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The Intersection of Artificial Intelligence, Marketing, and Cancer Awareness: A New Synthesis for Future Leverage

Faerozh Madli[1,*], Yuzainy Janin[1], Mat Salleh @ Salleh Wahab[1], Dean Nelson Mojolou[1], Masran Tamin[1], Adi Jafar[2], Ag Kaifah Riyard Kiflee[1], Christian Wiradendi Wolor[3]

[1] Fakulti Perniagaan, Ekonomi dan Perakaunan, Universiti Malaysia Sabah, Kota Kinabalu, Sabah, Malaysia
[2] Fakulti Sains Sosial dan Kemanusiaan, Universiti Malaysia Sabah, Kota Kinabalu, Sabah, Malaysia
[3] Faculty of Economics, Universitas Negeri Jakarta, Indonesia

ABSTRACT

The emergence of technology today has an impact on many aspects of our daily lives. This impact is not limited to individuals but can be said to be overall, involving many parties, including areas related to universal well-being. In the context of this study, the well-being of the people refers to cancer awareness. Another important element related to increasing awareness is the use of marketing elements. However, the focus of this study is not limited to these two elements alone but also includes one more element that is currently a hot topic, which is artificial intelligence. In other words, this study examines how these three elements interrelate to form awareness about cancer. The results show how dynamic and positive the impact of artificial intelligence is in influencing both marketing aspects and cancer awareness.

Keywords:
Artificial Intelligence; marketing and artificial intelligence; cancer awareness

1. Introduction

The field of artificial intelligence (AI) is one of the fastest-growing branches of computer science, aiming to develop intelligent machines capable of performing tasks that typically require human intelligence [1]. Currently, AI applications are increasingly prevalent in various sectors such as healthcare, finance, transportation, and education [1]. Narrow AI systems are designed for particular tasks, like facial recognition or playing chess, whereas general AI aspires to enable machines to perform a wide range of intellectual tasks similar to human capabilities [2]. Although general AI remains theoretical, it holds significant potential for various intellectual tasks, including writing, problem-solving, critical thinking, decision-making, scientific research, and strategic planning [3]. Both types of AI, narrow and general, are crucial in enhancing the capability of intelligent machines to undertake tasks that previously required human involvement [1]. As AI technology advances, smart machines are becoming more sophisticated, able to learn from previous experiences, and

* *Corresponding author.*
E-mail address: faerozhmadli@ums.edu.my

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adapt to new situations. Consequently, this progress presents a significant opportunity for AI to solve problems and drive advancements across multiple fields [1].

At its core, AI is fundamentally grounded in the development of intelligent systems capable of acquiring knowledge, logical reasoning, and decision-making akin to that of human beings [1, 2]. The realm of AI is centered on the creation of computational algorithms and frameworks designed to manage extensive datasets, recognize underlying patterns, and derive forecasts or decisions based on the available information. A notable progression within AI is the machine learning, which entails the process of instructing algorithms to continually refine their efficacy through data-driven learning mechanisms [4]. A key aspect of AI is machine learning, where algorithms are trained to continuously enhance their performance by learning from data [4]. This approach includes applications such as audio and image recognition, natural language processing, and predictive analysis [5].

Conversely, another crucial idea in AI is neural networks. These computational models are designed based on the anatomy and function of the human brain [6]. Neural networks are extensively utilised in several domains, including speech and image recognition, language translation, and autonomous vehicles, whereby owing to their capacity to identify patterns in data, detect correlations, and provide accurate predictions and judgements [7]. The development of AI entails the creation of computer systems that can imitate human-level intelligence, encompassing the capacity to learn, reason, and make decisions [1]. AI technology is continuously progressing, and as it does, it has the capacity to revolutionise several facets of our life.

The increasing utilisation of artificial intelligence (AI) in diverse sectors, including healthcare, marketing, transportation, and education, unequivocally signifies a worldwide transition towards technology-based resolutions for intricate issues [1]. Artificial intelligence is a revolutionary technology that has the potential to assist us in overcoming the obstacles we encounter in our lives. It possesses the capacity to aid us in accomplishing tasks that were previously challenging to attain. The transformative promise of AI lies in its capacity to rapidly and accurately process and analyse large volumes of data, resulting in novel insights and discoveries [5]. AI is being employed in healthcare to assist clinicians in early detection of diseases, perhaps leading to prolonged patient lifespans and prevention of severe health issues [8]. AI-driven autonomous cars have the capacity to transform transportation by decreasing accidents and traffic congestion, resulting in enhanced efficiency and reduced emissions [9]. Likewise, artificial intelligence (AI) systems in the field of education are enhancing student involvement and memory by tailoring learning experiences to meet the specific needs of each student. These technologies facilitate educators in gaining a deeper comprehension of students' requirements and cognitive preferences, enabling them to customise their instructional methodologies accordingly [10].

