Students' Perspectives on Ethical Concerns in Metaverse E-commerce: A Focus Group Study

Aidrina Mohamed Sofiadin[1*]

[1]*Kulliyyah of Information and Communication Technology, International Islamic University Malaysia, Jalan Gombak, 53100 Kuala Lumpur, Malaysia.*

ARTICLE INFO	ABSTRACT
	With the rapid expansion of the Metaverse, e-commerce has undergone transformative changes, offering immersive shopping experiences. This technological evolution, however, brings forth a range of ethical concerns. This study examines the perspectives of students on these ethical issues within metaverse e-commerce, utilising focus group discussions as the primary research method. 38 participants from the e-commerce course engaged in discussions that revealed several key concerns. Among these are issues related to privacy and data security, with students expressing fears about personal information misuse and inadequately protected digital identities. Additionally, the focus group identified the need for greater transparency and accountability from e-commerce platforms operating in the Metaverse. Participants suggested developing ethical guidelines and regulatory measures to protect consumers from ethical infringements, emphasising the role of education in equipping users with the skills to navigate these virtual spaces responsibly. This study contributes to the growing body of literature on the ethical dimensions of emerging digital environments. Highlighting the students' concerns and recommendations underscores the need for guidelines to ensure that metaverse e-commerce develops in an ethically responsible manner.

1. INTRODUCTION

As the metaverse continues to evolve, it is becoming an increasingly vital platform for e-commerce, presenting unique opportunities and ethical challenges. Integrating virtual, augmented, and mixed realities, the Metaverse revolutionises how consumers interact with brands and purchase goods. With this technological shift, the need to address ethical considerations becomes crucial, affecting privacy, consumer rights, digital ownership, and equitable access.

The emergence of metaverse e-commerce raises unique ethical concerns, particularly regarding privacy, transparency, and the need for guidelines amid rapid technological advancements. Students' perspectives on these issues are critical as they are among the primary users of these technologies. A study by Özdemir et al. (2022) highlights students' concerns about privacy, noting that the extensive data collection practices inherent to virtual environments raise significant ethical dilemmas. This aligns with findings from Venturini and Columbano (2024), who discuss consumer perceptions of digital identities in fashion metaverse

---

[1]* Corresponding author. Aidrina Mohamed Sofiadin. *E-mail address*: aidrina@iium.edu.my

settings, emphasising the potential risks of identity theft and data misuse. Moreover, the transparency of transaction processes within the Metaverse has emerged as a key point. Hofmann et al. (2024) indicate that students are concerned about unclear terms and conditions, which could lead to deceptive advertising practices in virtual marketplaces. These sentiments echo those from Alkhwaldi (2024), who calls for comprehensive guidelines to enhance consumer trust.

The need for structured guidelines is further reinforced by research from Shukla et al. (2024) and Pillai et al. (2024), where students express a desire for clearer ethical frameworks governing their online interactions and purchases. As Kovács and Keresztes (2024) and Azhar et al. (2024) suggest, establishing robust ethical standards will be crucial in fostering a safe and transparent metaverse e-commerce environment. Therefore, addressing these ethical concerns is vital in ensuring responsible technological evolution. Thus, the objective of this study is to explore and analyse students' perspectives on ethical concerns in metaverse e-commerce, with a particular focus on issues of privacy and data security, digital identity, consumer behaviour, and ethical marketing practices. By employing focus group discussions, this research aims to identify key ethical challenges perceived by students and to highlight areas where ethical guidelines and regulatory frameworks are needed to support the responsible development of metaverse-based commercial environments.

2. LITERATURE REVIEW

2.1 Privacy

Prior research consistently identifies privacy and data protection as central ethical challenges in Metaverse and immersive e-commerce environments (Dwivedi et al., 2022; Büchel & Spinler, 2024). These studies highlight how extensive biometric and behavioural data collection in virtual spaces creates new risks that are not sufficiently addressed by existing regulatory frameworks. As consumers engage with e-commerce platforms in the Metaverse, their data is collected, shared, and processed in ways that raise significant concerns about privacy (Büchel & Spinler, 2024). The unique nature of the Metaverse, which allows for immersive interactions and extensive data gathering about user behaviour, complicates traditional notions of privacy. Existing literature highlights that comprehensive data protection regulations are often lacking, leading to unregulated practices that could infringe on user privacy rights (Dwivedi et al., 2022). The insufficient regulatory frameworks in this rapidly evolving digital landscape heighten the risk of misuse of personal data, emphasising a critical need for robust privacy protections tailored for virtual environments.

