Robot Pintar Indonesia (ROPI) for AI-Driven Autonomous Personalized Robot: Systematic Literature Review

Mira Della Masali[1*], Maya Malinda[2], Yohanes Kurnia[3], Indrajani Sutedja[4]

[1] *Magister Management Program, Christian University of Maranatha, Indonesia*
[2] *Doctoral Program in Science Management, Christian University of Maranatha, Indonesia*
[3] *Computer Science Department, School of Computer Science, University of Gunadarma, Indonesia*
[4] *Information Systems Department, School of Information Systems, University of Bina Nusantara, Indonesia*
[*] *Corresponding author. Email: miradellamasali@gmail.com*

ABSTRACT

With the digital transformation, advertisers cannot reach their consumers anymore with traditional advertising, as these types of advertising tend to be static and non-interactive, and due to the lack of analytical capabilities in real time. This study explores the potential of Robot Pintar Indonesia (ROPI), an autonomous, personalized robot developed by PT. SARI Teknologi Global. We performed a Systematic Literature Review (SLR) compliant to the PRISMA framework, which led to a final set of 30 key publications selected from 1,441 studies published between 2015 and 2025 retrieved from Scopus, Google Scholar, and Crossref databases. The literature was grouped according to four categories: artificial intelligence-based personalized marketing, autonomous advertising robot, artificial intelligence-based customer analysis, and ethical issues. The study shows that ROPI's ability to recognize facial expressions, analyze demographics, and detect emotional responses greatly increase engagement, with 1.9 interactions per visitor on average, 9 seconds in attention span, and a conversion rate of 19.81%, especially among users aged 15-29. ROPI's Business-to-Robot-to-Consumer (B2R2C) model generates measurable marketing results by implementing data-driven decisions. Issues regarding privacy, transparency, and acceptance will be key to achieving sustainable AI deployment. In conclusion, this study explores how artificial intelligence and smart robots like ROPI can revolutionize digital advertising by making it more personalized, engaging, and effective, while also addressing ethical concerns such as privacy and public trust.

Keywords: *AI-driven advertising, Personalized Marketing, Customer Analytics, Autonomous Marketing Robot, Digital Marketing Ethics*

1. INTRODUCTION

In this digital era, advertisers often face problems in creating innovative ads that attract people's attention (Sánchez & Muneta, 2024). Most digital advertisements remain static and one-way in nature, making them feel less engaging and even monotonous to the audience (Bell, Olukemi, & Broklyn, 2024; Khandelwal et al., 2024).

The development of artificial intelligence (AI) is changing how companies communicate with, understand consumer behavior and engagement. In the past, the company relied on general market trends, but now they can use AI to create personal content based on customer interest and behavior (Gao & Liu, 2022; Babatunde et al., 2024; Naveeenkumar et al., 2024). With technology like analysis of data in real time and machine learning as well, AI can recognize facial expressions, body movements, and how long they attach something (Haleem et al., 2022; Verma et al., 2021; Shumanov, Cooper, & Ewing, 2022). From this information, ads can be made more targeted and interesting, so they can attract customers and increase their engagement with the ads (Wu & Wen, 2021).

The implementation of AI-powered autonomous robots in marketing has opened new opportunities, but it also brings some challenges. One of them is technical problems such as audio-visual integration, but the important one is about the ethics issue. So many questions about data privacy, transparency of technology usage, and consumer trust in these systems (Stahi & Wright, 2018; Kaur & Singh, 2024; Williams, Briggs, & Scheutz, 2015). The process of data collecting, personal information rights, and ensuring people clearly understand and consent to how their information is used are all responsibilities that businesses can't ignore. That's why businesses need AI regulation that is responsible and follows the law (Morapeli & Khemisi, 2024). Despite this, there are other social challenges, how to make people comfortable with autonomous robot presence in public areas. This is the importance of how to build people's trust and safety so this technology can be accepted well (Han et al., 2021; Xie, Liu, & Li, 2022).

To answer this challenge, PT. SARI Teknologi Global developed Robot Pintar Indonesia (ROPI), an innovative autonomous robot that combines advanced AI technology with an advertising system. Unlike conventional digital ads that only display pictures or videos on screens, ROPI can interact directly with the consumer personally. With AI-based data analysis, ROPI can understand customer engagement, adapt marketing strategy, and make ads more effective (Katona, Neamah, & Korondi, 2024; Hemalatha, 2023). This approach transforms advertising from a passive display into an interactive experience more fun for customers and makes great results for businesses.

