

Banking in the Metaverse: A New Frontier for Financial Institutions

Keng-Boon Ooi ^{a,b,c}, Garry Wei-Han Tan ^{a,c,d,e,f,*}, Eugene Cheng-Xi Aw ^a, Tat-Huei Cham ^{a,g}, Yogesh K. Dwivedi ^{h,i}, Rohita Dwivedi ^j, Laurie Hughes ^h, Arpan Kumar Kar ^k, Xiu-Ming Loh ^l, Emmanuel Mogaji ^m, Ian Phau ⁿ, Anshuman Sharma ^o

^aUCSI Graduate Business School, UCSI University, Malaysia

^bFORE School of Management, India

^cFaculty of Business, Design, and Arts, Swinburne University of Technology Sarawak Campus, Malaysia

^dSchool of Economics and Management, Yunnan Normal University, People's Republic of China

^eCollege of Business Administration, Adamson University, Philippines

^fSchool of Finance and Economics, Nanchang Institute of Technology, People's Republic of China

^gTashkent State University of Economics, Tashkent, Uzbekistan

^hDigital Futures for Sustainable Business & Society Research Group, School of Management, Swansea University, Bay Campus, Fabian Bay, Swansea, UK

ⁱDepartment of Management, Symbiosis Institute of Business Management, Pune & Symbiosis International (Deemed University), Pune, Maharashtra, India

^jPrin. L. N. Welingkar Insititute of Management Development and Research, India

^kDepartment of Management Studies, Indian Institute of Technology Delhi, India

^lFaculty of Business and Finance, Universiti Tunku Abdul Rahman, Malaysia

^mSchool of Management & Marketing, University of Greenwich, United Kingdom

ⁿFaculty of Business and Law, Curtin University, Perth, Australia

^oDepartment of Marketing, College of Business Administration, Ajman University, United Arab Emirates

Banking in the Metaverse: A New Frontier for Financial Institutions

Purpose: Technological advancements have catalyzed disruption in the banking sector. The impact of the metaverse on the banking sector is no exception. In view of this, the current paper provides valuable insights into four key areas (i.e., corporate banking, retail banking, banking employees, and public policy) that the metaverse could significantly disrupt.

Design/methodology/approach: Insights into four key areas of the banking sector that the metaverse could significantly impact were gathered from various invited contributors.

Findings: The invited contributors first introduce the association between their respective key areas with the metaverse. Subsequently, the opportunities and challenges relevant to the key areas were identified. Finally, future research agendas were proposed for the attention of all relevant stakeholders.

Originality: The metaverse's impact on key areas of the banking sector is discussed in this paper. Following the metaverse's potentially wide application in the banking sector, insights from the invited contributions offer great value to the relevant stakeholders.

Keywords: Metaverse; financial institutions; corporate banking; retail banking; bank employees, public policy, sustainability.

Article classification: Viewpoint.

Banking in the Metaverse: A New Frontier for Financial Institutions

1. Introduction

It is widely acknowledged that the term metaverse was first referenced by Neal Stephenson in his dystopic 1992 novel titled - Snow Crash, where he depicts the metaverse as a virtual reality (VR) space that incorporates avatars and software agents using the internet and augmented reality (AR) technologies (Joshua, 2017). Following studies have described it as an evolution of the internet –an element of Web 3.0 that utilises a combination of mixed reality (MR), avatars, and blockchain technology to develop an immersive environment that integrates the physical and virtual worlds (Dwivedi *et al.*, 2022a; Lee *et al.*, 2022). The launch of Second Life in 2003 by Linden Labs expanded this concept, enabling users to create and use avatars within a virtual environment that supported a thriving economy (Damar, 2021; Gent, 2022). Via the use of mixed reality experiences, the future use of the metaverse is likely to magnify our senses of presence and immersion, where users and physical objects are represented in the form of avatars and virtual objects within a fully interactive world (Goldman Sachs, 2022).

Researchers have posited the potential financial opportunities that may emerge from the metaverse (Dwivedi *et al.*, 2022a). Jensen Huang, the CEO of Nvidia, a US-based graphic technology corporation, anticipates that the virtual economy will eventually become much larger than the real-world economy (Forbes, 2022a). The Market Intelligence analysis by Precedence Research on the impact of the metaverse identifies a potential - \$1.6 trillion global market by 2030 (Globe News Wire 2022). In a review of the potential financial implications of the metaverse, Goldman Sachs believes up to 33% of the global digital economy could shift to the metaverse, highlighting a bullish case market size of \$12.5 trillion (Goldman Sachs, 2021).

The banking, commerce, and financial services industries are lauded to be the next entrants in the metaverse after gaming, media, and entertainment (Forbes, 2022b; Koohang *et al.*, 2023; Tan *et al.*, 2023). The metaverse will allow users to purchase or lease digital assets requiring financial services and the presence of trusted payment rails (Sheehan, 2022). The ability to create, buy and sell digital assets, virtual land, and property using the Ethereum blockchain on the Decentraland platform (Rosen, 2022) illustrates the potential for new virtual-focused business models within the financial services space (Smith, 2022). In the realm of metaverse platforms, users have the opportunity to acquire digital commodities, such as footwear from renowned brands like Nike and apparel from luxury fashion houses like Gucci, for the purpose of enhancing their avatars and virtual homes. The transactions involved typically necessitate the involvement of cryptocurrencies and digital assets, such as NFTs. To convert these virtual earnings into real-world spending, users must exchange them for real currencies, which involves banking institutions (Marr, 2022).

The metaverse integrates both virtual and physical realms, presenting financial and banking institutions with the prospect of fostering a conducive collaborative environment with their customers. By incorporating a third dimension and an element of presence, digital banking interactions may attain a more intimate and humanized quality. This could manifest in a customer having a heightened engagement with a service professional or consultant embodied by a lifelike avatar, as opposed to a mere chat interface or video call (Accenture, 2022). Although the impact on banking and financial services from the metaverse is uncertain, the change could be transformational, and banks cannot risk watching from the

sidelines and not exploring its potential to create immersive and highly interactive customer journeys (Accenture 2022; Dwivedi *et al.*, 2022a).

Significant challenges remain, especially in relation to governance, trust, and privacy within the metaverse environments. The widespread acceptance of new forms of digital trust is likely required by consumers - one that can replace the reassurance of face-to-face interactions, reliance on gut feelings, and perceptions of honesty and trust in the context of virtual avatar-based interactions (Moradi *et al.*, 2022). This is likely a key challenge facing banking and financial service organisations, where a lack of trust in this area could constrain widespread consumer adoption and engagement.

This study has employed a multi-perspective approach, which involves gathering diverse viewpoints and insights from experts in the field (Dwivedi *et al.*, 2021ab; 2022abc). Our aim is to provide a comprehensive understanding of the potential opportunities and implications of the metaverse, with a particular focus on the banking and finance perspective (see table 1). We posit this research within the emerging debates and discussions within the academic and practice-based literature that aim to deliver insight into the many opportunities and key challenges of the metaverse. The remainder of this study is as follows: section two discusses corporate banking, and retail banking is discussed in section three. We discuss the impact on employees in section four and public policy in section five. We conclude the study in the final section.

