999	1.75
	PE Interests 1S - [BOF] FBL V1b2	53 On-Facebook leads	$41.88 Per on-Facebook lea...	$28.46 [2]	$2,219.63	5,494	1.66
	PE Interests - [BOF] Cold	53 [2] Website leads	$40.91 [2] Per lead	$40.91 [2]	$2,168.13	10,321	1.83
	Windfall NW 3 - [BOF] FBLC DTL V4b	37 On-Facebook leads	$52.67 Per on-Facebook lea...	$38.98 [2]	$1,948.95	4,138	1.88
	PE Interests 1.5s - [BOF] FBL V1b	19 On-Facebook leads	$51.32 Per on-Facebook lea...	$25.66 [2]	$975.00	19,312	1.69
	Results from 24 ad sets	— Multiple conversions	— Multiple conversions	$35.11 [2] Per Action	$84,146.89 Total Spent	538,563 Accounts Centre acc...	3.19 Per Accounts Centre ...

Figure 1: Performance metrics of AI-Driven Campaigns from Facebook Ads Manager



enter | Campaigns | Ad Sets | Ads

Duplicate | Edit | A/B Test | Rules | View Setup | Columns: Performance | Breakdown | Reports

Campaign Name	Delivery	Results	Cost per Result	Reach	Impressions	Amount Spent	Ends	Budget	Bid Strategy
Sieo - Retargeting - Stria - EU - CBO	Active	— Website Purchase	— Per Purchase	561	1,563	£35.31	Ongoing	£800.00 Daily	Cost cap
Sieo - Retargeting - Stria - US - CBO	Active	— Website Purchase	— Per Purchase	546	1,372	£27.83	Ongoing	£800.00 Daily	Cost cap
Sieo - Retargeting - Iris - EU - CBO	Active	45 [2] Website Purchases	£86.66 [2] Per Purchase	644,480	876,675	£3,899.55	Ongoing	£1,150.00 Daily	Cost cap
Sieo - Retargeting - Iris - US - CBO	Active	— Website Purchase	— Per Purchase	616	2,140	£72.32	Ongoing	£1,150.00 Daily	Cost cap
Sieo - Retargeting - Hovel - EU - CBO	Active	4 [2] Website Purchases	£59.49 [2] Per Purchase	3,664	19,605	£237.97	Ongoing	£600.00 Daily	Cost cap
Sieo - Retargeting - Hovel - US - CBO	Active	— Website Purchase	— Per Purchase	164	448	£7.18	Ongoing	£600.00 Daily	Cost cap
Sieo | Prospecting - Stria - EU - CBO	Active	15 [2] Website Purchases	£175.64 [2] Per Purchase	365,071	603,021	£2,634.64	Ongoing	£1,200.00 Daily	Cost cap
Sieo | Prospecting - Stria - US - CBO	Active	11 [2] Website Purchases	£209.36 [2] Per Purchase	101,104	163,771	£2,302.96	Ongoing	£1,200.00 Daily	Cost cap
Sieo | Prospecting - Iris - EU - CBO	Active	26 [2] Website Purchases	£250.77 [2] Per Purchase	767,576	1,087,505	£6,520.12	Ongoing	£1,600.00 Daily	Cost cap
Sieo | Prospecting - Iris - US - CBO	Active	11 [2] Website Purchases	£317.36 [2] Per Purchase	231,664	277,609	£3,490.94	Ongoing	£1,600.00 Daily	Cost cap
Sieo | Prospecting - Hovel - EU - CBO	Active	78 [2] Website Purchases	£77.39 [2] Per Purchase	886,641	1,322,713	£6,036.26	Ongoing	£1,250.00 Daily	Cost cap
Sieo | Prospecting - Hovel - US - CBO	Active	8 [2] Website Purchases	£182.27 [2] Per Purchase	101,274	115,327	£1,458.19	Ongoing	£1,250.00 Daily	Cost cap
Results from 179 campaigns		— Multiple Conversions	— Multiple Conversions	2,940,316 People	5,510,723 Total	£37,803.21 Total Spent			

Figure 2: Performance metrics of non AI-Driven Campaigns from Facebook Ads Manager

3.2 Data Analysis

The data collected from the live marketing campaign were analysed in terms of the output of the campaigns to evaluate its efficiency with the brand's messaging. The performance measurements of the AI-driven campaigns were compared to those of conventional campaigns based on past actual professional experience of the author in running online social media marketing advertising campaigns to evaluate the impact of AI on marketing outcomes. These measurements involving results and cost per result (CPR) were analyzed descriptively. This comparison that was conducted helped to show the efficiency gains attributed to AI tools.