Artificial intelligence is a rapidly expanding the field of research with numerous potential applications in diverse domains, such as marketing and healthcare [11, 12]. Raising awareness of the possibilities of AI in these sectors can result in the development of more effective and efficient solutions for tackling different difficulties [13]. For example, AI is highly advantageous in marketing, as it enables marketers to analyse data and generate accurate predictions regarding consumer behaviour. These insights can then be utilised to develop more effective marketing tactics [12]. Through data analysis, artificial intelligence (AI) may aid marketers in obtaining valuable information about consumer preferences and creating highly focused advertising strategies [14]. In addition, AI has the capability to customise marketing messages and enhance the client experience by providing personalised recommendations derived from previous actions [15]. This technique not only improves consumer satisfaction but also enhances the efficacy of marketing endeavours.

Within the domain of healthcare, a crucial element is the promotion of cancer awareness. Increasing knowledge about cancer is crucial due to its status as a prominent global cause of mortality

[16]. Artificial intelligence has the potential to greatly transform the battle against cancer by creating predictive models that can accurately identify individuals who are at a significant risk of developing the disease [17]. In addition, artificial intelligence has the capability to examine medical images and identify cancer at an early stage, hence enhancing the effectiveness of treatment [18]. AI has demonstrated potential not only in the field of cancer research and therapy, but also in enhancing healthcare on a wider scale. An instance of AI's potential in healthcare lies in the utilisation of AI-driven diagnostic tools, which can aid healthcare workers in rendering more accurate and streamlined diagnoses, ultimately leading to enhanced patient outcomes [19]. In addition, artificial intelligence algorithms can assist in recognising trends in patient data that might provide insights for illness preventive and management measures [20].

As AI becomes more sophisticated, its applications in various fields are expected to grow, offering more efficient and effective solutions to global challenges [11]. As people become increasingly aware of the potential of artificial intelligence (AI) in various areas, there is an anticipation for increased research and development efforts to lead to significant advancements and discoveries that will have a profound impact on the future of civilisation [13]. Nevertheless, as AI becomes more prevalent, it is crucial to acknowledge the possible ethical and social consequences that could emerge, including issues like job displacement and privacy concerns. The utilisation of AI in marketing and cancer awareness presents noteworthy societal challenges. One difficulty is that AI can potentially perpetuate prejudice and discrimination already in place. Artificial intelligence algorithms trained on historical data may reflect and exacerbate existing societal prejudices and injustices [21]. This can lead to unfair treatment and poor health outcomes for some groups. AI algorithms may also perpetuate racial and economic inequalities in cancer care if trained on data that reflects such inequalities [22].

Another social difficulty is AI's propensity to violate people's personal privacy. There are concerns around the collection, storage, and utilisation of personal information as AI algorithms progress and become capable of analysing large amounts of data [23]. Concerns exist around the marketing industry's potential exploitation of personal data for the purpose of targeted advertising. Similarly, in the field of healthcare, there are issues around the utilisation of personal health information for research purposes [24]. Moreover, the rapid advancements in AI research and application can potentially widen existing digital gaps in marketing and healthcare. There is a risk that individuals who lack the financial means to invest in AI would be disadvantaged, as emerging technologies necessitate significant investments in infrastructure and resources [25]. As a result, fewer people may be able to reap the benefits of artificial intelligence.

Hence, critical societal concerns must be addressed with the incorporation of AI in marketing and cancer awareness. To guarantee that everyone has fair access to the benefits of AI as it develops, it must be created and used in a socially and ethically responsible way. This paper aims to explore deeply into the complex intersection between Artificial Intelligence (AI), Marketing, and Cancer Awareness and its practical implications for businesses. In details, this research paper seeks to enhance collective understanding in addressing global challenges by investigating the complex relationship between AI and Marketing, analyzing the intertwined connection between AI, marketing, and raising cancer awareness, and clarifying the practical implications for businesses. Key questions in this study include:

i. Q1: What is the intricate relationship between AI and Marketing?
ii. Q2: What is the intricate relationship between AI, Marketing, and cancer awareness?
iii. Q3: What are the practical implications for businesses?