This study finds the ethical, privacy, and social issues that come with using AI-powered advertisement robots. By conducting a Systematic Literature Review (SLR), it brings so many insights from existing research to overview AI in advertising and mean for the future (Synder, 2019).

2. RESEARCH METHODS

According to Synder (2019), the approach uses Systematic Literature Review (SLR) method to find how ROPI works in AI-powered digital marketing and advertising. This method help us review current research of how AI is used in modern marketing. The review follows six steps using SLR framework that identified by Bai et al. (2019) and Collins et al. (2021), making research question; study criteria; relevant literature; analyze the results; combining the findings and presenting them. We followed the guidelines of PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) from Page et al. (2021) to keep the process clear and reliable.

For data collection, we used Perish software to search for articles from Google Scholar, Crossref , and Scopus. We are using keywords such as "Artificial Intelligence in Digital Marketing," "AI-driven advertising," "Autonomous robots in marketing," "Customer analytics and AI," and "Content Management System (CMS) in advertising" for the search. To make the search more accurate, we also used Boolean operators such as "AI-driven marketing" AND "customer personalization" AND ("Artificial Intelligence" OR "Machine Learning") and "AI in advertising" AND ("Ethics" OR "Privacy" OR "Regulations"). We only selected articles published between 2015 and 2025 so that the information would reflect the most recent technological trends.

To make sure the article selection was done carefully and in an organized way, we followed the PRISMA framework (Page et al., 2021). In the first step, we found 1,441 articles. After removing duplicates and articles that were not peer-reviewed, we had 645 studies left. Then, we checked the titles and abstracts and filtered out the ones that didn't relate to AI in marketing, robotics, or customer analytics, this left us with 238 articles. Next, we read the full texts and used clear inclusion and exclusion criteria, resulting in 128 articles. Finally, we reviewed the quality of those papers, checking how relevant and useful they were to our research. In the end, we selected approximately 30 articles for deeper analysis. The number of articles that have already been collected and selected are summarized in Table 1.

Table 1. Articles have already been collected and selected

No	Source	Studies Found	Candidate Studies	Selected Studies
1	Google Scholar(https://scholar.google.com)	808	112	15
2	Scopus(https://www.scopus.com/home.url)	210	78	10
3	Crossref (https://www.crossref.org)	423	48	5
	Total	1,441	238	30

Table 1 shows a summary of the papers we collected and selected. We have used clear inclusion and exclusion criteria to make sure that we only included studies that were high quality and relevant. A study would have been included if it was written in English or Indonesian, focused on the use of AI in digital marketing, advertising robots, or AI-based customer analysis, and if it provided real findings either from experiments, actual data, or a structured literature review. We excluded papers if they didn't directly relate to marketing, if they were only theoretical without real data, or if they didn't include any practical examples using machine learning.

After selecting the articles, we collected the data and grouped the findings into four main topics: personalized marketing using AI, the use of autonomous robots in advertising, AI-based customer analysis, and ethical concerns related to AI. We used Microsoft Excel to organize the details like the methods used, key results, and the technology involved, so we could compare them more easily. This process showed that the use of AI and robots in digital marketing doesn't follow a straight path. Instead, it grows in different ways depending on the need. From here, we also see how ROPI can become part of this trend as a smart, automated assistant that brings a new kind of interaction to digital marketing.

3. THE RESULTS AND DISCUSSIONS

3.1. A Systematic Literature Review

In this study, we used a systematic process to review the existing research. We found 808 studies from Google Scholar, 210 from Scopus, and 423 from Crossref, giving us a total of 1,441 articles. To help us choose the right ones, we followed the PRISMA method (Page et al., 2021). After reading the titles and summaries, we focused on studies related to AI in marketing, advertising robots, and customer data analysis. This narrowed it down to 238 articles. Then, we looked deeper into the quality, the data they used, and how closely they matched our topic. Finally, we selected 30 high-quality studies for a more detailed review (Bai et al., 2019; Collins et al., 2021).