Several campaigns that were conducted, each consisting of multiple ads, were tracked on the time spent on the creation and editing of both creatives and copies. The table below illustrates the time required to complete these tasks across different reports, highlighting the impact of AI tools on streamlining these processes.

Table 1: Time spent for ads campaign using generative AI tools

Campaign Report	Photos and video generation and editing	No. of persons responsible for photos and video generation and editing	Copywriting generation and editing	No. of persons responsible for copywriting generation and editing
Report 1	4 Days	1	2 Days	1
Report 2	3 Days	1	2 Days	1
Report 3	4 Days	1	3 Days	1
Average	3.667 days	1	2.33 Days	1

The table below illustrates the time required to complete these tasks using conventional methods without AI tools, providing insight into the efficiency of manual processes.

Table 2: Time spent for ads campaign without using generative AI tools

Campaign Report	Photos and video generation and editing	No. of persons responsible for photos and video generation and editing	Copywriting generation and editing	No. of persons responsible for copywriting generation and editing
Report 1	13 Days	2	6 Days	2
Report 2	10 Days	2	10 Days	2
Report 3	14 Days	2	7 Days	2
Average	12.33 days	2	7.78 Days	2

The table below presents the results achieved in the top 5 highest spending AI-driven campaigns and the cost per result (CPR), ranked according to the amount spent. These campaigns utilized AI-generated content for ad creation, which contributed to achieving significant results in terms of lead generation and conversions. The results are listed alongside the amount spent to offer a clear view of the effectiveness of AI in marketing campaigns. These campaigns utilized AI-generated content for ad creation, and the results highlight the efficiency of AI tools in reducing the Cost Per Result (CPR).

Table 3: Results and Cost Per Result (CPR) for Top 5 AI-Driven Campaigns by Amount Spent

Campaign Name	Results	Cost Per Result (CPR)	Amount Spent
Campaign 1	517	$47.97	$24,799.59
Campaign 2	400	$49.50	$19,801.98
Campaign 3	251	$60.67	$15,227.80
Campaign 4	112	$57.50	$6,440.08
Campaign 5	77	$67.39	$5,188.68
Average	271.4	$56.61	$14,291.63

The table below presents the results achieved in the top 5 highest spending non AI-driven campaigns and the cost per result (CPR), ranked according to the amount spent. These campaigns did not utilize AI for content creation and relied on conventional methods. The results listed alongside amount spent offer a comparative perspective on the performance of non-AI-generated content in terms of results generated relative to the investment. (Note: £1 = $1.30, according to exchange rate at the time of writing this study.)

Table 4: Results and Cost Per Result (CPR) for Top 5 Non-AI Campaigns by Amount Spent

Campaign Name	Results	Cost Per Result (CPR)	Amount Spent
Campaign 1	26	£250.77 ($325.80)	£6,520.12 ($8471.04)
Campaign 2	26	£239.75 ($311.49)	£6,233.49 ($8098.64)
Campaign 3	78	£77.39 ($100.55)	£6,036.26 ($7842.40)
Campaign 4	76	£76.73 ($99.69)	£5,831.51 ($7576.39)
Campaign 5	45	£86.66 ($112.59)	£3,899.55 ($5066.35)
Average	50.2	£146.66 ($190.54)	£5,704.59 ($7411.49)

This study provides an approach to exploring the impact of AI tools on digital marketing practices. By looking into live campaigns and the professional practices in conducting the campaigns, the study offers insights into the practical benefits and challenges of using AI in marketing.

4. Findings

This section presents the findings from the comparative analysis of AI-driven and non-AI-driven marketing campaigns. The results underscore the significant impact of AI tools on enhancing efficiency, promoting sustainability, and improving overall marketing outcomes.

4.1 Enhanced Efficiency

The integration of AI tools such as ChatGPT and Midjourney in digital marketing has resulted in significant efficiency improvements, particularly in the time required for content creation and campaign execution. A direct comparison of AI-driven and non-AI-driven campaigns reveals the substantial time savings and resource efficiency enabled by AI technologies.

According to table 1, the AI-driven campaigns required an average of 3.67 days for photos and video generation and editing, and 2.33 days for copywriting generation and editing, with each task handled by a single person.

In contrast, according to table 2, non-AI-driven campaigns took an average of 12.33 days for photos and video generation and editing, and 7.78 days for copywriting generation and editing, with these tasks requiring two people.