To further enlighten the implications of privacy in Metaverse e-commerce, it is essential to examine consumer sentiments and expectations regarding their data. Recent studies indicate that users are becoming increasingly aware of the complexities surrounding their personal information and express a desire for greater control over their data (Fadhel et al., 2024). The literature suggests that transparency and accountability in data use are critical components for building trust within these digital ecosystems. Consumers expect clarity regarding how their data is utilised, who has access to it, and the measures taken to protect it. When enterprises demonstrate a commitment to ethical data practices, they not only enhance customer loyalty but also mitigate potential backlash from privacy violations.

2.2 Digital Identity

The role of digital identity is also crucial in understanding the ethical landscape of Metaverse e-commerce. As users navigate the Metaverse, they create and curate digital identities that can significantly differ from their real-world personas. The issue of digital identity presents challenges regarding consent and the ownership of personal data, further complicating the ethical considerations surrounding privacy. Digital identity is a fundamental element of the Metaverse, raising ethical concerns related to authenticity and representation. Research on digital identity in the Metaverse highlights its ethical significance for trust, authenticity, and fraud prevention. Nleya and Velempini (2024) document the increasing prevalence of impersonation and identity theft in immersive environments, while Jenkins (2022) proposes authentication mechanisms as a response to these risks. Rony et al. (2024) further demonstrate that perceptions of digital

identity directly influence consumer trust and willingness to engage in metaverse commerce, positioning identity management as a core ethical and commercial concern. The advent of digital environments has enabled users to craft avatars and personas that may significantly diverge from their physical identities, introducing ethical dilemmas surrounding self-representation and fraud (Nleya & Velempini, 2024). These avatars, while offering the potential for enhanced creativity and personal expression, may also become conduits for misleading behaviours such as identity theft and impersonation.

This concern is underscored by the increasing reports of fraudulent activities in virtual spaces, suggesting a pressing need for comprehensive strategies to mitigate these risks (Nleya & Velempini, 2024). The existing literature underscores the necessity for robust authentication systems capable of verifying digital identities while simultaneously preserving user privacy. Jenkins (2022) argues that the implementation of multifactor authentication processes, alongside biometric verification tools, can serve to enhance security measures within virtual environments. Such technologies aim to create a secure framework that authenticates user identities while minimising reliance on traditional identifiers, such as email addresses or passwords, which may be vulnerable to breaches. The ethical implications of the surveillance and data collection inherent in these technologies are a concern that requires further examination as users navigate the balance between security and autonomy in digital spaces. Moreover, the distinction between real and digital identities is crucial to understanding consumer behaviour within the Metaverse. Rony et al. (2024) reveal that how users perceive their digital selves in relation to their real-world identities significantly influences their trust in e-commerce transactions.

2.3 Consumer Behaviour

Moreover, ethical dilemmas extend to consumer behaviour patterns within the Metaverse. The immersive nature of these environments can lead to manipulated perceptions and behaviours, raising concerns about informed consent and susceptibility to marketing tactics that exploit user vulnerabilities (Bermejo & Hui, 2022). The literature indicates that emotional engagement and cognitive biases play a significant role in shaping consumer actions in virtual spaces, thus raising ethical concerns about manipulative marketing tactics that exploit these traits (Bermejo & Hui, 2022). As Arshad (2024) notes, understanding these behaviours is critical for ensuring ethical standards are upheld and can help in formulating guidelines that protect consumers from predatory practices. The literature identifies the need for ethical guidelines governing advertising practices in the Metaverse, ensuring that users are not misled or coerced into making purchasing decisions. Implementing digital literacy programs that empower consumers to navigate the complexities of e-commerce and recognise ethical practices could foster a more equitable marketplace.