Table 1: Authors' Contributions

Contributions	Contributors
Formal analysis, supervision, project administration, review, re-write, and editing	Keng-Boon Ooi
Introduction	Laurie Hughes & Rohita Dwivedi
Metaverse for Corporate Banking	Emmanuel Mogaji & Anshuman Sharma
Metaverse for Retail Banking	Garry Wei-Han Tan & Xiu-Ming Loh
Metaverse from the Bank Employees' Perspective	Eugene Cheng Xi Aw, Tat-Huei Cham & Ian Phau
How should Metaverse and Public Policy evolve for Sustainability	Arpan Kumar Kar & Yogesh K Dwivedi

2. Metaverse for Corporate Banking

2.1 Overview

Banking services are an integral part of any economy, it delivers for businesses and people across the country, ensuring access to credit facilities and financial support and enhancing swift transactions (Mogaji *et al.*, 2018). Banking services are often classified as retail for individuals and corporate banking for businesses and larger organizations. While retail banking – for individuals may be better suited for the metaverse, it is imperative to explore if and how corporate banking can succeed. The role of corporate banking may become more prominent with the inherent characteristics of metaverses that might be at risk for financial speculation. Corporate banking could potentially capitalize on opportunities to counteract the actions of speculators who are not focused on the primary substance of the virtual world. Additionally, it may assume the responsibility of maintaining the stability of the exchange rate (Vidal-Tomás, 2023). For example, in Second Life, Linden Lab functions as the issuing bank, ensuring a stable exchange rate by controlling Linden Dollar volatility and adjusting supply based on demand.

Technology used in the metaverse, such as VR and AR, is being implemented for various business functionalities, including recreating bank branches in the virtual world (Depari *et al.*, 2022). Shoolapani and Jinka (2011) developed a virtual bank branch using Open Wonderland to simulate a physical bank branch meant to address customer inquiries about the bank's products and services. The employees log in to this virtual branch using avatars and avail themselves in the virtual office to assist. The viability of the metaverse in corporate banking is anchored on the growing popularity of users interacting with a computer-generated environment in 3D through virtual reality (Falchuk *et al.*, 2018, Dwivedi *et al.*, 2020). Its growing popularity is fueled by technological innovations and the exponential rise of the experience economy (Maiya, 2022). A report by JP Morgan has indicated that the market and business opportunities for corporate entities in the metaverse are estimated to be over \$1 trillion in yearly revenues (Dwivedi *et al.*, 2022a). Other banks, such as KB Koomin Bank in South Korea, have developed VR branches in the metaverse that enable customers to access banking services using head-mounted VR devices (Peter, 2021). Banking institutions can explore opportunities in the metaverse by developing facilities to enable financial transactions, such as providing loans to finance asset purchases and converting fiat currency into cryptocurrency (Shoolapani and Jinka, 2011). The increasing relevance of the metaverse in banking can also be associated with the transformations in the business models toward cloud computing.

2.2 Opportunities

Metaverse allows augmented engagement, which presents a considerable opportunity for banks to engage with their clients. From this engagement, there are considerable opportunities to ethically collect customer data and use it to improve service delivery. As Lilien (2016) noted that business-to-business data is not always effectively collected and adequately analyzed in a meaningful way, suggesting that corporate banks are losing out on additional datasets to know the customers better and how to serve them effectively (O'Donnell *et al.*, 2002; Mogaji *et al.*, 2018). As Guo (2018) established that the management of customer relationships is still very critical for the success of corporate bankers, and Andaleeb *et al.* (2016) reiterated relationship banking (intangible factors) as a critical measure to differentiate corporate bank offerings, using metaverse to engage with their client represents a huge opportunity waiting to be explored.

Metaverse presents opportunities for banks to reach out and engage with diverse customers, perhaps building on the achievement of technology through teleworking during the pandemic; there are opportunities for more interactive engagement (Mogaji, 2022). Notably, the role of customer-facing staff will evolve to effectively use this technology and deliver a streamlined banking experience (Tyler and Stanley, 2001), especially in situations where the client is not conversant. Banks can explore the non-fungible token (NFT) opportunity in the metaverse since many individuals transact in the VR world and invest in NFTs. NFTs are a vital enabler in the metaverse, and banks can regard them as asset classes under wealth management (Bushnell, 2022). In this case, the banks and other financial institutions can launch mutual funds of NFTs where investments appreciate. The immersive banking experience is an essential customer relationship management strategy built on increased internet use for banking services. It can also be harnessed as an essential tool in customer relationship management by enhancing the effectiveness of online banking through the offline-like service available by avatars (Liu and Liu, 2019). Since consumers often need social interactions, the metaverse avails an avenue to enhance their banking experience.

Additionally, the presence of banks in the metaverse is likened to the massively multiplayer online role-playing games (MMORPGs) that have rapidly evolved into alternative realities (Manninen and Kujanpää, 2007). This opportunity is even enhanced by the increasing number of people spending time in the metaverse. The metaverse constitutes a business and marketing platform as it is a continuous and persistent 3D virtual world designed for the user with control over almost all aspects of their world and stimulates creativity and self-expression (Vafopoulos *et al.*, 2006). Corporate banking opportunities in the metaverse are directly linked to its role in commerce. According to Inengite (2022), the metaverse avails various solutions that will help bridge the gap between physical retailing and digital commerce. Therefore, banks will be vital in facilitating commercial activity in the metaverse by offering banking services and financing various business activities.

The financing services will enable creators to connect design tools and acquire assets needed to facilitate their activities (Peter, 2021). Azamat (2021) indicated that banking and payment systems are vital in commercial activities. The introduction of a blockchain-powered currency has availed many opportunities for banking institutions to support commerce in the metaverse. It is achieved through cryptocurrencies and NFTs, where the former will support buying items while the latter supports the purchase of digital assets.

2.3 Challenges

One of the challenges associated with corporate banking in the metaverse is the increased technological complexity (Reynolds, 2008). Despite enhancing the experience of other users, this complexity may result in certain aspects of the financial transactions for various users. It may give rise to user-friendliness and navigation issues since controlling avatars through various spheres in the virtual world may not be straightforward and convenient. This technological complexity may discourage many business clients from engaging in the metaverse. This lack of engagement presents a considerable challenge for corporate bankers who may have invested resources in developing their virtual banking lounge. However, business clients are not capable or willing to interact.

Another derivative of this technological complexity is how to keep the clients engaged in the metaverse. Clients who are comfortable with meeting their corporate bankers in the metaverse might question the value of such interactions if there isn't much activity taking place. Looking at the Onyx banking lounge of JP Morgan in Decentraland, which promised to run banking services virtually just as it does in the physical world, there is not much activity going on, and there is no interaction and engagement for anyone coming to the space. It appears like a “placeholder” until everyone gets used to the metaverse. If bank consumers find it disengaging and never visit, it highlights a challenge in attracting busy business clients to a virtual space lacking activity. Corporate bankers must, therefore, critically evaluate their investment in the metaverse if they do not have plans to effectively engage the clients (Mogaji and Nguyen, 2022a).