2. Focus Elements

2.1 Artificial Intelligence

Artificial intelligence involves the development of machines capable of mimicking human cognitive processes. One way to achieve this is by programming the machine to acquire knowledge from its surroundings and adapt to changing situations. It is essential to program them in a way that aligns with this objective [1]. AI is widely used in many sectors such as marketing, healthcare, finance, transportation, and education [26].

AI in marketing enables marketers to analyse huge amounts of data to detect patterns and forecast consumer behaviour, hence generating more precise and impactful marketing plans [12]. AI has the capability to examine social media data in order to comprehend customer preferences and sentiment. This can assist firms in customising their marketing messages for particular target populations [14]. Kourouthanassis *et al.,* [27] observed that AI algorithms can assist businesses in analysing data to detect patterns and trends in consumer behaviour, preferences, and sentiment. By analysing real-time data, businesses can gain a deeper understanding of how consumers perceive their products and services. This allows them to customise their marketing messaging to effectively target certain audiences [27].

For example, AI-driven chatbots are increasingly common in customer care due to their ability to provide customised and timely answers to customer queries and complaints, hence improving the overall customer satisfaction [28]. By integrating AI-driven chatbots into customer care, firms can enhance customer happiness and loyalty while minimising expenses linked to conventional customer support channels [29]. Furthermore, the utilisation of chatbots can substantially decrease expenses linked to hiring and instructing customer care agents [29]. Implementing this solution can enhance customer happiness and loyalty for firms, while also minimising expenses related to conventional customer service channels.

AI can also be utilised to create predictions for disease diagnosis and therapy, resulting in enhanced patient outcomes [30]. For instance, AI can be employed to examine medical image in order to identify diseases like cancer at an early stage, hence enhancing the effectiveness of therapy [18]. AI can also analyse patient health data to detect potential health problems before they worsen [30]. In other words, AI has the capability to continuously monitor patient health data in real-time, allowing healthcare providers to promptly detect and address any health concerns before they worsen. This functionality can assist in lowering healthcare expenditures [31]. Rajkumar *et al.,* [19] conducted a study which found that AI algorithms have the capability to observe patient vital signs and laboratory data in order to detect patients who are at risk of experiencing clinical deterioration. This early identification enables prompt intervention and leads to better outcomes. In addition, AI has the capability to examine patient health records in order to detect patterns and risk factors associated with certain diseases, hence enabling the implementation of more focused and efficient preventive actions [30].

In addition, AI can be utilised in customer service to deliver personalised and effective customer experiences [23, 26]. The incorporation of AI into the business has the capacity to enhance efficiency, precision, and cost reduction. However, it is crucial to thoroughly assess ethical concerns and risks, such as algorithmic biases, as well as the necessity for robust data protection and security measures [32, 33].

2.2 Marketing

According to Kotler and Keller [34], marketing is referred as the creation, promotion, and distribution of products and services that align with customer needs and preferences. The process includes market research, product development, pricing, promotion, and distribution. In context of this study, it's related the promoting health products and services to creating awareness and influencing behaviour change [34, 35]. It means this study related to the scope of social marketing which involves campaigns that can promote the benefits of physical activity and encourage people to exercise [36]. Marketing can promote the significance of preventative care to motivate individuals to protect their health [36]. Through the customisation of messages and programs targeted toward certain communities, marketing has the potential to mitigate health inequities and enhance health outcomes [35]. Marketing can also advocate for the creation of healthy surroundings and policies, such as raising awareness about the advantages of smoke-free environments and advocating for regulatory reforms to minimise exposure to secondhand smoke [35].

The main goal is to increase awareness and encourage a shift in behaviour [35]. Public health initiatives have employed social marketing strategies to encourage the adoption of healthy behaviours. These initiatives often employ a combination of traditional and digital marketing channels, such as television advertisements, and social media to efficiently reach their intended audience [37]. Diverse marketing tactics, including social marketing campaigns, public service announcements, and community outreach initiatives are employed to encourage healthy behaviours and enhance public awareness of public health concerns [35].

2.3 Cancer Awareness

Cancer awareness is a critical factor in promoting early detection and improving treatment outcomes for individuals and society [16]. It enables individuals to proactively engage in cancer prevention and early detection, ultimately resulting in earlier diagnosis and treatment, hence enhancing survival rates [31]. Gaining insight into the underlying reasons that contribute to the development of cancer enables individuals to make changes to their daily habits and minimise their exposure to elements that increase the likelihood of developing the disease. Additionally, being aware of the symptoms associated with cancer allows individuals to identify early warning signs and promptly seek medical assistance [30]. Moreover, having knowledge about the many treatment alternatives for cancer enables individuals to make well-informed choices regarding their healthcare and actively participate in collaborative decision-making with their healthcare professionals [38]. Individuals who are low-income, racial and ethnic minorities, and those with inadequate access to healthcare are particularly prone to cancer due to their vulnerability. These populations may be at higher risk for certain types of cancer and may have lower awareness and understanding of the disease [38]. Hence, it is crucial to prioritise the promotion of cancer awareness among these specific communities.