The literature indicates that consumer behaviour in virtual settings is often influenced by factors such as customisation and the social presence of avatars (Fici et al., 2024). Avatars serve as digital representations of consumers, influencing social interactions and, consequently, purchase decisions. The sense of social presence can foster a sense of community and trust among users, which, in turn, may enhance participation in e-commerce activities. However, avatar customisation also presents ethical challenges. Studies suggest that the portrayal of avatars may evoke different emotional responses from consumers and can influence identity perception, potentially leading to unrealistic beauty standards and purchasing behaviour biased toward certain products (Wang & Fodness, 2010). Additionally, promoting ethical consumer behaviour entails creating educational initiatives that empower users to make informed choices. By facilitating understanding of how their data is used and the potential psychological impacts of immersive marketing strategies, consumers can develop critical awareness of their interactions within the Metaverse. As such, integrating ethical education into the design of virtual shopping experiences may serve to mitigate the adverse effects of emotional manipulation and foster a culture of responsible consumption.

2.4 Digital Marketing Strategies

Moreover, the advanced algorithms used in Metaverse e-commerce can lead to ethical dilemmas related to manipulation. Targeted advertising strategies leverage data analytics to personalise marketing efforts, which can enhance user engagement but may also exploit consumer vulnerabilities. Ethical concerns

surrounding metaverse marketing are strongly reflected in prior research on immersive persuasion. Wang and Fodness (2010) established that avatar-based environments that increase emotional trust and attachment, an innovation that Song et al. (2024) argue can be exploited by AI-driven personalisation systems. Wu and Zhang (2023) further contend that transparent regulatory frameworks are necessary to prevent deceptive or coercive digital practices. Together, these studies frame metaverse marketing not only as a technological innovation but as an emerging ethical risk domain.

Various scholars argue for regulatory frameworks that promote transparency and fairness in digital marketing practices in the Metaverse (Wu and Zhang, 2023). Such frameworks should encompass principles of informed consent, requiring businesses to disclose how consumer data is collected and utilised. By fostering an environment of transparency, companies can build trust with consumers, which is essential for sustained engagement in e-commerce platforms.

In synthesising these insights, it becomes evident that a multifaceted approach is required to address the ethical dilemmas presented by Metaverse e-commerce. Stakeholders, including corporations, consumers, and regulatory bodies, must collaborate to craft a digital environment that not only fosters innovation but also prioritises the ethical treatment of consumers. Emphasising transparency, accountability, and ethical standards will contribute significantly toward mitigating the risks associated with privacy violations, consumer manipulations, and identity fraud in this growing digital frontier. The ethical considerations surrounding Metaverse e-commerce are increasingly recognised as integral to the successful integration of virtual marketplaces within societal frameworks.

3. METHODOLOGY

Focus groups are a qualitative research method used to gather feedback and insights about a product, service, concept, or marketing campaign. Focus groups are primarily used to explore complex behaviours and motivations, identify user needs, and generate ideas for product development or improvement. They can also test or refine marketing messages and promotional strategies. Unlike surveys, which collect quantifiable data, focus groups provide qualitative insights, giving a more nuanced understanding of the users' perspectives. They involve a small, diverse group of people whose interactions are observed and guided by a moderator. This study conducted focus groups in which participants were encouraged to discuss their perceptions, opinions, beliefs, and attitudes regarding the given topic. This interaction helps researchers understand the audience's feelings and motivations better (Krueger & Casey, 2015).

The focus group discussions were audio-recorded and transcribed. The data were analysed using thematic analysis, following the six-phase approach outlined by Braun and Clarke (2006). First, the researchers familiarised themselves with the data through repeated reading of the transcripts. Second, initial open codes were generated to capture meaningful units related to ethical concerns in metaverse e-commerce. Third, related codes were grouped into broader categories. These categories were then reviewed and refined to develop overarching themes, such as privacy and data security, digital identity, consumer behaviour, and ethical marketing practices. The themes were continuously compared against the raw data to ensure consistency and representativeness. Finally, the themes were clearly defined and interpreted to generate the study's findings.

It is also noted that organising and conducting focus groups required significant planning, recruitment, facilitation, and data analysis. Furthermore, relying on participant availability and attendance can introduce significant logistical challenges. Ensuring that the right individuals show up at the scheduled time and location can be daunting, and a single no-show can disrupt the entire session. This logistical complexity can lead to delays, increased costs, and potential biases in the data (Parker & Tritter, 2006). All 38 participants attended and fully participated in the focus group, which reduced potential bias. After conducting the focus group session, the collected data needs to be analysed to identify common themes, patterns, and any unique insights. The qualitative data give context to the topic, helping companies and researchers make informed decisions (Morgan, 1997).