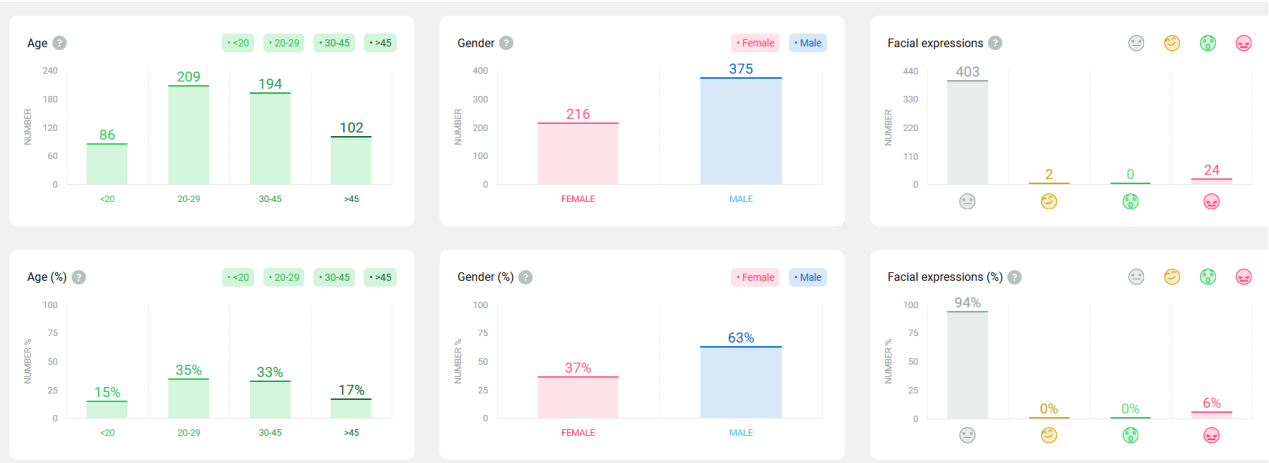
We started the review process using PRISMA screening by removing duplicate articles. Then, we checked the titles and summaries to see if the studies were relevant. After that, we looked at the full content of the articles to make sure they matched the goals of our research. In the final step, we picked the best-quality studies based on their methods and useful data. This careful step-by-step process follows what experts recommend for systematic literature reviews (Bai et al., 2019; Collins et al., 2021).

From the selected studies, we grouped the research into four main topics, namely AI-driven personalization in marketing, autonomous robots in advertising and customer engagement, AI-driven analytics for decision-making, and ethics. These topics help us understand how AI is changing the way marketing works today. One example is the increasing use of smart advertising tools like ROPI, which is already being used in malls and public places (Nirwana et al., 2023; Lubis & Widodo, 2024).

The review also shows how AI is becoming more important in marketing. Many studies found that AI makes it easier to show ads that match what customers like, which increases customer engagement and conversion rates (Inggriana & Rolando, 2025; Naveeenkumar et al., 2024; Wu & Wen, 2021). AI also helps businesses understand what customers want, so they can improve their marketing plans (Sani & Febrian, 2023). Autonomous robots like ROPI are mostly used in retail settings to create fun and interactive brand experiences (Hartono et al., 2022; Thomas & Fowler, 2020). Our findings match with earlier research showing that AI helps in personalizing ads, learning customer behavior, and managing content more efficiently (Bell, Olukemi, & Broklyn, 2024; Haleem et al., 2022; Shumanov et al., 2022).

3.2. ROPI

The dashboard analysis is illustrated in Figure 1.