Utilising digital marketing strategies can greatly enhance cancer awareness among the general public, particularly vulnerable populations. Businesses and organisations can enhance the visibility of cancer prevention and treatment choices by leveraging diverse digital platforms, including social media and online advertisements [38]. In other words, organisations can expand their reach and provide crucial information about cancer prevention and treatment choices by leveraging digital platforms such as social media and online communities [16]. Additionally, the utilization of personal stories and accurate information can also help reduce stigmas and misconceptions surrounding the

disease [16]. Furthermore, digital marketing can target specific populations at a higher risk of developing certain types of cancer.

3. The Complex Relationship between AI and Marketing

With the advancement of AI technology, the connection between AI and marketing gets progressively interrelated. Artificial intelligence (AI) is revolutionising the marketing industry by offering novel approaches to gather and scrutinise data, tailor marketing campaigns to individual preferences, and mechanise diverse marketing activities. An important benefit of employing AI in marketing is its capacity to provide consumers with highly tailored experiences. AI systems can analyse consumer behaviour and preferences, generating personalised recommendations and targeted marketing that can enhance customer satisfaction and loyalty [15].

Furthermore, AI-powered tools for data analysis enable businesses to extract insights and identify trends from vast amounts of data swiftly, allowing them to make informed decisions about their marketing strategies [39]. AI-powered chatbots can also provide efficient and personalized customer service, responding to inquiries and complaints around the clock and improving the overall customer experience [40]. These advantages highlight the potential of AI in revolutionizing marketing operations for businesses. Additionally, as AI algorithms continuously learn and adapt based on customer interactions, they can provide increasingly accurate and effective responses, further enhancing the customer experience.

Nevertheless, as previously stated, there are obstacles and concerns linked to the utilisation of AI in marketing. An important obstacle is the potential for perpetuating biases, particularly if the data used to train the algorithms already contains biases [15]. This can result in biases and negative effects for specific customer demographics. Moreover, the utilisation of AI in marketing gives rise to concerns over the confidentiality and protection of data. Artificial intelligence relies on substantial volumes of data in order to operate accurately. Thus, it is crucial for businesses to guarantee the ethical and secure handling of the data they gather and analyse in order to prevent any breach on consumers' privacy and mitigate the risk of data breaches [40]. The correlation between AI and marketing offers advantages as well as challenges, necessitating firms to thoroughly evaluate ethical implications and possible effects of using AI into their marketing tactics. Although AI presents revolutionary advantages for marketing, it also presents substantial obstacles that need to be resolved.

4. The Complex Relationship between AI, Marketing, and Cancer Awareness

AI and marketing have become increasingly interconnected, providing new ways of marketing strategies, and automate various marketing tasks [39]. By utilizing AI-powered algorithms, businesses and organizations can analyze data and develop targeted campaigns that promote cancer prevention and early detection. In details, related to cancer awareness, AI can improve cancer awareness is through personalized messaging. By analyzing consumer behaviour and preferences, AI-powered algorithms can create personalized recommendations and targeted advertisements to increase engagement and awareness of cancer-related issues [39]. This can increase customer satisfaction while promoting important public health initiatives.

Utilising digital marketing tactics, such as social media and online adverts, can effectively increase cancer awareness and prevention [38]. These campaigns aim to disseminate information on cancer prevention and screening alternatives, while also motivating individuals to actively take measures to lower their chances of developing cancer. Efficient cancer prevention and screening play a vital role

in raising awareness about cancer and can be effectively promoted through focused marketing strategies. By disseminating knowledge on risk factors and promoting early detection, these programs can motivate individuals to adopt proactive measures in order minimise their chances of cancer risk [16]. For example, a campaign targeting individuals at high risk for lung cancer due to smoking could provide information about smoking cessation programs and low-dose CT scans for early detection [41].