3.1 Participants

The focus groups in this study recruited 38 participants through purposive convenience sampling from students enrolled in an e-commerce course. Recruitment was conducted by announcing the study during scheduled class sessions and distributing an invitation via the course communication platform. Students who agreed to participate registered their interest and were subsequently assigned to focus groups. Each group was structured to foster open communication, with sessions lasting approximately 90 minutes. Participants were prompted with a combination of pre-established questions and spontaneous follow-up inquiries designed to generate discussion on ethical marketing practices, consumer privacy, consumer behaviour, digital identity, and data security within the Metaverse. The discussions were recorded and subsequently transcribed to allow for detailed analysis.

The present study employs focus group discussions as the principal research method to analyse students' perspectives on ethical concerns in metaverse e-commerce. This qualitative approach is particularly well-suited for uncovering the complex viewpoints of participants, as it facilitates in-depth dialogue and encourages the expression of personal experiences and opinions. Prior research has underscored the value of employing user experience methodologies in the context of the Metaverse, as evidenced by Al-kfairy et al. (2024), who proposed that qualitative insights provide a vital lens through which to comprehend user interaction within virtual environments.

4. ANALYSIS & RESULTS

The Metaverse, an immersive virtual environment that integrates digital reality with everyday interaction, has emerged as a significant frontier in the realm of e-commerce. Defined by a convergence of various technologies, such as virtual reality (VR), augmented reality (AR), and blockchain, the Metaverse facilitates an interactive shopping experience that transcends traditional online retail modalities. As suggested by Zallio et a. (2023), the ethical concerns raised in the context of virtual reality may also be applicable to the Metaverse. Its relevance within today's digital economy cannot be overstated, particularly as consumer behaviour increasingly shifts towards these innovative platforms. This evolution necessitates an investigation into not only the commercial potential of metaverse e-commerce but also the ethical implications that accompany its adoption.

> *"Metaverse and XR technology collect users' movement, data, eye tracking, and other biometrics. It shows that it is not secure, as attackers can easily breach the data and misuse it. For example, use the biometrics to make a payment."* – female participant

As examined by Hofmann et al. (2024), understanding consumer intentions to adopt metaverse platforms is vital for businesses aiming to harness these emerging marketplaces. Students, as the next generation of consumers and professionals, possess unique insights into the ethical issues that may arise in the context of commerce within the Metaverse. Thus, focus group discussions with 38 participants enrolled in an e-commerce course provide an avenue to enlighten these perspectives, enabling a rich dialogue on the ethical concerns that engage metaverse interactions.

In the context of e-commerce, several ethical concerns arise that require investigation. First, issues pertaining to data privacy and security stand at the forefront of student concerns. In the Metaverse, users generate a wealth of personal data through their interactions, making it imperative for businesses to establish transparent data handling policies. Participants in the focus groups expressed concern over how their data would be utilised, emphasising the need for robust privacy protocols. This concern underscores a broader demand for accountability and responsible data management practices in the commercial practices of the Metaverse. In addition to concerns surrounding marketing practices, consumer privacy emerged as a dominant theme throughout the discussions. Participants expressed a strong desire for greater transparency regarding data use and the implications of purchasing behaviour in the Metaverse. Many highlighted the potential for unnecessary data collection and the risks of unauthorised access to personal information, underscoring the critical importance of consumer trust in virtual marketplaces.

> *"Metaverse and XR collected privacy and sensitive data like biometrics, users' behaviors, and environmental demographics. This technology should protect the data from unauthorised parties. So that the attacker cannot misuse this data."* – male participant

> *"Ethical concern with virtual reality is on privacy and security, and health and safety. Privacy and security are on information collected."* – female participant

Additionally, the question of consent becomes increasingly complex in immersive environments. Unlike traditional e-commerce, where consent may be explicitly sought before transactions, the Metaverse blurs the lines of user engagement, raising ethical questions about whether users truly understand the implications of their actions. Students highlighted the potential for misleading advertising tactics in vibrant digital settings, which could manipulate buyers' experiences or distort their understanding of products.

> *"An extensive collection of users' data that leads to a risk of data leak. Businesses might have too much information about customers, though they will have to inform and ask for consent before collecting customer data."*

The findings from these focus group discussions revealed a spectrum of ethical concerns regarding marketing practices in virtual shopping environments. Participants expressed concern over manipulative advertising techniques, often comparing these to traditional e-commerce strategies that may lack transparency. This aligns with the analysis conducted by Kumar et al. (2024), which highlighted a growing tension between innovative marketing strategies and ethical considerations. Moreover, many participants voiced the belief that consumers in the Metaverse are particularly susceptible to such tactics due to the immersive nature of these environments, which can grow feelings of urgency and emotional engagement.