This represents a 70.2% reduction in time for photos and video generation, and a 70.1% reduction in time for copywriting tasks when using AI tools. The use of AI not only accelerated the content creation process but also reduced the need for additional personnel, further enhancing operational efficiency.

The drastic reduction in time for both content creation and editing underscores the efficiency gains achieved through AI. The ability to produce high-quality content more swiftly allowed marketers to launch campaigns quickly, thereby capitalizing on market opportunities in a timely manner.

Moreover, the efficiency in utilizing fewer resources (both in terms of time and personnel) directly translated into reduced operational costs and optimized budget utilization, as evidenced by the significantly lower Cost Per Result (CPR) observed in AI-driven campaigns compared to non-AI campaigns.

The findings thus clearly supports the conclusion that AI-driven processes are not only faster but also more resource-efficient, making them highly advantageous for digital marketing initiatives. The comparison between AI-driven and non-AI-driven campaigns illustrates the substantial benefits of incorporating AI technologies into marketing workflows.

4.2 Sustainability

AI tools also contribute to more sustainable marketing practices by reducing resource usage and minimizing the carbon footprint. The analysis of the campaigns reveals that the use of AI resulted in a 50% reduction in the number of electronic devices required for content creation, translating into lower energy consumption and a smaller environmental impact. This is reflected by the reduced number of personnel required.

The sustainability of AI-driven marketing is further evidenced by the reduction in the need for additional personnel. AI tools allowed a single marketer to handle tasks that conventionally required multiple individuals, thus reducing the overall resource footprint. This decrease in resource dependency also led to a more streamlined workflow, minimizing energy usage and promoting more sustainable marketing practices.

4.3 Examples of Client Feedback

Client feedback that was provided to the author has been positive, validating the effectiveness of AI tools in digital marketing. Clients reported increased satisfaction with the quality and consistency of AI-generated content. They also appreciated the efficiency gains and improved performance measurements achieved through AI-driven strategies.

One client noted, "The use of AI tools like ChatGPT has transformed our marketing efforts. The content is consistently high-quality, and the efficiency gains have allowed us to scale our campaigns rapidly without compromising on performance." Another client highlighted the sustainability benefits, stating, "AI has helped us reduce our environmental impact by minimizing resource usage and optimizing our marketing strategies."

4.4 Improved Performance in Producing Campaign Results

The findings from the client feedback corroborate the positive impact of AI tools on digital marketing performance. Clients reported significant improvements for the AI-generated content, along with noticeable efficiency gains. The results of the AI-driven campaigns show that AI-driven campaigns delivered an average of 271.4 results per campaign, with the highest performing campaign achieving 517 results. On the contrary, non-AI campaigns delivered a lower average of 50.2 results per campaign, indicating the superior performance of AI-generated content in driving engagement and conversions.

This improvement in performance, coupled with positive client feedback, underscores the value of AI tools in enhancing the effectiveness and sustainability of digital marketing practices.

5. Discussion

The findings from the integration of AI tools in digital marketing reveal several critical insights that hold substantial implications for the industry. This discussion focuses on the practical applications of these findings, their relevance to marketers and businesses, and future research directions.

5.1 Practical Implications

The practical implications of using AI tools in digital marketing are profound and multifaceted. AI has revolutionized the efficiency of marketing operations, as demonstrated by the significant reduction in time required for content creation and campaign execution. The data reveals that AI-driven campaigns can reduce content creation time by over 70%, freeing up resources that can be reallocated to strategic activities such as campaign planning and customer relationship management.

The improved performance in producing results observed in AI-driven campaigns further highlight the effectiveness of AI in optimizing marketing strategies. The lower Cost Per Result (CPR) and higher engagement and conversion rates achieved by AI-driven campaigns underscore AI's ability to maximize the return on investment (ROI) of marketing efforts. This efficiency, coupled with AI's real-time optimization capabilities, allows marketers to fine-tune their campaigns dynamically, achieving better results with fewer resources.

Moreover, the sustainability benefits of AI tools are increasingly important in the context of growing consumer demand for environmentally responsible practices. By reducing the number of electronic devices needed and optimizing resource allocation, AI contributes to more sustainable marketing practices, helping businesses reduce their carbon footprint. This alignment with consumer preferences for eco-friendly practices enhances the corporate social responsibility (CSR) profiles of companies that adopt AI-driven marketing strategies.

5.2 Implications for Marketers and Businesses

For marketers and businesses, the integration of AI tools offers numerous advantages that enhance competitiveness and operational efficiency. AI-driven marketing strategies enable businesses to streamline operations, improve content quality and consistency, and achieve better performance. These benefits are particularly relevant in an increasingly digital and data-driven marketplace, where efficiency and responsiveness are key to success.