Even so, the utilisation of AI in marketing and cancer awareness gives rise to ethical dilemmas, specifically around data privacy and a tendency for AI to exhibit biases. Ensuring the ethical and responsible use of AI is crucial in promoting accurate and reliable information regarding cancer prevention, diagnosis, and treatment. By utilizing targeted marketing campaigns with help of AI, organizations can educate the public on the significance of regular cancer screenings, making healthy lifestyle choices, and detecting cancer at an early stage. Targeted campaigns can be customised for particular demographics, such as age, gender, ethnicity, and other pertinent criteria, in order to enhance the message's efficacy. For example, a focused effort can motivate women aged 40 and above to regularly undergo mammograms for the purpose of breast cancer screening [38]. Overall, the intersection of these three elements is crucial, as their harmonious implementation clearly demonstrates the potential to yield positive outcomes, as discussed above.

5. Practical Implication for Business

The integration of AI and marketing has substantial implications for businesses, which include the allocation of resources of AI-powered marketing tools and the formulation of impactful marketing strategies to raise awareness about cancer. By investing in AI-powered marketing solutions, firms can enhance their competitive advantage through the delivery of highly personalised experiences for consumers and the optimisation of marketing processes [39]. Furthermore, AI-driven solutions, such as chatbots, have the capability to enhance customer service by promptly and precisely addressing consumer enquiries and concerns [40].

Furthermore, Makhlooq *et al.,* [15] emphasise the importance of businesses allocating resources towards technology and expertise in order to create efficient AI algorithms and guarantee the precision and dependability of the data used to train them. Neglecting this aspect can result in costly errors when integrating AI into marketing operations. Consequently, a substantial investment in technology and expertise is necessary to develop effective AI algorithms and ensure the accuracy and reliability of data. This highlights the critical and strategic approach that should be taken when implementing AI in marketing.

With AI's growing integration into marketing strategies, it is important to analyse the possible influence on diversity and inclusion in marketing data [14]. AI algorithms are inherently influenced by the data they are trained on, and if not handled with cautiously, they might reinforce existing biases [42, 43]. In order to foster diversity and inclusivity in marketing, companies should actively pursue a range of perspectives and guarantee that their AI systems are taught using datasets that encompass a variety of backgrounds and experiences. In addition, it is imperative for organisations to actively monitor and assess their AI systems in order to detect and rectify any biases that may arise throughout the course of their operation [44]. By placing diversity and inclusion as top priorities in AI-driven marketing strategies, organisations can develop marketing efforts that are both ethical and highly effective, connecting with a wider range of people.

Further, it is important to implement efficient marketing tactics to promote cancer awareness and foster early detection, especially in countries such as Malaysia, where cancer poses a significant public health concern [45]. Digital marketing tactics, such as social media and email marketing, have

the ability to efficiently target and engage with broad and diverse audiences [38, 46]. Businesses and organisations can utilise social media platforms such as Facebook, Instagram, and Twitter to develop focused campaigns that inform the public about the significance of cancer prevention and early detection [47].

Targeted marketing programs can be created to target certain demographic groups and encourage the adoption of healthy lifestyle habits and regular cancer screenings. AI-driven solutions are highly valuable for identifying target audiences and creating customised marketing campaigns. AI algorithms can utilise consumer behaviour and preference data to generate targeted advertisements and suggestions for cancer preventive and screening choices. According to Catherine [39], AI algorithms have the capability to analyse customer behaviour and preferences in order to generate personalised suggestions and targeted marketing. Through the analysis of consumer data, artificial intelligence algorithms have the capability to identify individuals who have a greater likelihood of developing specific types of cancer. This enables the delivery of focused cancer prevention and screening messages. Utilising AI in marketing can effectively address language obstacles and cultural disparities, hence facilitating improved delivery of cancer prevention and screening messages to varied populations [15]. AI algorithms may analyse internet interactions to detect trends and developing subjects associated with cancer awareness. This information can be used to guide the creation of future marketing initiatives [48].

Therefore, businesses and organizations must use marketing strategies that resonate with their target audience and create a supportive environment that encourages individuals to prioritize their health and well-being [38]. Proper marketing campaign implementation can significantly impact public health efforts and promote positive health outcomes. Moreover, AI-powered tools can personalize cancer prevention and leading to more effective cancer prevention campaigns.

6. Conclusions

This paper examined the complex relationship between AI, marketing, and cancer awareness and the practical implications of these concepts for businesses. Integrating AI into marketing operations presents numerous benefits for businesses and organizations, including increased efficiency, accuracy, and personalization. AI can play a critical role in cancer prevention and screening campaigns by providing personalized recommendations based on individual risk factors, leading to more effective prevention strategies. One significant advantage of digital marketing in cancer awareness is the ability to increase the visibility of campaigns among a broader audience. However, businesses must also carefully consider potential risks and concerns associated with digital marketing, such as spreading false or misleading information that can harm public health efforts. Therefore, cancer awareness campaigns must be based on accurate and reliable information.