Discussions among the participants also underscored the digital divide, how access to metaverse platforms could worsen existing inequalities. Students expressed a need for equitable access to these technologies, cautioning that failure to address inclusivity could lead to disengagement of certain demographic groups, particularly those lacking resources or digital literacy. However, participants also highlighted that the immersive nature of the Metaverse can lead to addictive behaviour, impacting mental health and well-being.

Moreover, the issue of identity management emerged prominently in the discussions. Students expressed concerns regarding the anonymity typically associated with virtual identities within the Metaverse. This anonymity presents challenges in verifying the authenticity and trustworthiness of users and products, potentially enabling fraudulent activities and further complicating ethical e-commerce practices. Participants highlighted the importance of ensuring that virtual identities are securely managed to prevent the manipulation of both consumers and creators of content, thus emphasising the need for clear policies and mechanisms to safeguard users within this digital environment.

> *"The usage of Metaverse and XR in e-commerce may lead to identity theft and fraud. The attacker might pose as a legitimate user to attack the e-commerce site and do a fraudulent transaction without having a real identity or using the real identity of other people."* – female participant

> *"Users can personalise the 'avatar' of themselves in Metaverse and XR, and other people can see it. It might lead to sexual harassment when the user really makes the avatar look like them in real life, because we never know who is behind the Internet."* – female participant

> *"One of the ethical concerns associated with Metaverse and XR that can be discussed is the concern of harassment while using virtual reality (VR). Harassment in VR is really concerning, as VR can be accessed by many people regardless of age and gender. Also, the harassment can lead to something more serious, such as mental health issues."* – male participant

In addition to issues of privacy and identity, participants raised critical questions about the authenticity of virtual products. The Metaverse allows for the creation and sale of items that may not possess the same tangible qualities as physical goods, thus leading to debates about their intrinsic value and quality assurance. The students indicated a demand for greater transparency in the marketing and sale of virtual goods, stressing that consumers should have clear information regarding product origin and authenticity. This concern echoes Alkhwaldi's (2024) findings, which suggest that users' perceptions of authenticity significantly influence trust and purchasing behaviour in digital marketplaces.

Furthermore, the discussions touched on the notion of social sustainability in relation to immersive technologies. Participants critiqued the potential impact of the increasing reliance on the Metaverse for commerce on community relationships and societal values. There were concerns that a focus on virtual consumption might withdraw from local economies and contribute to broader individual isolation, posing ethical dilemmas about responsible consumption and social equity in the digital age. Such insights are consistent with existing literature highlighting the need for sustainability initiatives that consider the impacts of digital innovations on real-world communities (Alkhwaldi, 2024).

Fig. 1. Word frequency from focus group discussion

The word frequency analysis (see Figure 1) provided an initial overview of the most critical ethical concerns discussed by participants. Frequently occurring terms such as 'privacy,' 'data,' 'security,' 'identity,' 'harassment,' 'access,' and 'addiction' indicated main areas of concern across the focus group discussions. These high-frequency terms were then used as an analytical guide in the thematic coding process. By clustering related words and examining their contextual usage in the transcripts, broader thematic categories were developed, which informed the key perspectives presented in Table 1.

Table 1. Key ethical perspectives derived from thematic analysis, informed by high-frequency terms identified in the focus group transcripts

Key perspective	Concern
Privacy and data security	Students are cautious about how their personal data is collected, used, and shared within the Metaverse, as well as how consent is obtained.
Digital ownership and copyright	There may be ambiguities around the ownership of digital assets and intellectual properties.
Environmental impact	The energy consumption required for operating vast metaverse infrastructures can have a significant environmental footprint.

Inclusivity and accessibility	Not all students may have access to the technology needed to participate in the Metaverse.
Behavioural addiction	The immersive nature of the Metaverse can lead to addictive behavior, impacting mental health and well-being.
Identity and anonymity	The ability to create avatars and maintain anonymity can lead to identity manipulation and cyberbullying.
Economic inequality	Disparities in digital wealth within the Metaverse might reflect or increase real-world economic inequalities.
Social sustainability	The increasing reliance on the Metaverse for commerce could impact community relationships and societal values.
Legal and governance framework	The lack of clear regulatory frameworks governing metaverse commerce can lead to legal ambiguities.