Other challenges include responsiveness, co-presence perceptions, and ease of use difficulties that the users may experience as they engage with the products (Abdulquadri *et al.*, 2021; Gadalla *et al.*, 2013). Challenges associated with responsiveness arise due to the higher expectations of the customers as they anticipate an offline-like service provided by the avatars. Gadalla *et al.* (2013) also established that customers wish for better co-presence by using avatars. The global location of the bank's client may also pose a challenge, even though metaverse allows virtual access from any part of the world. Accessibility and security issues may also arise as a challenge from this complex operating environment, especially for those

with limited internet and digital infrastructure access to engage. These technologies are still in their infant stage, and customers in some countries with structural and institutional challenges causing digital divides may not be able, albeit ready and equipped to engage in the metaverse.

Another challenge stems from potential legal issues arising from transactions within the metaverse. Key legal concerns associated with the commercial aspects of the metaverse include the marketplace, data privacy and protection, and interactions between avatars and users in the metaverse (Lau, 2022). Financial services are highly regulated, especially corporate banking. There are huge implications on whom to hold responsible on behalf of a company. While individuals may be held responsible within retail banking on the metaverse, structural and organizational issues pose a challenge for the companies and the banks. Regarding responsibility and monitoring, there are possibilities of marketplace exploitation, like the dark web, which may affect the business operation of the bank and client. The business clients may be exposed to attacks, impersonation, and fraudulent activities, which may jeopardize the working relationship between the bank and the client. In addition, the country's regulations and policies for financial transactions and financial services providers on the metaverse must be recognized as a potential challenge. These legal issues are specifically on the applicability of the legal rules, listing requirements, and banking and securities legislation when launching NFTs such as music, digital art, or other creative products (Harvard Business Review, 2021).

2.4 Research Agenda

Corporate banking offers a different business arrangement, and future research must validate the relevance of corporate banking in the metaverse empirically. This relevance is a very concerning business proposition, and banks must make an informed decision. Interestingly, this research strand addresses a similar concern raised by the Centre for Financial Services Innovation in 1997 when discussing the prospects of corporate banks on the Internet. The report noted that corporate banks are unlikely to adopt the Internet because they offer a “bespoke business in which a low-cost mass-market distribution network is far less important.” This same concern is raised here, and future research needs to explore this further; beyond the enormous opportunities for retail banks in the metaverse, does corporate banking have a chance? Engaging with policymakers, corporate banking, which may nurture this idea, and prospective business clients will be essential. It is also imperative to diversify the sample size of the business client from small and medium enterprises to large multination, from businesses in the developed and developing worlds. This research-driven understanding will help further drive this conversation about the prospects of corporate banking on the metaverse.

Additionally, future research needs to examine how corporate bankers will utilize the user-centric philosophy of the metaverses to encourage creativity and allow customers to create their banking products. This aligns with the challenges raised around engagement on the platform. There is a need to understand the level of involvement to expect from a business client when engaging in the metaverse. This level of involvement will also be influenced by how banks implement e-service quality for their financial services and products in the metaverse. On this note, future research needs to explore the possible hybrid interaction to establish if and how engagement on the metaverse can impact the business's financial status in the real world. Future research would also need to engage with the policymakers, the banks, and business clients to understand measures, policies, and laws that need to be implemented to prevent the possibility of marketplace exploitation in the metaverse. The dark

side of technologies is inevitable (Mogaji and Nguyen, 2022b), and more so in the metaverse; stakeholders need to make informed policy implications on addressing the possible attack and reassuring the customers about the safety of their transactions.

3. Metaverse for Retail Banking

3.1 Overview

Given the general applicability of the metaverse's utility, it has great potential to disrupt and even revolutionize many sectors (Koochang *et al.*, 2023). Many financial institutions worldwide have taken their first steps toward the metaverse, particularly in the retail banking sector. For example, JP Morgan (U.S.), CaixaBank (Spain), and DBS Bank (Singapore) are leveraging the metaverse to engage, educate, and entertain their customers (Global Finance, 2023). With that said, the metaverse still has much to offer regarding maximizing the effectiveness and efficiency of the banks' operations.

Overall, the metaverse is appealing to managers as it can be applied to all aspects of business, from the individual customer and employee to the entire company and from the physical to digital settings. While the metaverse is expected to play a role in revolutionizing the banking sector, it can also be a double-edged sword. This is because banks that can successfully integrate their banking services with the metaverse will undoubtedly gain many growth opportunities. However, the failure to address the challenges inherent to such integration will only cause more complications and setbacks.

3.2 Opportunities

The purchase of digital assets such as cryptocurrencies and real estate is frequently carried out in the metaverse (Forbes, 2022c). As such, banks can also leverage the metaverse to attract new customer segments, such as gamers and technology enthusiasts, by offering metaverse-specific products and services.

While e-banking enables customers to carry out key banking activities anywhere and anytime, it is devoid of the personal engagement that one would get by going to the physical bank. That said, the metaverse would allow for better humanization of the banking experience and engagement. In the metaverse, customers are to create a unique avatar for themselves and can have more lifelike interactions with others. With that said, they will not only be able to interact with bank employees but also with other customers in the metaverse. These interactions open up the possibilities for co-creation among the different parties. J.P. Morgan has recently established an Onyx Lounge within the Metaverse, specifically in the blockchain-driven universe of Decentraland. Analogous to its real-life operations, the bank is capable of streamlining cross-border transactions, foreign currency exchange, financial asset generation, trading, and secure storage (Raj, 2022).

Furthermore, customers have pointed out that they would like excitement in their banking activities (Khurana, 2022). Given this, the metaverse can give customers more hedonic value as banks can better personalize their operations to each customer's journey. This can come in the form of a personalized avatar and interactive environment. In other words, customers would be able to conduct banking activities (e.g., view account balance, transfer money, pay bills) in a(n) creative and immersive setting. This would better position the banks to attract new customers, especially younger crowds who resonate with these benefits.

Moreover, banks that can seamlessly link their physical operations with the virtual world can create powerful synergies. Given the virtual nature of the metaverse, it can be an alternative channel for customers who may find it difficult to carry out banking activities physically. With the help of automation and Artificial Intelligence, banks can set up their virtual presence in the metaverse to allow customers access to their services anytime and anywhere. One example is the Union Bank of India which showcases its products and services in the metaverse (Raj, 2022). As such, this would bring added value to banks that cannot operate 24/7 because of high operating costs.

3.3 Challenges

The first challenge is the high financial obligation needed for the metaverse's research, development, and application into the bank's business model. More precisely, the necessary infrastructure (hardware and software) must be thoroughly developed and maintained. Therefore, this implies hiring qualified metaverse specialists for such an undertaking. However, "there are not enough qualified people to deal with the complexity of the architecture and develop secure solutions for the metaverse" (Dwivedi *et al.*, 2022a, p.10). As such, the cost of hiring such talent will come at a premium as the demand continues to outpace the supply. In addition, there is the cost of training the employees to provide banking services to customers in the metaverse competently. Smaller banks with limited financial resources could not afford such an undertaking.

The second challenge involves the policies pertaining to the operation of banking activities in the metaverse. In particular, the lack of comprehensive policies surrounding banking activities in the metaverse will further embolden criminals to commit cybercrimes. Identity theft is a major concern in this setting (Forbes, 2022d). This is because criminals can construct a lookalike avatar or hack other people's avatars to carry out illegal activities in the metaverse. Therefore, it is important for banks to properly identify which banking activities can be integrated into the metaverse and to what extent. Any issues arising from such integration will only erode customers' confidence and trust in the banks.