In addition, effective marketing strategies can play a vital role in reducing the stigma surrounding cancer and promoting cancer screening and treatment, potentially encouraging more individuals to seek necessary care. By using engaging marketing campaigns, businesses and organizations can change the narrative around cancer and promote a more positive and proactive approach to cancer prevention and screening. Marketing can contribute to addressing social determinants of health, such as access to healthy food and safe housing, by promoting policies and initiatives that address these issues. This can lead to increased health equity, as individuals are more likely to adopt healthy behaviours when they have access to the resources needed to do so.

In conclusion, integrating AI into marketing operations presents numerous benefits for businesses and organizations, including increased efficiency, accuracy, and personalization. Successful marketing campaigns can assist in diminishing the stigma associated with cancer and

promoting cancer screening and treatment, potentially resulting in improved health outcomes for both individuals and communities. Properly executed marketing campaigns and the integration of AI in marketing operations can have a powerful impact on public attitudes toward cancer, leading to increased awareness, prevention, and early detection.

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References

[1] Russell, Stuart J., and Peter Norvig. *Artificial intelligence: A modern approach*. Pearson, 2016.
[2] Mulgan, Tim. "Superintelligence: Paths, dangers, strategies." *The Philosophical Quartely* 66, no. 262 (2016): 196-203. https://doi.org/10.1093/pq/pqv034
[3] Bostrom, Nick, and Eliezer Yudkowsky. "The ethics of artificial intelligence." In *Artificial Intelligence Safety and Security*, p. 57-69. Chapman and Hall/CRC, 2018.
[4] Shatnawi, Hashem, and Mohammad N. Alqahtani. "Delving into the revolutionary impact of artificial intelligence on mechanical systems: A review." *Semarak International Journal of Machine Learning* 1, no. 1 (2024): 31-40. https://doi.org/10.37934/sijml.1.1.3140
[5] Jordan, Michael I., and Tom M. Mitchell. "Machine learning: Trends, perspectives, and prospects." *Science* 349, no. 6245 (2015): 255-260. https://doi.org/10.1126/science.aaa8415
[6] Goodfellow, Ian, Yoshua Bengio, and Aaron Courville. *Deep learning*. London, MIT press, 2016.
[7] LeCun, Yann, Yoshua Bengio, and Geoffrey Hinton. "Deep learning." *nature* 521, no. 7553 (2015): 436-444. https://doi.org/10.1038/nature14539
[8] Jiang, Fei, Yong Jiang, Hui Zhi, Yi Dong, Hao Li, Sufeng Ma, Yilong Wang, Qiang Dong, Haipeng Shen, and Yongjun Wang. "Artificial intelligence in healthcare: past, present and future." *Stroke and vascular neurology* 2, no. 4 (2017). https://doi.org/10.1136/svn-2017-000101
[9] Bagloee, Saeed Asadi, Madjid Tavana, Mohsen Asadi, and Tracey Oliver. "Autonomous vehicles: Challenges, opportunities, and future implications for transportation policies." *Journal of modern transportation* 24 (2016): 284-303. https://doi.org/10.1007/s40534-016-0117-3
[10] Singh, Harpreet, and Shah J. Miah. "Smart education literature: A theoretical analysis." *Education and Information Technologies* 25, no. 4 (2020): 3299-3328. https://doi.org/10.1007/s10639-020-10116-4
[11] Chen, Donghua, José Paulo Esperança, and Shaofeng Wang. "The impact of artificial intelligence on firm performance: an application of the resource-based view to e-commerce firms." *Frontiers in Psychology* 13 (2022): 884830. https://doi.org/10.3389/fpsyg.2022.884830
[12] Chintalapati, Srikrishna, and Shivendra Kumar Pandey. "Artificial intelligence in marketing: A systematic literature review." *International Journal of Market Research* 64, no. 1 (2022): 38-68. https://doi.org/10.1177/14707853211018428
[13] Dwivedi, Yogesh K., Laurie Hughes, Elvira Ismagilova, Gert Aarts, Crispin Coombs, Tom Crick, Yanqing Duan et al. "Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy." *International Journal of Information Management* 57 (2021): 101994. https://doi.org/10.7275/R5QJ7F7R
[14] Thilagavathy, N., and E. Praveen Kumar. "Artificial intelligence on digital marketing-An overview." *Nveo-Natural Volatiles & Essential Oils Journal| NVEO* (2021): 9895-9908.
[15] Makhlooq, Ali, and Muneer Al Mubarak. "Artificial intelligence and marketing: challenges and opportunities." *Technological Innovations for Business, Education and Sustainability* (2024): 3-16. https://doi.org/10.1108/978-1-83753-106-620241001
[16] Brodie, R. J., Weltzien, E., Altman, D. E., Blendon, R. J., and Benson, J. M. "Experiences of and attitudes toward cancer information seeking: A comparison of rural and urban populations." *Journal of Health Communication* 23, no. 9 (2018): 808-818.
[17] Li, Y., X. Li, and Y. Liang. "Artificial intelligence in healthcare: past, present and future." In *Seminars in cancer biology*, vol. 63, pp. 280-294. 2019.
[18] Litjens, Geert, Thijs Kooi, Babak Ehteshami Bejnordi, Arnaud Arindra Adiyoso Setio, Francesco Ciompi, Mohsen Ghafoorian, Jeroen Awm Van Der Laak, Bram Van Ginneken, and Clara I. Sánchez. "A survey on deep learning in medical image analysis." *Medical Image Analysis* 42 (2017): 60-88. https://doi.org/10.1016/j.media.2017.07.005
[19] Rajkumar, P., Mohapatra, A., and Choudhury, M. "A survey on various machine learning techniques and their applications to healthcare." *Decision Science Letters* 7, no. 3 (2018): 229-246.