5. CONCLUSION

Participants expressed concerns regarding consumer privacy, digital identity, data security, and the potential for exploitation in digital exchanges. These sentiments resonate with calls for heightened regulatory oversight. The findings underscore the need for policymakers to address the unique challenges posed by e-commerce in the Metaverse, suggesting an avenue for collaboration among educational institutions, industry stakeholders, and government entities to develop cohesive ethical standards. Fici et al. (2024) emphasise the importance of integrating consumer perceptions and insights into broader strategic frameworks for businesses entering the Metaverse. This integration is critical for ensuring that marketing strategies align with consumer expectations and ethical standards, thus promoting sustainable engagement in virtual commerce.

Moreover, the dynamic nature of the Metaverse necessitates continuous inquiry into the evolving ethical landscape. Future research endeavours may benefit from a longitudinal approach to monitor and analyse changes in student perspectives as emerging technologies and market trends influence their experiences and expectations. As the Metaverse continues to expand, the attitudes and concerns of young consumers who will shape this environment are likely to evolve.

The need for ethical consideration extends beyond mere compliance; it shapes the foundational principles of customer relationships and brand loyalty in the Metaverse. As businesses increasingly incorporate immersive technologies such as augmented reality (AR) and virtual reality (VR) into their operations, there is an intrinsic responsibility to ensure that these tools are employed ethically, reflecting the values expressed by the consumers themselves. In light of these findings, it becomes evident that the discourse surrounding ethical concerns in metaverse e-commerce is not merely an academic exercise but a critical component of strategic development and brand positioning in an evolving digital marketplace. Further exploration into these themes will undoubtedly yield insights that improve practices in the field and inform educational efforts aimed at preparing a new generation of ethical consumers and entrepreneurs.

CONFLICT OF INTEREST STATEMENT

The authors agree that this research was conducted in the absence of any self-benefits, commercial or financial conflicts, and declare the absence of conflicting interests with the funders.

AUTHORS' CONTRIBUTIONS

Aidrina Sofiadin solely designed and carried out the research, wrote and revised the article.

REFERENCES

Arshad, R. U. (2024). The Evolution of E-Commerce: Emerging Trends and Consumer Behaviors in the Digital Marketplace. Research Corridor Journal of Engineering Science, 1(2), 166-181.

Al-kfairy, M., Alomari, A., Al-Bashayreh, M. G., & Tubishat, M. (2024). Unveiling the Metaverse: A Survey of User Experience, Social Dynamics, and Technological Interoperability.

Alkhwaldi, A. F. (2024). Investigating the social sustainability of immersive virtual technologies in higher educational institutions: students' perceptions toward metaverse technology. Sustainability, 16(2), 934.

Azhar, M., Ali, R., & Naz, A. (2024). Faith in Metaverse: understanding adoption intentions of Metaverse amongst the Muslim students. Journal of Islamic Marketing.

Bermejo, C., & Hui, P. (2022). Life, the Metaverse and Everything: An Overview of Privacy, Ethics, and Governance in Metaverse. In arXiv (Cornell University). Cornell University. https://doi.org/10.48550/arxiv.2204.01480

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology,3(2), 77-101. http://eprints.uwe.ac.uk/11735

Büchel, H., & Spinler, S. (2024). The impact of the Metaverse on e-commerce business models–A Delphi-based scenario study. Technology in Society, 76, 102465.

Dwivedi, Y. K., Hughes, L., Baabdullah, A. M., Ribeiro-Navarrete, S., Giannakis, M., Al-Debei, M. M., ... & Wamba, S. F. (2022). Metaverse beyond the hype: Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. International Journal of Information management, 66, 102542.

Fadhel, M. A., Duhaim, A. M., Albahri, A. S., Al-Qaysi, Z. T., Aktham, M. A., Chyad, M. A., ... & Gu, Y. (2024). Navigating the Metaverse: unraveling the impact of artificial intelligence—a comprehensive review and gap analysis. Artificial Intelligence Review, 57(10), 264.