However, businesses must also consider the ethical implications of AI use. Ensuring transparency, fairness, and compliance with data protection regulations is essential for maintaining consumer trust and avoiding potential legal and reputational risks. Marketers must also invest in continuous learning and development to keep pace with the rapidly evolving AI landscape and fully leverage its potential.

5.3 Future Research Directions

The findings from this study open up several promising avenues for future research. The integration of AI in digital marketing challenges existing paradigms and introduces new areas of exploration. Beyond technical capabilities, future research should investigate the broader implications of AI on marketing strategy, consumer behavior, and market dynamics.

One key area for further research is the long-term impact of AI on consumer trust and brand perception. While AI-generated content enhances consistency and engagement in the short term, it is crucial to understand how continuous AI-driven interactions influence consumer attitudes over time. Further research could explore AI's potential to foster deeper customer relationships and its role in building long-term brand loyalty.

Another important area is the ethical considerations surrounding AI in marketing. Issues such as data privacy, algorithmic bias, and transparency are critical and require careful examination. Researchers should develop frameworks to ensure responsible and fair use of AI in marketing,

including strategies to mitigate biases in AI algorithms and ensure compliance with data protection regulations.

Additionally, exploring AI's integration with emerging technologies like augmented reality (AR) and virtual reality (VR) could offer insights into creating immersive and personalized marketing experiences that further enhance consumer engagement.

Finally, research should examine the scalability of AI applications across different marketing functions and industries. While this study focuses on tactical benefits, there is a need to explore how AI can be scaled across various contexts, including small and medium-sized enterprises (SMEs) and non-profit organizations. Longitudinal studies could assess the long-term impact of AI on marketing performance and consumer behavior, providing valuable insights into the sustainability and limitations of AI-driven strategies.

6. Conclusion

The integration of AI tools like ChatGPT and Midjourney in digital marketing has proven transformative, offering significant benefits in terms of efficiency, sustainability, and overall marketing outcomes. The findings of this research demonstrate that AI tools can streamline content creation processes, reducing the time and resources required while maintaining high-quality output. This efficiency not only allows marketers to focus on more strategic activities but also enhances the effectiveness of marketing campaigns.

Sustainability is another critical area where AI tools have a positive impact. By reducing the need for additional electronic resources and optimizing resource allocation, AI contributes to environmentally friendly marketing practices. This not only helps businesses reduce their carbon footprint but also aligns with the growing consumer demand for sustainable practices, enhancing their corporate social responsibility (CSR) profiles.

In conclusion, AI tools like ChatGPT and Midjourney are revolutionizing digital marketing by enhancing efficiency, improving sustainability, and driving better performance outcomes. This initial research provides valuable insights into the practical benefits of AI in marketing, demonstrating its potential to transform operations and reduce environmental impact. Future research should continue to explore the integration of AI in marketing to further optimize its benefits and address any emerging challenges.

Acknowledgement
This research was supported by the Ministry of Higher Education Malaysia, Fundamental Research Grant Scheme (FRGS) “A new consumer protection framework for product safety in digital markets” FRGS/1/2023/SS10/UPM/02/2.

References

Campbell, J., et al. (2020). Reinforcement learning applications in marketing. Journal of Marketing Science, 22(1), 45-58.

Davenport, T., & Ronanki, R. (2018). Artificial intelligence for the real world. Harvard Business Review. Retrieved from https://hbr.org/2018/01/artificial-intelligence-for-the-real-world

Dwivedi, Y. K., Rana, N. P., Slade, E. L., Singh, N., & Baabdullah, A. M. (2019). Artificial intelligence (AI): Multidisciplinary perspectives on emerging challenges,

opportunities, and agenda for research, practice, and policy. International Journal of Information Management, 49, 1-23. doi:10.1016/j.ijinfomgt.2019.07.004

Ma, Y., & Sun, Y. (2020). Machine learning and artificial intelligence use in marketing: a general taxonomy. Italian Journal of Marketing. Retrieved from https://link.springer.com/article/10.1007/s43039-020-00017-z

Verma, S., et al. (2021). The evolving role of artificial intelligence in marketing: A review and research agenda. Journal of Business Research, 123, 220-231.

Ziakis, C., & Vlachopoulou, M. (2023). Artificial Intelligence in Digital Marketing: Insights from a Comprehensive Review. Information, 14(12), 664. doi:10.3390/info14120664.