The third challenge concerns the limited accessibility to the metaverse. The general public currently lacks the necessary resources, knowledge, and skills to use the metaverse for banking purposes proficiently. This is because many still do not have the specialized hardware (e.g., virtual reality headsets) to enter and engage in the metaverse. As prices to purchase such technologies remain relatively high, people in the middle- and lower-income groups will not be able to afford them. While such technology will only become cheaper, easier to use, and more accessible over time, there will still be an initial widening of the digital divide in the early stages.

The fourth challenge comes in the form of resistance from customers. People naturally prefer the status quo because it provides a sense of security, familiarity, and comfort (Loh *et al.*, 2022a). However, integrating banking services into the metaverse will undoubtedly lead to changes in how customers carry out their banking services (e.g., balance checks and fund transfers). As such, the likelihood of errors would increase as customers need more familiarity and relevant information to handle more advanced banking activities in the metaverse. In view of this, banks will need to allocate sufficient resources to educate and train customers to ensure they can competently perform banking activities in the metaverse.

3.4 Research Agenda

It is important to understand how the metaverse can be integrated with banking operations to enhance performance. However, massive gaps have yet to be explored, given the metaverse's nascency. In other words, there is a plethora of opportunities for future studies to be carried out. It includes the effects of the metaverse on the different stakeholders in the retail banking sector, which are detailed below:

3.4.1 Corporate Perspective

It will be a massive undertaking for banks to integrate their operations with the metaverse. This is because the metaverse's novelty would undoubtedly involve many strategic decisions. With that said, a bank's internal environment comprises multiple parties, from the Board of Directors and C-Suite Executives to the departmental heads and employees. Hence, there will be differing perceptions, hesitancy, and readiness toward integrating the metaverse into the business model. Thus, future research can look into the following research questions:

- What major decisions must top management address before, during, and after integrating the metaverse with their operations?
- What would be the optimal blend for omnichannel engagement between the banks and their customers?
- How can banks leverage the metaverse to develop their brand and enhance customer relationships (e.g., acquisition and retention)?
- What factors would facilitate positive post-adoption outcomes among customers when using the metaverse for banking purposes (e.g., satisfaction, word of mouth, continued usage, loyalty)?
- What policies can be enacted to protect customers from banking-related cybercrimes (e.g., fraud, scam, impersonation, identity theft) in the metaverse?

3.4.2 Customer Perspective

The customer is undoubtedly the most important stakeholder that banks must consider when integrating their business operations with the metaverse. This is because they play a significant role in determining its success and sustainability. However, current literature has largely overlooked the study of customers' resistance, adoption, and usage of the metaverse in the retail banking sector. With that said, a multi-dimensional approach should be employed to look into the customers' behaviour (Loh *et al.*, 2022b). Therefore, the research questions that can be addressed by future research include:

- What factors influence customers' perceptions, decision-making, and motivations to perform banking activities in the metaverse?
- What would affect customers' resistance to conducting banking activities in the metaverse (e.g., perceived complexity, privacy concerns, security threats)?
- How would customer resources (e.g., access to technology, finances, self-efficacy) affect their propensity to perform banking activities in the metaverse?
- How would customers' resistance, adoption, and usage of the metaverse for banking purposes differ among individuals with different characteristics (e.g., age, gender, risk appetite, preference for the status quo)?
- How would customers' interactions with banks differ in the metaverse and reality over time?

4. Metaverse from the Bank Employees' Perspective

4.1 Overview

The inception of the metaverse has transformed the way of operation for the players in the financial industry. Driven by the use of NFT, blockchain, virtual reality, digital currencies,

augmented reality, and decentralized finance (DeFi), the disruptive attributes of metaverse have enabled virtual banking with a more immersive and personalized experience for both financial service providers and consumers (Gunasundaram, 2022). Hence, banks must see these benefits as an opportunity to become the potential avenue that empowers digital banking and online commerce. Given the metaverse's potential, it was reported that several major banks around the world had incorporated such innovation into their offerings (Zainurin *et al.*, 2023). For example, KB Kookmin Bank, one of South Korea's leading financial companies, is reportedly creating the KB metaverse VR Branch Testbed technology, which allows customers to access banking services within the metaverse realms and could be used for educational and training purposes. Similarly, JPMorgan became the first Wall Street bank to establish a virtual lounge in Decentraland, a browser-based 3D metaverse platform (Michelle, 2022). The establishment and intervention of the metaverse have benefited banks in terms of their operation and service provision. Fuelled by the combination of artificial intelligence (AI) and automation, the benefits of metaverse could assist bank officers in performing their tasks effectively and efficiently (Sudeep, 2022). For instance, using the metaverse could help bank employees build stronger relationships with clients, handle challenging conversations, and respond to their queries with empathy. Additionally, metaverse could also help the banks' management team craft their business and marketing strategies that could improve their engagement with customers.

4.2 Opportunities

The revolutionary disruption brought by the metaverse has provided the banking industry with various benefits from an operational perspective that involves bank employees. From the employee and customer experience standpoint, the implementation of metaverse technology can aid banks in their virtual banking operations by providing customers with engaging experiences whereby they do not need to visit the bank physically and facilitating bank employees in serving their customers from any location (Bjat *et al.*, 2022; Zainurin *et al.*, 2023). Apart from that, using the metaverse can also help bank employees offer personalized experiences to customers and engage them in a meaningful way. This approach will benefit the banks from a marketing standpoint as it can help them enhance their branding and corporate image, which could be an advantage in attracting new (virtual) customers while retaining the existing ones.

Since the metaverse is still a relatively a new innovation, the early adoption of the metaverse allows bank managers to explore, learn, and experiment with the most optimal way to operate virtually on the metaverse platform. Such benefits enable employees to develop innovative solutions and strategies to improve the operation and process within the metaverse platform to bank clients. Grounded on the trial-and-error approach, such an initiative allows bank employees to change how they perform their daily activities and help them build solutions around the metaverse at an affordable cost. Furthermore, with proficiency in dealing with the metaverse among the employees, banks will be able to compete with other established financial institutions on an equal footing. To sum up, the metaverse is considered the future, and by early adoption, banks can significantly benefit from this innovative and evolving technology.

4.3 Challenges

Technical difficulties are among the possible challenges that the finance and banking industry may face in involving employees in disruptive metaverse technology. Although the metaverse might offer endless opportunities to the employees in the finance and banking industries, such as providing a whole new experience of training and servicing customers, the current reality indicates a range of technical hurdles await to be resolved. The use of metaverse may not be

as simple and straightforward given the limitations of interface and hardware issues. Much consideration needs to be taken into account, including the type of hardware and its accessibility to the employees. On top of that, physical health concerns may impede the transforming metaverse as the next workplace for employees. It has been contended that prolonged use of virtual reality gear can induce eye strain and fatigue, which in turn affect employees' productivity and performance. In addition, shifting employees to the metaverse may raise issues pertaining to virtual presenteeism and burnout. Metaverse will hardly gain a place in the banking service platforms without this problem resolving first. Lastly, financial and banking services are typically considered high-involvement services. It would be challenging for employees to provide banking services and market financial products in the metaverse world where avatars prevail instead of the real human touch.