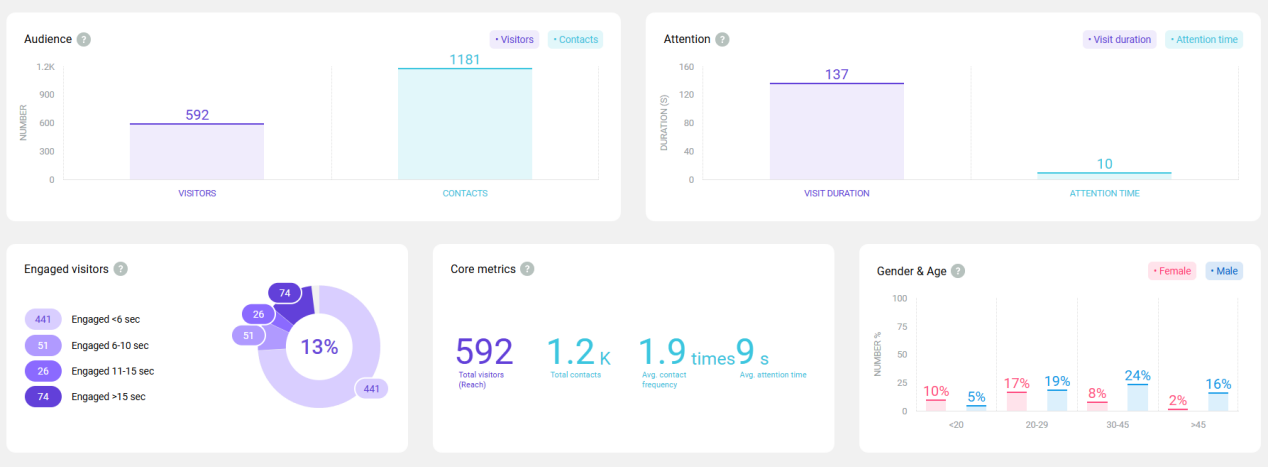


Figure 1 Content insights of ROPI (Source: PT. SARI Teknologi Global, 2024)

Data from ROPI's dashboard shows that this AI-powered advertising tool works well, and the results support what many researchers have found about AI in marketing (Khandelwal et al., 2024). ROPI's ads were seen 3,003 times, with 592 different people interacting. It collected 1,200 contacts, and on average, each person interacted with the robot about 1.9 times.per visitor. These results is according to Verma et al. (2021) and Hemalatha (2023), whereas real-time data helps boost how much people engage with ads and how efficiently content is shared.

Regarding customer engagement, interaction duration varied, with 441 visitors engaging for less than 6 seconds, 51 visitors for 6-10 seconds, 26 visitors for 11 to 15 seconds, and 74 visitors for more than 15 seconds. The average attention span recorded is 9 seconds, which supports the findings from Han et al. (2021), who stated that the enhancement of AI in marketing strategies contributes to prolonged audience retention and more meaningful user interactions.

From a demographic perspective, computer vision technology identified that most visitors were aged 20-45 years, with 35% of visitors within the 20-29 age range and 33% in the 30-45 age group. This is consistent with the study by Gao & Liu (2022), who observed that AI audience segmentation allows for more precise targeting in marketing. Gender analysis revealed that there are 63% of male and 37% of female visitors, aligning with the findings of Morapeli & Khemisi (2024), who highlighted the involvement of AI in marketing strategies enhancement based on audience segmentation.

Facial expression analysis showed that 94% of visitors exhibited a neutral expression, 6% dissatisfaction, and 0% expressed happiness. These insights are consistent with the research of Babatunde et al. (2024), which highlights AI's ability to track customer sentiment and real-time responses to advertising content. This analysis allows businesses to refine their marketing strategies for improved audience engagement and user experience.

Lastly, the conversion rate of 19.81% supports findings from Haleem et al. (2022), that AI-driven content personalization improves conversion rates in digital marketing campaigns. Additionally, this result aligns with Katona et al. (2024), who state that marketing effectiveness can be increased when robotic systems integrated with AI are able to deliver personal interactions for potential customers

The use of robotics in marketing, as explored by Affiah et al. (2022), has revolutionized conventional marketing strategies by introducing a Business-to-Robot-to-Consumer (B2R2C) model, where robots act as a mediator between companies and customers. ROPI is an example of this model in real-world scenarios, it acts as an autonomous robot that can navigate crowded public areas such as shopping centers and exhibitions without human assistance. This autonomy allows ROPI to interact directly with people, delivering personalized promotional content while collecting valuable behavioral data through features like facial recognition and voice interaction. This mobility is a clear advantage for ROPI to reach a diverse audience more dynamically than static advertising tools. This is in line with Holthoewer and van Doorn (2021), who note that robots are most effective with routine, repetitive tasks, thus allowing humans to deal with more complicated, interpersonal responsibilities (Williams et al., 2015). Additionally, Shiomi et al. (2013) show that social robots can effectively increase customer engagement, especially when providing recommendations. ROPI combines real-time behavioral analysis with autonomous operation, allowing it to adjust its messaging dynamically based on user responses. ROPI's autonomy gives a significant role in its mobility and its effectiveness as a marketing agent, showing how robotics can support meaningful interaction between brands and consumers in modern commercial spaces.

4. CONCLUSION

This study looks at how artificial intelligence (AI) and smart robots like Robot Pintar Indonesia (ROPI), can help make advertising more modern and effective in today's digital world. Many traditional digital ads can feel boring and don't really show who is paying attention to them. But with AI, ads can become more interesting, more personal, and can give useful feedback to improve marketing.