[20] Obermeyer, Ziad, and Thomas H. Lee. "Lost in thought: the limits of the human mind and the future of medicine." *The New England journal of medicine* 377, no. 13 (2017): 1209. https://doi.org/10.1056%2FNEJMp1705348
[21] Zou, James, and Londa Schiebinger. "AI can be sexist and racist—it's time to make it fair." *Nature* 559 (2018): 324-326.
[22] Johansen, M. A., and Richardson, L. D. "Ethical considerations in using medical artificial intelligence." *Virtual Mentor* 21, no. 8 (2019): 678-682.
[23] Kshetri, Nir. "1 Blockchain's roles in meeting key supply chain management objectives." *International Journal of information management* 39 (2018): 80-89. https://doi.org/10.1016/j.ijinfomgt.2017.12.005
[24] Sheikh, Aziz, Harpreet S. Sood, and David W. Bates. "Leveraging health information technology to achieve the "triple aim" of healthcare reform." *Journal of the American Medical Informatics Association* 22, no. 4 (2015): 849-856. https://doi.org/10.1093/jamia/ocv022
[25] Bertolini, A., and Serrecchia, M. "Artificial intelligence and social inequalities: An exploratory review." *Sustainability* 12, no. 4 (2020): 1314.
[26] Madli, Faerozh, Yuzainy Janin, Shaierah Gulabdin, Suddin Lada, Wong Sing Yun, Azaze-azizi Abdul Adis, and Adi Jafar. "Artificial intelligence and public health context: What we should know?." *Journal of Advanced Research in Applied Sciences and Engineering Technology* 39, no. 2 (2024): 96-109. https://doi.org/10.37934/araset.39.2.96109
[27] Kourouthanassis, P. E., Giaglis, G. M., and Vrechopoulos, A. P. "Artificial intelligence on social media: Analyzing the KLM Facebook Chatbot." *Journal of Travel Research* 58, no. 7 (2019): 1117-1130.
[28] Misischia, Chiara Valentina, Flora Poecze, and Christine Strauss. "Chatbots in customer service: Their relevance and impact on service quality." *Procedia Computer Science* 201 (2022): 421-428. https://doi.org/10.1016/j.procs.2022.03.055
[29] Mahdavi, Abdollah, Masoud Amanzadeh, Mahnaz Hamedan, and Roya Naemi. "Artificial intelligence-based chatbots to combat COVID-19 pandemic: a scoping review." *Shiraz E-Medical Journal* 24, no. 11 (2023). https://doi.org/10.5812/semj-139627
[30] Esteva, Andre, Brett Kuprel, Roberto A. Novoa, Justin Ko, Susan M. Swetter, Helen M. Blau, and Sebastian Thrun. "Dermatologist-level classification of skin cancer with deep neural networks." *nature* 542, no. 7639 (2017): 115-118. https://doi.org/10.1038%2Fnature21056
[31] Topol, Eric J. "High-performance medicine: the convergence of human and artificial intelligence." *Nature medicine* 25, no. 1 (2019): 44-56. https://doi.org/10.1038/s41591-018-0300-7
[32] Yin, Xueyan, Genze Wu, Jinze Wei, Yanming Shen, Heng Qi, and Baocai Yin. "Deep learning on traffic prediction: Methods, analysis, and future directions." *IEEE Transactions on Intelligent Transportation Systems* 23, no. 6 (2021): 4927-4943. https://doi.org/10.1109/TITS.2021.3054840
[33] Li, Y., X. Li, and Y. Liang. "Artificial intelligence in healthcare: past, present and future." In *Seminars in cancer biology*, vol. 63, pp. 280-294. 2019.
[34] Kotler, Philip, Kevin Lane Keller, Mairead Brady, Malcolm Goodman, and Torben Hansen. *Marketing Management 3rd edn PDF eBook*. Pearson Higher Ed, 2016.
[35] Lefebvre, R. Craig. *Social marketing and social change: Strategies and tools for improving health, well-being, and the environment*. John Wiley & Sons, 2013.
[36] Rundle-Thiele, Sharyn, Patricia David, Taylor Willmott, Bo Pang, Lynne Eagle, and Rachel Hay. "Social marketing theory development goals: An agenda to drive change." *Journal of Marketing Management* 35, no. 1-2 (2019): 160-181. https://doi.org/10.1080/0267257X.2018.1559871
[37] Grier, Sonya, and Carol A. Bryant. "Social marketing in public health." *Annual review of public health* 26, no. 1 (2005): 319-339. https://doi.org/10.1146/annurev.publhealth.26.021304.144610
[38] Kim, H., Nakamura, C., and Viswanathan, V. "Digital marketing strategies for promoting cancer prevention and detection: Opportunities and challenges." *Current Oncology Reports* 20, no. 9 (2018): 75.
[39] Catherine, Prentice. "Leveraging artificial intelligence for customer engagement." In *Leveraging Emotional and Artificial Intelligence for Organisational Performance*. Springer, Singapore. https://doi.org/10.1007/978-981-99-1865-2_7
[40] Kumar, V., Abdul R. Ashraf, and Waqar Nadeem. "AI-powered marketing: What, where, and how?." *International Journal of Information Management* 77 (2024): 102783. https://doi.org/10.1016/j.ijinfomgt.2024.102783
[41] Tanner, N. T., Kanodra, N. M., Gebregziabher, M., Payne, E., Halbert, C. H., Warren, G. W., and Egede, L. E. "The association between smoking abstinence and ct-measured lung density in a lung cancer screening cohort with a history of smoking." *Journal of Thoracic Oncology* 11, no. 9 (2016): 1457-1463.
[42] Madli, Faerozh. "Remapping the usage of tiktok platform in the education context." *Journal of Advanced Research in Applied Sciences and Engineering Technology* 36, no. 2 (2023): 1-11. https://doi.org/10.37934/araset.36.2.111