4.4 Research Agenda

The rise of the metaverse represents the next stage of development for the banking and fintech sectors. The transformation of traditional bank service to digital-oriented service has largely automated the banking service process. On this note, it is worth exploring how banking and financial service employees can find new ways to deliver an engaging customer experience and enhance their relationship marketing strategies in the metaverse world. It is particularly relevant given that the interactions between bank employees and customers will largely be realised through digital avatars, and we are still in the infancy stage of understanding avatar-based bank marketing. Furthermore, future research can be devoted to understanding employee service failure in the metaverse. While initial metaverse endeavours have been exerted by a few banking and financial service providers, the expectations or experiences of encountering service failure on metaverse remain largely unknown. Would customers' responses and expectations differ from those of online (mobile and web) and offline banking services? How should employees act, respond, and more importantly, how can they leverage metaverse attributes to handle the crisis? How will it unfold throughout the metaverse development? Apart from that, it will be important for future research to investigate how the metaverse can serve as a new learning and community platform for financial and banking service employees. The well-being of employees represents a valuable avenue to be explored in the context of bank marketing.

5. How should Metaverse and Public Policy evolve for Sustainability?

5.1 Overview

The metaverse is increasingly gaining prominence in how the current social media platforms, virtual worlds, and digital economy businesses may integrate in the very near future and create digital platforms touching upon many stakeholders in an unprecedented way (Dwivedi *et al.*, 2022a). While these platforms are going to be extremely immersive and engaging, the extent to which users and stakeholders may interact over these platforms would be unprecedented. While the journey in this evolution is definitely going to be extremely exciting, this also leads to major disruptions in the traditional ways of technology usage by individuals, groups, organizations, and society. Recent evidence shows that extended reality is often more demanding and may have a higher load on the users in terms of mental demand, temporal demand, effort, performance, and frustration (Xi *et al.*, 2022). Further, there will be major governance issues stemming from this disruption.

The functional objectives of the metaverse would be to create a virtual socio-economic ecosystem where stakeholders may interact and engage with each other by extending social interaction through virtual reality, ownership, and exchange of digital assets, forming digital identity and communities in shared virtual spaces. While this means that new

forms of societies would be formed, it means there is a pressing need to understand the nuances these societies may face so that policy interventions may be planned for the stakeholders when needed. Evidence is present that in existing platforms which may evolve into metaverse platforms with meta-stakeholders, like virtual tourism, how stakeholders engage using emerging technologies results in unintended consequences from interaction among stakeholders and demand variability within the ecosystem (Verma *et al.*, 2022).

Some of the technological artefacts that will be useful to build the functional objectives of metaverse platforms would be mature technologies like networking and the Internet, which would be extended through the use of emerging technologies like unstructured and non-relational data storage and sharing technologies, edge computing platforms, and heterogeneous wireless platforms. Further, there may be emerging technology artefacts like virtual reality, augmented reality, blockchain, the Internet of Things, wearable devices, and many more, which will make the ecosystem viable for meeting the functional objectives of the metaverse. The interaction and use of these technology artefacts by the user groups and stakeholders would generate huge volumes of data, which may be mined by the new age artificial intelligence algorithms, like reinforcement learning, federated learning, and deep learning. These technologies, in conjunction, would enable mobility, interoperability, scalability, real-time information processing, identity management, smart contracts, and shared responsibilities, which will enable the sustenance of virtual communities.

The use of these technology artefacts integrated into an ecosystem will inherently need policy planning if these platforms continue to create value for the stakeholders without creating unwanted disruptions. Without policymaking by governments and institutions, these platforms may witness unintended consequences at a scale that may disrupt the social infrastructure beyond repair. In this article, we discuss opportunities, challenges, and future research agendas surrounding the metaverse which should impact.

5.2 Opportunities

Metaverse presents a new socio-economic knowledge ecosystem for governments. The stakeholders of the metaverse would be organizations and individuals who are highly skilled, educated, and economically well-established. This ecosystem is, therefore, likely to generate traction from profit-seeking firms in a big way since the economic value generated and exchanged in this ecosystem will be significantly large. The economic opportunity itself presents excitement from firms and stakeholders who may engage and transact across geographical realities. Therefore, governments would need to plan to develop a legal framework for operations that may have acceptance across geographies for the enforcement of contracts for financial consideration. Technological advancements like smart contracts may enable contracts, and immense opportunities exist for multi-party entities to engage on these platforms and co-create economic value.

Metaverses present opportunities to get honest signals from users and stakeholders. Interaction in the metaverse in extended reality for social networking, collaboration, and personal dialogues may get unshackled from the social norms in this immersive platform. This interaction will create a huge amount of user data between user-to-user interaction and user-to-non-living character interaction. These interactions will be stored within the platforms. Individuals will share their experiences from service encounters through gamified platforms with others. These experiences may present immense opportunities to improve services and products for firms onboarded on these platforms.

Metaverse may enable new business models where new types of digital assets and services may be created. Users on metaverse may purchase and consume these services. These services may lead to different models of platform economics being created whereby multiple parties may engage together and co-create value for the consumers. A lot of these new models of business and service consumption may be for entertainment purposes through gaming or companionship. Through models like extended reality integrated with emerging artefacts like digital twins, consumers, and users may customize their services and needs by tweaking processes in a way that hyper-personalization may happen in these platforms to create value for users that was unprecedented.

Metaverse creates personas of individuals whereby they can interact with others without the apprehension of being attributed to, watched, and judged for their personal preferences and choices. Therefore, individuals may feel inclined to interact and create social networks beyond social barriers like religion, class, creed, or ethnicity. It may help create networks beyond geographical borders in an unprecedented way. Such interaction may potentially unite sections of society that may share similar values, spiritual sentiments, political ideologies, hobbies, interests, and concerns. This may also help create self-help groups and supportive social infrastructure in society beyond borders.

Last but not least, the metaverse promises to be a platform beyond social interaction and enable economic interactions among parties. This would be an opportunity for financial institutions to create products that will have value within these platforms. Further, the financial institutions may create mechanisms of digital currencies that may have acceptance and usage beyond the borders of individual metaverse platforms and allow interoperability. Blockchain as a technology may enable this interoperability of value across platforms engaged together in the metaverse. To enable a self-sustaining digital economy, metaverse users should be able to exchange non-fungible tokens (digital goods, assets, etc.) for cryptocurrency to buy other metaverse entities or choose to cash out for fiat money at any moment. How should financial institutions like banks also enable the role of new-age entrepreneurs and influencers, who can operate their businesses in the metaverse with endless opportunities? How should these business entities be taxed while they generate revenue in the metaverse? Also, individual users on the metaverse will accrue huge amounts of assets with financial value over time, and this opens up opportunities for new models of financial institutions to manage these assets. Needless to say, this evolution of the economic ecosystem within the extended reality creates huge financial opportunities for banks and other related financial institutions interconnected through these platforms and generating value.

5.3 Challenges

A more complex area that presents a huge challenge in the era of the metaverse is contractual legal frameworks. In the metaverse, contracts may be enabled and automated by blockchain through smart contracts. The parties engaging may be geographically dispersed. The contracts present exciting opportunities for governments to enable multi-party collaboration through the exchange of consideration, which could be financial, digital currencies, and non-fungible tokens as well. As organizations and institutions engage, the legal framework surrounding norms for mutual consent, expressions of validity of offer and acceptance; adequacy of consideration; capacity; and legality need to evolve in this virtual ecosystem.