The research reviewed articles from the last 10 years and found four main themes: personalized ads using AI, robots in marketing, using AI to understand customer behavior, and ethical issues like privacy. ROPI is already being used in public places like malls. It can recognize faces, guess age and gender, and show ads that match the people nearby. The results are impressive, with a conversion rate of 19.81%, especially among young people aged 15 to 29.

Even though this technology has a lot of potential, we still need to think carefully about privacy and how comfortable people are with robots in public. To use it more widely, we must build trust and make sure it's used in a fair and ethical way. In the end, ROPI shows that advertising in the future can be smarter and more engaging if we do it the right way.

ACKNOWLEDGMENT

This research was made possible through the kind support of Maranatha Christian University and PT. SARI Teknologi Global. We sincerely thank all contributors and stakeholders involved in the development and deployment of ROPI.

REFERENCES

Affiah., Aniefiok, E., Mfon, A. A., & Ibok, N. (2022). Robotics marketing: Some challenges and way forward. British International Journal of Business and Marketing Research, 5(6), 2758-6352. https://aspjournals.org/Journals/index.php/bijbmr/index/

Babatunde, S. O., Odejide, O. A., Edunjobi, T. E., & Ogundipe, D. O. (2024). The role of AI in marketing personalization: A theoretical exploration of consumer engagement strategies. International Journal of Management & Entrepreneurship Research, 6(3), 2664-3588. https://doi.org/10.51594/ijimer.v6i3.964

Bai, Z., Jain, N., Kurdyukov, R., Walton, J., Wang, Y., Wasson, T., Zhu, X., & Chircu, A. M. (2019). Conducting systematic literature reviews in information systems: An analysis of guidelines. Issues in Information Systems, 20(3), 83-93. https://doi.org/10.48009/3_iis_2019_83-93

Bell, C., Olukemi, A., & Broklyn, P. (2024). AI-driven personalization in digital marketing: Effectiveness and ethical considerations. Preprints.org. https://doi.org/10.20944/preprints202408.0023.v1

Collins, C., Dennehy, D., Conboy, K., & Mikalef, P. (2021). Artificial intelligence in information systems research: A systematic literature review and research agenda. International Journal of Information Management, 60, 1-17. https://doi.org/10.1016/j.ijinfomgt.2021.102383

Gao, Y., & Liu, H. (2022). Artificial intelligence-enabled personalization in interactive marketing: A customer journey perspective. Journal of Research in Interactive Marketing, 17(1), 1-18. https://doi.org/10.1108/JRIM-01-2022-0023

Gentsch, P. (2019). AI in marketing, sales and service. Springer Nature Link.

Haleem, A., Javaid, M., Qadri, M. A., Singh, R. P., & Suman, R. (2022). Artificial intelligence (AI) applications for marketing: A literature-based study. International Journal of Intelligent Networks, 3(1), 119–217. https://doi.org/10.1016/j.ijin.2022.08.005

Han, R., Lam, H. K. S., Zhan, Y., Wang, Y., Dwivedi, Y. K., & Tan, K. H. (2021). Artificial intelligence in business-to-business marketing. Industrial Management & Data Systems, 121(12), 2467-2497. https://doi.org/10.1108/IMDS-05-2021-0300

Hartono, U., Kistyanto, A., Fatoni, F., Isbanah, Y., & Arifah, I. D. C. (2022). Increasing batik market share through optimization of web-based digital marketing. Jurnal Abdi Insani, 9(2), 381-389. https://doi.org/10.29303/abdiindsani.v9i2.540

Hemalatha, A. (2023). AI-driven marketing: Leveraging artificial intelligence for enhanced customer engagement. Jupiter Publications Consortium, 1. https://doi.org/10.47715/JPC.B.978-93-91303-61-7

Holthoewer, J., & Doorn, J. V. (2021). Artificial intelligence and robotics in marketing. Groningen Digital Business Centre (GDBC). www.rug.nl/gdbc

Ingriana, A., & Rolando, B. (2025). Revolutioning e-commerce: Investigating the effectiveness of AI-driven personalization in influencing consumer purchasing behavior. JUMANAGE, 4(1), 549-565. https://doi.org/10.33998/jumanage.2025.4.1.2040

Katona, K., Neamah, H. A., & Korondi, P. (2024). Obstacle avoidance and path planning methods for autonomous navigation of mobile robot. PubMed Central, 24(11), 3573. https://doi.org/10.3390/s24113573

Kaur, S., & Singh, G. (2024). Adoption of artificial intelligence in marketing: Legal and ethical perspectives. Neurosensory and neuromarketing impacts on consumer behavior (pp.1-32). IGI Global. https://doi.org/10.4018/979-8-3693-8222-6.ch001