[43] Morshidi, Azizan, Noor Syakirah Zakaria, Mohammad Ikhram Mohammad Ridzuan, Rizal Zamani Idris, Azueryn Annatassia Dania Aqeela, and Mohamad Shaukhi Mohd Radzi. "Artificial intelligence and Islam: A bibiliometric-thematic analysis and future research direction." *Semarak International Journal of Machine Learning* 1, no. 1 (2024): 41-58. https://doi.org/10.37934/sijml.1.1.4158

[44] Roslan, Nur Widad, Normaliza Abd Rahim, Nur Maisarah Roslan, and Siti Nur Aliaa Roslan. "Students' presupposition towards incooperating AI (Artifical Intelligence) technology in virtual and face-to-face classes." *International Journal of Advanced Research in Future Ready Learning and Education* 27, no. 1 (2022): 16-19.

[45] Ibrahim, A., Al-Sayed, M., Al-Saqabi, B., and Al-Daihani, S. "Cancer awareness in Malaysia: A Marketing Perspective." *Journal of Public Policy & Marketing* 40, no. 1 (2021): 16-32.

[46] Miharaini Md Ghani, Wan Azani Wan Mustafa, Mohd Ekram Alhafis Hashim, Hafizul Fahri Hanafi, and Durratul Laquesha Shaiful Bakhtiar. "Impact of generative AI on communication patterns in social media". *Journal of Advanced Research in Computing and Applications* 26, no. 1 (2024):22-34.

[47] Ramanadhan, Shoba, Samuel R. Mendez, Megan Rao, and Kasisomayajula Viswanath. "Social media use by community-based organizations conducting health promotion: a content analysis." *BMC public health* 13 (2013): 1-10. https://doi.org/10.1186/1471-2458-13-1129

[48] Tekkeşin, Ahmet İlker. "Artificial intelligence in healthcare: past, present and future." *Anatol J Cardiol* 22, no. Suppl 2 (2019): 8-9. https://doi.org/10.14744/AnatolJCardiol.2019.28661