Interaction among stakeholders in extended reality would generate real-time, very high-velocity user-generated private content. Information assurance and data privacy would be major challenges in these virtual ecosystems. Ownership of data and the legal framework

surrounding possible data misuse for commercial benefits would need attention. Further unintended usage of private information beyond the purpose of the data being created would require policy interventions as current mechanisms would be inadequate to capture this data storage, access, and distribution. Will firms create profiles and personas about their customers that would only be used to serve their needs, or will these information assets be utilized for other purposes as well? Will users know how their information and virtual persona may be used for others? Governments would need to bring in policy frameworks for the protection of privacy rights.

Hyper-personalization of business processes through new business models may make the metaverse extremely engaging. Through extended realities, the new business models may create service and entertainment models whereby frequent users slowly get disconnected from physical reality. This may further drastically increase user engagement on these platforms leading to even addiction to these services or digital assets. Highly immersive problem games (e.g., Blue Whale Challenge) have led to social disruption among addicted users to the extent that users abused themselves and even committed suicides (Erevik *et al.*, 2022). Over ten studies investigated the association between immersive problem gaming behaviour among users and suicidal ideation and found statistically significant, positive associations. Addiction to extended reality may adversely impact the mental health of society whereby groups of users and even communities face unforeseen consequences of overuse of metaverse. Policy intervention surrounding fair usage of metaverse platforms and permissible business models may be needed.

Since metaverse users may have a virtual personality in the platforms, users may resort to behaviour knowing they may not be attributed to the action by their social circles. This may also bring out behavioral changes at the individual and group levels. Therefore, divergent behavior may become very common under these circumstances when users may feel they may not be identifiable and therefore engage in activities that would otherwise be socially ostracized. This may lead to activities like social shaming, cyberbullying, extortion, and sexual harassment on these platforms. Policy guidelines would be needed to enable reporting of these cases and actions that could be taken against the miscreants on these extended reality platforms built within the platforms.

Since users and entrepreneurship ventures may connect with financial institutions through the metaverse, these new-age firms are less likely to have a physical infrastructure. Banks will be highly exposed to financial exchanges and transactions undertaken on the metaverse. However, this may also create risks if transactions fail and financial losses are incurred. How can insurance evolve to cover losses in the metaverse? Banks may face greater challenges in recovering debts incurred from small start-ups if they fail after having incurred large debts. To what extent can banks provide credits to risky ventures as bad debt will also adversely impact the investors and account holders of the banks, which may move towards bankruptcy or mismanaged cases of financial lending? How can federal banks and the government create legal frameworks for economic exchanges of financial institutions within the metaverse?

5.4 Research Agenda

Future research in the space of public policy and government intervention could be extremely exciting in the years to come. We foresee different areas where metaverse research can add high impact and societal value, as the technology artefact is relatively in its infancy. Still, the

adverse impacts of its adoption in the socio-economic ecosystem are relatively less explored. In this context, we frame the following research agenda for the future:

- How will contracts and inter-organizational interaction evolve in metaverse ecosystems? How should the government intervene to protect rights and responsibilities of parties engaged in contracts in metaverse?
- How would service delivery change when organizations and consumers use metaverse and how would the service consumption be affected by this change?
- How would the government develop frameworks for the protection of rights and privileges surrounding ownership of artefacts, goods, and experiences of users in metaverse?
- How should governments intervene in the nature of advertisements, expectation setting, and fulfillment of services for consumer protection in the metaverse?
- How can the government create policies for the transferability of assets like digital currencies and digital goods across metaverse platforms?
- How will information storage be governed in the metaverse so that users and their identities are protected without adversely impacting the rights of others?
- How can we develop frameworks for data governance and data distribution to protect the privacy of individuals?
- How can information privacy and security be assured for use across different parties engaged over metaverse platforms?
- How can guidelines surrounding fair usage and permissible business models be developed to protect against overuse and adverse impacts of immersive metaverse platforms?
- How can the government empower individuals and institutions to intervene in cases of unforeseen and unintended usage leading to adverse outcomes?
- How can governments preempt the divergent behaviour of individuals and groups in the metaverse?
- What could be new types of disruption that social fabric may witness because of interaction among users and groups in the metaverse?
- How can policy intervention be introduced to prevent phenomena like cyberbullying and extortion among naïve users?
- What kind of legal frameworks may be suitable for the governance of institutional funding for new business ventures in the metaverse?
- How can taxation be enabled for the financial ecosystem of the metaverse where transactions and value creation happen across geographic borders?

While the metaverse is here for the future, some of these challenges may need policy planning before the communities at large adopt the metaverse. However, many of these challenges may be discovered as we continue exploring the metaverse. As the interaction of society increases, newer challenges that may require policy interventions may be witnessed.

6. Conclusion

While implementing the metaverse is still in its infancy, the potential in the banking industry seems endless. The banking industry has the opportunity to establish meaningful relationships with customers at every stage of the customer journey, enhance customer engagement and experience, and offer innovative financial products and services. However, all these benefits are also associated with risks, such as regulatory compliance, ensuring data privacy and security, as well as managing the complexity of new technology. The study followed a multi-perspective approach on different viewpoints (Dwivedi *et al.*, 2023) focusing on the banking

and finance perspectives, such as corporate banking, retail banking, employee, and public policy, from 11 expert contributors. Furthermore, the study comprehensively analyzed potential opportunities, key challenges, and future research agendas.

References

- Abdulquadri, A., Kieu, T.A. and Nguyen, N.P. (2021), "Digital transformation in financial services provision: a Nigerian perspective to the adoption of chatbot", *Journal of Enterprising Communities: People and Places in the Global Economy*, Vol. 15 No. 2, pp. 258-281, doi: 10.1108/JEC-06-2020-0126
- Accenture. (2022), "*The ultimate guide to banking in the metaverse*", available at <https://bankingblog.accenture.com/ultimate-guide-to-banking-in-the-metaverse>
- Andaleeb, S.S., Rashid, M. and Rahman, Q.A. (2016), "A model of customer-centric banking practices for corporate clients in Bangladesh", *International Journal of Bank Marketing*, Vol. 34 No. 4, pp. 458–475, doi: 10.1108/IJBM-10-2014-0156
- Bhat, J.R., AlQahtani, S.A. and Nekovee, M. (2022), "FinTech enablers, use cases, and role of future internet of things", *Journal of King Saud University-Computer and Information Sciences*, Vol. 35 No. 1, pp. 87-101, doi: 10.1016/j.jksuci.2022.08.033
- Bushnell, M. (2022), *Global capital markets and cryptocurrency: Exploring the international political economy of blockchain ecosystems and metaverse development* (Master's thesis), available at https://knowledge.uchicago.edu/record/3730/files/Bushnell_Thesis_CIR.pdf
- Damar, M. (2021), "Metaverse shape of your life for future: A bibliometric snapshot", *Journal of Metaverse*, Vol. 1 No. 1, pp. 1-8.
- Dwivedi, Y.K., Hughes, L., Baabdullah, A.M., Ribeiro-Navarrete, S., Giannakis, M., Al-Debei, M.M., ... and Wamba, S.F. (2022a), "Metaverse beyond the hype: Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy", *International Journal of Information Management*, Vol. 66, Article No. 102542, doi: 10.1016/j.ijinfomgt.2022.102542
- Dwivedi, Y.K., Hughes, L., Cheung, C.M., Conboy, K., Duan, Y., Dubey, R., ... and Viglia, G. (2022b), "How to develop a quality research article and avoid a journal desk rejection. *International Journal of Information Management*, Vol. 62, Article No. 102426, doi: 10.1016/j.ijinfomgt.2021.102426
- Dwivedi, Y.K., Hughes, L., Ismagilova, E., Aarts, G., Coombs, C., Crick, T., ... and Williams, M.D. (2021b), "Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy", *International Journal of Information Management*, Vol. 57, Article No. 101994, doi: 10.1016/j.ijinfomgt.2019.08.002
- Dwivedi, Y.K., Hughes, L., Kar, A.K., Baabdullah, A.M., Grover, P., Abbas, R., ... and Wade, M. (2022c), "Climate change and COP26: Are digital technologies and information management part of the problem or the solution? An editorial reflection and call to action", *International Journal of Information Management*, Vol. 63, Article No.