Khandelwal, Y., Malhotra, S., Sharma, R., & Sarin, G. (2024). Artificial intelligence in digital marketing: A bibliometric analysis and future research directions. Abhigyan, 42(4), 341–363. https://doi.org/10.1177/09702385241277358

Lubis, E. S., & Widodo, S. (2024). The role of digital marketing in international marketing. Sinergi International Journal of Economics, 2(1), 25-37. https://doi.org/10.61194/economics.v2i1.209

Morapeli, S., & Khemisi, M. (2024). The influence of artificial intelligence on the strategic communication industry. Journal for Communication Studies in Africa, 43(1), 48-58. https://doi.org/10.36615/jcsa.v43i1.1432

Naveeenkumar, N., Rallapalli, S., Sasikala, K., Priya, P. V., Husain, J., & Boopathi, S. (2024). Enhancing consumer behavior and experience through AI-driven insights optimization. IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3693-1918-5.ch001

Nirwana, A., Sudarmiatin, S., & Melany. (2023). Implementation of artificial intelligence in digital marketing development: A thematic review and practical exploration. Jurnal Manajemen Bisnis Akutansi dan Keuangan, 2(1), 85-112. https://doi.org/10.55927/jambak.v2i1.4034

Page, M. J., Mckenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Aki, E., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., Mcdonald, S., McGuinness, L. A., Stewart, L. A., Thomas, J., Tricco, A., Weich, V., Whiting, P., & Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. Journal of Clinical Epidemiology, 134, 178-189. https://doi.org/10.1016/j.jclinepi.2021.03.001

Sani, I., & Febrian, W. D. (2023). Marketing analysis and customer satisfaction on customer loyalty global competition era. Jurnal Perspektif Manajerial dan Kewirausahaan, 3(2), 111-120. https://doi.org/10.59832/jpmk.v3i2.204

Sánchez, C. S., & Muneta, M. E. A. (2024). Impact of artificial intelligence on customer engagement and advertising engagement: A review and future research agenda. International Journal of Consumer Studies, 48(2), 1–22. https://doi.org/10.1111/ijcs.13027

Shiomi, M., Shinozawa, K., Nakagawa, Y., Miyashita, T., Sakamoto, T., Terakubo, T., Ishiguro, H., & Hagita, N. Recommendation effects of a social robot for advertisement-use context in shopping mall. International Journal of Social Robotics, 5(2), 1-13. https://doi.org/10.1007/s12369-013-0180-4

Shumanov, M., Cooper, H., & Ewing, M. (2022). Using AI predicted personality to enhance advertising effectiveness. European Journal of Marketing, 56(6), 1590-1609. https://doi.org/10.1108/EJM-12-2019-0941

Stahl, B. C., & Wright, D. (2018). Ethics and privacy in AI and big data: Implementing responsible research and innovation. IEEE Security & Privacy Magazine, 16(3), 26-33. https://doi.org/10.1109/MSP.2018.2701164

Synder, H. (2019). Literature review as a research methodology: An overview and guidelines. Journal of Business Research, 104, 333-339. https://doi.org/10.1016./j.jbusres.2019.07.039

Thomas, V. L., & Fowler, K. (2020). Close encounters of the AI kind: Use of AI influencers as brand endorsers. Journal of Advertising. 50, 11-25. https://doi.org/10.1080/00913367.2020.1810595

Verma, S., Sharma, R., Deb, S., & Maitra, D. (2021). Artificial intelligence in marketing: Systematic review and future research direction. International Journal of Information Management Data Insights, 1(12), 1-8. https://doi.org/10.1016/j.jjimei.2020.100002

Williams, T., Briggs, P., & Scheutz, M. (2015). Covert robot-robot communication: Human perceptions and implications for human-robot interaction. Journal of Human-Robot Interaction, 4, 24-49. https://doi.org/10.5898/JHRI.4.2.Williams

Wu, L., & Wen, T. J. (2021). Understanding AI advertising from the consumer perspective. Journal of Advertising Research, 61, 133-146. https://doi.org/10.2501/JAR-2021-004

Xie, L., Liu, X., & Li, D. (2022). The mechanism of value cocreation in robotic services: Customer inspiration from robotic service novelty. Journal of Hospitality Marketing & Management, 31, 962-983. https://doi.org/10.1080/19368623.2022.2112354