Fici, A., Bilucaglia, M., Casiraghi, C., Rossi, C., Chiarelli, S., Columbano, M., ... & Russo, V. (2024). From E-Commerce to the Metaverse: A Neuroscientific Analysis of Digital Consumer Behavior. Behavioral Sciences, 14(7), 596.

Hofmann, L., Al-Dhabyani, Y., & Arslan, E. (2024). Towards a metaverse shopping revolution: a mixed-method study on factors influencing consumers' intentions to adopt Metaverse as shopping marketplace. European Journal of Business Science and Technology, 129.

Jenkins, T. (2022). Immersive virtual shopping experiences in the retail Metaverse: Consumer-driven E-commerce, blockchain-based digital assets, and data visualization tools. Linguistic and Philosophical Investigations, 21, 154-169.

Kovács, I., & Keresztes, É. R. (2024). Digital innovations in e-commerce: Augmented reality applications in online fashion retail: A qualitative study among Gen Z consumers. Informatics 11(3), 56.

Krueger, R. A., & Casey, M. A. (2015). Focus Groups: A Practical Guide for Applied Research. Sage Publications.

Kumar, J., Arora, M., & Erkol Bayram, G. (Eds.). (2024). Exploring the Use of Metaverse in Business and Education. IGI Global.

Morgan, D. L. (1997). Focus Groups as Qualitative Research. Sage Publications.

Nleya, S. M., & Velempini, M. (2024). Industrial Metaverse: A comprehensive review, environmental impact, and challenges. Applied Sciences, 14(13), 5736.

Özdemir, A., Vural, M., Süleymanoğulları, M., & Bayraktar, G. (2022). What do university students think about the Metaverse? Journal of Educational Technology and Online Learning, 5(4), 952-962.

Rony, J. H., Khan, R. H., Miah, J., & Syeed, M. M. (2024, July). "E-Commerce Application in Metaverse: Requirements, Integration, Economics and Future Trends." 2024 IEEE International Conference on Electronics, Computing and Communication Technologies (CONECCT), Bangalore, India, 2024, pp. 1-6, http://dx.doi.org/10.1109/CONECCT62155.2024.10677060

Shukla, A., Mishra, A., Rana, N. P., & Banerjee, S. (2024). The future of metaverse adoption: A behavioral

reasoning perspective with a text-mining approach. Journal of Consumer Behaviour.

Song, F., Xia, T., & Tang, Y. (2024). Integration of artificial intelligence technology and visual communication design in metaverse e-commerce and its potential opportunities. Electronic Commerce Research, 1-21.

Parker, A., & Tritter, J. (2006). Focus group method and methodology: current practice and recent debate. International Journal of Research & Method in Education, 29(1), 23–37. https://doi.org/10.1080/01406720500537304

Pillai, R., Sivathanu, B., Rana, N. P., & Struweg, I. (2024). Assessing the determinants of metaverse adoption for e-commerce retailing. Journal of Computer Information Systems, 1-20.

Venturini, A., & Columbano, M. (2024). 'Fashioning' the Metaverse: A qualitative study on consumers' value and perceptions of digital fashion in virtual worlds. Journal of Global Fashion Marketing, 15(1), 6-22.

Wang, L. C., & Fodness, D. (2010). Can avatars enhance consumer trust and emotion in online retail sales? International Journal of Electronic Marketing and Retailing 3 (4), 341. Inderscience Publishers. https://doi.org/10.1504/ijemr.2010.036881

Wu, H., & Zhang, W. (2023). Digital identity, privacy, security, and their legal safeguards in the Metaverse. Security and Safety, 2, 2023, https://doi.org/10.1051/sands/2023011

Zallio, M., Ohashi, T., & Clarkson, P. J. (2023). Designing the Metaverse: A Scoping Review to Map Current Research Effort on Ethical Implications. AHFE International, https://doi.org/10.54941/ahfe1003935

ABOUT THE AUTHOR

Aidrina Mohamed Sofiadin, PhD is an Assistant Professor at the Department of Information Systems, Kulliyyah of Information and Communication Technology, International Islamic University Malaysia (IIUM). She completed her doctoral research in the Sustainable E-learning Framework at Curtin University, Australia. As an academic, she is interested in establishing sustainable education and humanising education to enhance students' learning experiences and ensure they complement future needs through extended reality (XR) technology. Aidrina is a certified professional and a member of the Australian Computer Society (ACS). She is also a certified professional technologist by the Malaysia Board of Technologists.