102456, doi: 10.1016/j.ijinfomgt.2021.102456

- Dwivedi, Y.K., Hughes, L., Wang, Y., Alalwan, A.A., Ahn, S.J., Balakrishnan, J., ... and Wirtz, J. (2023), "Metaverse marketing: How the metaverse will shape the future of consumer research and practice", *Psychology & Marketing*, Vol. 40 No. 4, pp. 750-776, doi: 10.1002/mar.21767
- Dwivedi, Y.K., Ismagilova, E., Hughes, D.L., Carlson, J., Filieri, R., Jacobson, J., ... and Wang, Y. (2021a), "Setting the future of digital and social media marketing research: Perspectives and research propositions", *International Journal of Information Management*, Vol. 59, Article No. 102168, doi: 10.1016/j.ijinfomgt.2020.102168
- Erevik, E.K., Landrø, H., Mattson, Å.L., Kristensen, J.H., Kaur, P. and Pallesen, S. (2022), "Problem gaming and suicidality: A systematic literature review", *Addictive Behaviors Reports*, Vol. 15, Article No. 100419, doi: 10.1016/j.abrep.2022.100419
- Falchuk, B., Loeb, S. and Neff, R. (2018), "The social Metaverse: Battle for privacy", *IEEE Technology and Society Magazine*, Vol. 37 No. 2, pp. 52-61, doi: 10.1109/MTS.2018.2826060
- Forbes (2022a), "Nvidia on how the metaverse can overtake the current economy", available at <https://www.forbes.com/sites/bethkindig/2022/02/18/nvidia-on-how-the-metaverse-can-overtake-the-current-economy/>
- Forbes. (2022b), "Council Post: Banking on the Metaverse", available at <https://www.forbes.com/sites/forbestechcouncil/2022/03/15/banking-on-the-metaverse/>
- Forbes. (2022c), "How to buy land & real estate in the Metaverse", available at <https://www.forbes.com/sites/bernardmarr/2022/03/23/how-to-buy-land--real-estate-in-the-metaverse/>
- Forbes. (2022d), "Policing in the Metaverse: What's happening now", available at <https://www.forbes.com/sites/bernardmarr/2022/11/18/policing-in-the-metaverse-whats-happening-now/>
- Gadalla, E., Keeling, K. and Abosag, I. (2013), "Metaverse-retail service quality: A future framework for retail service quality in the 3D internet", *Journal of Marketing Management*, Vol. 29 No. 13-14, pp. 1493-1517, doi: 10.1080/0267257X.2013.835742
- Gent, E. (2022), "Lessons from a second life > Before Meta, Philip Rosedale created an online universe", *IEEE Spectrum*, Vol. 59 No. 1, pp. 19, doi: 10.1109/MSPEC.2022.9676346
- Global Finance. (2023), "Metaverse: Banking Beyond Borders", available at <https://www.gfmag.com/magazine/february-2023/metaverse-banking-beyond-borders>
- Globe News Wire. (2022), "Metaverse market size to worth around USD 1,607.12 bn by 2030", available at <https://www.globenewswire.com/news-release/2022/06/08/2458533/0/en/Metaverse-Market-Size-to-Worth-Around-USD-1-607-12-Bn-by-2030.html>
- Goldman Sachs. (2022), "Understanding the Metaverse and Web 3.0", available at <https://www.goldmansachs.com/insights/podcasts/episodes/01-11-2022-eric-sheridan.html>
- Gunasundaram, G. (2022), "Metaverse and its impact on the banking sector", available at <https://www.linkedin.com/pulse/metaverse-its-impact-banking-sector-gunasundaram-gnanamuthu/>
- Guo, Y. (2017), "Implementing relationship banking strategies and techniques and improving customer value", *Finance and Market*, Vol. 2 No. 2, doi: 10.18686/fm.v2.980
- Kaczynski, S. and Kominers, S.D. (2021), "How NFTs create value", *Harvard Business Review*, available at <https://hbr.org/2021/2011/how-nfts-create-value>
- Koohang, A., Nord, J.H., Ooi, K.B., Tan, G.W.H., Al-Emran, M., Aw, E.C.-X., Baabdullah, A.M., Buhalis, D., Cham, T.H., Dennis, C., Dutot, V., Dwivedi, Y.K., Hughes, L.,

- Mogaji, E., Pandey, N., Phau, I., Raman, R., Sharma, A., Sigala, M., Ueno, A. and Wong, L.W. (2023), "Shaping the metaverse into reality: a holistic multidisciplinary understanding of opportunities, challenges, and avenues for future investigation", *Journal of Computer Information Systems*, doi: 10.1080/08874417.2023.2165197.
- Helm, S.V., Ligon, V., Stovall, T. and Van Riper, S. (2018), "Consumer interpretations of digital ownership in the book market", *Electronic Markets*, Vol. 28 No. 2, pp. 177-189, doi: 10.1007/s12525-018-0293-6
- Joshua, J. (2017), "Information Bodies: Computational Anxiety in Neal Stephenson's Snow Crash", *Interdisciplinary Literary Studies*, Vol. 19 No. 1, pp. 17-47, doi: 10.5325/intelitestud.19.1.0017
- Kadry, A. (2022), "The Metaverse revolution and its impact on the future of advertising industry", *Journal of Design Sciences and Applied Arts*, Vol. 3 No. 2, pp. 131-139, doi: 10.21608/jdsaa.2022.129876.117
- Kasiyanto, S. and Kilinc, M. (2022), "Legal Conundrums of the Metaverse", *Journal of Central Banking Law and Institutions*, Vol. 1 No. 2, pp. 299-322, doi: 10.21098/jcli.v1i2.25
- Khurana, P. (2022), "Metaverse: The real impact on banking and fintech industry", available at <https://economictimes.indiatimes.com/markets/cryptocurrency/metaverse-the-real-impact-on-banking-and-fintech-industry/articleshow/95604401.cms>
- Koohang, A., Nord, J.H., Ooi, K.B., Tan, G.W.H., Al-Emran, M., Aw, E.C.X., ... and Wong, L.W. (2023), "Shaping the Metaverse into reality: A holistic multidisciplinary understanding of opportunities, challenges, and avenues for future investigation. *Journal of Computer Information Systems*, Vol. ahead-of-print No. ahead-of-print, doi: 10.1080/08874417.2023.2165197
- Lee, H.K., Park, S. and Lee, Y. (2022), "A proposal of virtual museum metaverse content for the MZ generation", *Digital Creativity*, Vol. 33 No. 2, pp. 79-95, doi: 10.1080/14626268.2022.2063903
- Lee, J.Y. (2021), "A study on metaverse hype for sustainable growth", *International Journal of Advanced Smart Convergence*, Vol. 10 No. 3, 72-80, doi: 10.7236/IJASC.2021.10.3.72
- Lilien, G.L. (2016), "The B2B knowledge gap", *International Journal of Research in Marketing*, Vol. 33 No. 3, pp. 543-556, doi: 10.1016/j.ijresmar.2016.01.003
- Liu, J. and Liu, Z. (2019), "A survey on security verification of blockchain smart contracts", *IEEE Access*, Vol. 7, pp. 77894-77904, doi: 10.1109/ACCESS.2019.2921624
- Loh, X.M., Lee, V.H., and Leong, L.Y. (2022a), "A multi-dimensional nomological network of mobile payment continuance", *Journal of Computer Information Systems*, Vol. ahead-of-print No. ahead-of-print, doi: 10.1080/08874417.2022.2125102
- Loh, X.M., Lee, V.H., and Leong, L.Y. (2022b), "Mobile-lizing continuance intention with the mobile expectation-confirmation model: an SEM-ANN-NCA approach", *Expert Systems with Applications*, Vol. 205, Article No. 117659, doi: 10.1016/j.eswa.2022.117659
- Marr, B. (2023), "Banking In The Metaverse – The Next Frontier For Financial Services", available at <https://www.forbes.com/sites/bernardmarr/2022/11/16/banking-in-the-metaverse--the-next-frontier-for-financial-services/?sh=43c2f5122d1a>
- Michelle, S. (2022), "JP Morgan is first bank to enter the metaverse with a virtual 'Onyx lounge'", available at <https://www.usatoday.com/story/money/2022/02/15/jp-morgan-bank-joins-metaverse/6803137001/>
- Mogaji, E. and Nguyen, P. (2022a), "Managers' understanding of artificial intelligence in relation to marketing financial services: insights from a cross-country study", *International Journal of Bank Marketing*, Vol. 40 No. 6, pp. 1272-1298, doi:

10.1108/IJBM-09-2021-0440

- Mogaji, E. and Nguyen, P. (2022b), “The dark side of mobile money: Perspective from an emerging economy”, *Technological Forecasting and Social Change*, Vol. 185, Article No. 122045, doi: 10.1016/j.techfore.2022.122045
- Mogaji, E. (2022), “Wishful thinking? Addressing the long-term implications of COVID-19 for transport in Nigeria”, *Transportation Research Part D: Transport and Environment*, Vol. 105, Article No. 103206, doi: 10.1016/j.trd.2022.103206
- Mogaji, E., Czarnecka, B. and Danbury, A. (2018), “Emotional appeals in UK business-to-business financial services advertisements”, *International Journal of Bank Marketing*, Vol. 36 No. 1, pp. 208–227, doi: 10.1108/IJBM-09-2016-0127
- Moradi, M.A., Dehmardan, A. and Niazkar, N. (2022), “The blockchain’s transformation in new financing and management progress with the application of smart contracts and metaverse”. *2022 European Conference on Computing in Construction*.
- O’Donnell, A., Durkin, M.G. and McCartan-Quinn, D. (2002), “Corporate banking in the UK: personal vs remote interaction”, *International Journal of Bank Marketing*, Vol. 20 No. 6, pp. 273–284, doi: 10.1108/02652320210446733
- Oxford Analytica (2022), “Metaverse holds unknowable societal risks”, *Expert Briefings*, doi: 10.1108/OXAN-DB267012
- Raj, A. (2022), “Banking in the metaverse unlocking new possibilities?”, available at <https://techwireasia.com/2022/11/banking-in-the-metaverse-unlocking-new-possibilities/>
- Roblox. (2021), “The Gucci Garden experience lands on Roblox”, available at <https://blog.roblox.com/2021/05/gucci-garden-experience/>
- Rosen, P. (2022), “Metaverse mortgages are being issued to buy virtual land — and one of the first ever was just signed for a property in Decentraland”, available at <https://markets.businessinsider.com/news/currencies/metaverse-mortgage-terrazero-decentraland-virtual-land-real-estate-crypto-finance-2022-2>
- Sheehan, D. (2022), “CitizenM announce opening a hotel in the Metaverse”, available at <https://www.hospitalityandcateringnews.com/2022/04/citizenm-announce-opening-a-hotel-in-the-metaverse/>
- Shoolapani, B. and Jinka, P. (2011), “Virtual simulation and augmented interfaces for business models with focus on banking and retail”, *IEEE 4th International Conference on Utility and Cloud Computing*, pp. 469-473, doi: 10.1109/UCC.2011.77
- Smith, R. (2022), “NPD with the Metaverse, NFTs, and Crypto”, *Research-Technology Management*, Vol. 65 No. 5, pp. 54-56, doi: 10.1080/08956308.2022.2090182
- Sudeep, S. (2022), “Metaverse in banking – How is the technology transforming the future of banks?”, available at <https://appinventiv.com/blog/metaverse-in-banking/>
- Tan, G.W.H., Aw, E.C.X., Cham, T.H., Ooi, K.B., Dwivedi, Y.K., Alalwan, A.A., Balakrishna, J., Chan, H.K., Hew, J.J., Hughes, L., Jain, V., Lee, V.H., Lin, B., Rana, N.P., Tan, T.M. (Forthcoming). Metaverse in marketing and logistics: the state of the art and the path forward. *Asia Pacific Journal of Marketing and Logistics*.
- Tyler, K. and Stanley, E. (2001), “Corporate banking: the strategic impact of boundary spanner effectiveness”, *International Journal of Bank Marketing*, Vol. 19 No. 6, pp. 246-260, doi: 10.1108/EUM0000000006023
- Verma, S., Warriar, L., Bolia, B. and Mehta, S. (2022), “Past, present, and future of virtual tourism-a literature review”, *International Journal of Information Management Data Insights*, Vol. 2 No. 2, Article No. 100085, doi: 10.1016/j.jjime.2022.100085
- Vidal-Tomás, D. (2023), “The illusion of the metaverse and meta-economy”, *International Review of Financial Analysis*, Vol. 86, pp. 102560.
- Watkins, R.D., Denegri-Knott, J. and Molesworth, M. (2016), “The relationship between ownership and possession: observations from the context of digital virtual goods”,

Journal of Marketing Management, Vol. 32 No. 1-2, pp. 44-70, doi: 10.1080/0267257X.2015.1089308

Xi, N., Chen, J., Gama, F., Riar, M. and Hamari, J. (2022), "The challenges of entering the metaverse: An experiment on the effect of extended reality on workload", *Information Systems Frontiers*, Vol. ahead-of-print No. ahead-of-print, doi: 10.1007/s10796-022-10244-x

Zainurin, M.Z.L., Haji Masri, M., Besar, M.H.A. and Anshari, M. (2023), "Towards an understanding of metaverse banking: a conceptual paper", *Journal of Financial Reporting and Accounting*, Vol. ahead-of-print No. ahead-of-print, doi: 10.1108/JFRA-12-2021-0487