



Exploring the Benefits and Barriers of Adopting Metaverse Banking Systems through a Socio-Technical Lens

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ABSTRACT

The emergence of the metaverse, integrating blockchain, augmented reality (AR), virtual reality (VR), artificial intelligence (AI), and machine learning (ML), presents an unparalleled opportunity in banking. However, the success of metaverse banking hinges on user acceptance. While existing research highlights significant advantages and challenges in adopting metaverse banking systems, inconsistencies persist across reported findings. This study aims to reconcile these views and uncover the underlying causes of such disparities using a socio-technical methodology applied to distinct metaverse banking initiatives in Klang Valley, Malaysia. The findings reveal both consistent and novel benefits and barriers, emphasizing the need for a qualitative approach to identify strategies to mitigate obstacles and propose compelling justifications for integrating metaverse banking systems effectively.

Keywords: Metaverse, Banking, Adoption, Acceptance, Social-technical study.

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INTRODUCTION

The metaverse's emergence represents a groundbreaking digital interaction paradigm, envisioning a cohesive virtual environment where users immerse themselves in a spectrum of experiences, from entertainment to commerce. This immersive digital realm extends its reach to the domain of banking, offering what's coined as "metaverse banking" (Ooi et al., 2023). Lyoussi and Kouchih (2023) have echoed this sentiment, highlighting the transformative potential of integrating cutting-edge technologies—blockchain, augmented reality (AR), virtual reality (VR), artificial intelligence (AI), and machine learning (ML)—within the context of banking services in the metaverse.

In this landscape, metaverse banking is positioned as a frontier where users engage with financial services in a way that transcends conventional interfaces. The amalgamation of blockchain technology ensures transparency and security in transactions, while AR/VR offers an experiential layer, transforming mundane financial interactions into immersive experiences. AI and ML are pivotal in delivering personalised services, predicting financial trends, and enhancing user experiences within this digital realm (Zainurin et al., 2023).

Recent discourse has underlined the promise of this integration, showcasing how these technologies can revolutionise banking experiences, offering seamless and interactive financial services within the metaverse. The evolution of the metaverse as a hub for diverse activities, including banking, holds vast potential to redefine user interactions, reshape financial landscapes, and reimagine traditional banking services in a digitised and immersive environment (Pratama, 2023). As such, understanding the implications, challenges, and opportunities within this emerging realm of metaverse banking is crucial in shaping the future of financial services.

This study embarks on the following objectives: 1. To investigate bank users' perception of metaverse banking and 2. To examine the benefits and barriers that drive the adoption of metaverse banking.

LITERATURE REVIEW

Metaverse Banking

The metaverse concept has rapidly evolved from a speculative science fiction idea to a burgeoning reality, capturing the imagination of technologists, investors, and consumers alike. Essentially, the metaverse is a collective virtual shared space created by the convergence of virtually enhanced physical reality and physically persistent virtual space, including virtual worlds, augmented reality, and the internet. As this digital frontier expands, it presents unprecedented opportunities and challenges for

various industries, including banking. Metaverse banking represents a paradigm shift in how financial services are delivered, consumed, and perceived.

Metaverse banking involves integrating banking services into the metaverse's virtual environments. This includes creating virtual branches where customers can interact with bank representatives through avatars, conducting transactions in virtual currencies, and offering financial products tailored to virtual environments. Banking services can transcend geographical boundaries in the metaverse, providing a seamless, immersive experience that integrates with users' digital lifestyles.

For instance, JP Morgan opened a virtual lounge in the Decentraland metaverse, enabling users to explore banking products and services in a virtual environment. Similarly, South Korea's KB Kookmin Bank has launched a virtual branch on Zepeto, allowing users to engage in banking activities using their avatars (Morgan, 2022).

Banks should embrace the Metaverse because the metaverse offers banks a unique platform to engage with tech-savvy customers, particularly younger generations who are already comfortable with digital and virtual experiences (Kaur et al., 2023). This engagement can lead to increased brand loyalty and customer retention. Moreover, the metaverse economy, driven by virtual goods and services, presents new revenue opportunities for banks. They can facilitate transactions in virtual currencies, offer financing for virtual real estate, and provide investment products linked to virtual assets.

Additionally, the metaverse enables banks to develop innovative financial products and services tailored to the virtual environment. This includes virtual mortgages, insurance for virtual assets, and metaverse-specific investment funds. Virtual branches eliminate the need for physical presence, allowing banks to reach a global audience without the constraints of geographical boundaries. This can significantly reduce operational costs and enhance scalability.

Challenges, Opportunities and Barriers of Metaverse Banking

The regulatory landscape for the metaverse is still evolving, requiring banks to navigate complex legal and compliance issues, including data privacy, anti-money laundering (AML) regulations, and consumer protection laws. Additionally, the metaverse's decentralised nature can make it vulnerable to cyber-attacks, fraud, and data breaches, making robust security measures crucial to protect customers' virtual assets and personal information. Integrating banking services into the metaverse requires significant technological investment and expertise, as banks must ensure seamless interoperability between traditional banking systems and virtual platforms. While the metaverse promises inclusivity, there is a risk of exacerbating the digital divide, and ensuring equitable access to metaverse banking services for all demographic groups is a challenge that banks must address (Jung et al., 2023; Pratama, 2023).

For the opportunities, the metaverse has a thriving market for virtual real estate, with properties being bought, sold, and rented for significant sums. Banks can offer financing options for virtual real estate transactions, providing mortgages and loans tailored for digital properties. Additionally, banks can leverage blockchain technology to tokenise real-world assets, enabling their representation and trade in the metaverse and opening up new avenues for asset management and investment services. The metaverse also provides an ideal platform for offering personalised financial advice through virtual advisors. These AI-powered avatars can interact with customers in real time, providing tailored financial planning and investment guidance. Furthermore, virtual branches can serve as collaborative financial education and community engagement spaces. Banks can host seminars, workshops, and networking events in the metaverse, fostering financial literacy and community building.

The barrier of the metaverse is a fragmented ecosystem with multiple platforms and standards, and this lack of standardisation can hinder the seamless integration of banking services across different virtual environments. Building and maintaining consumer trust in virtual banking services is crucial, so banks must ensure transparency, reliability, and security to gain the confidence of their customers (Lyoussi & Kouchih, 2023). Developing and maintaining a presence in the metaverse requires significant financial and technological investment, and smaller banks and financial institutions may struggle to allocate the necessary resources. Additionally, cultural resistance to adopting virtual banking services may exist, particularly among older generations and those less familiar with digital technologies. Banks must implement strategies to educate and onboard these customers effectively.

Users Adoption of Metaverse Banking

Understanding banking professionals and customer perceptions within the metaverse banking landscape is foundational to shaping successful user experiences. Arpacı et al. (2022) and Visconti-Caparrós & Campos-Blázquez (2022) underscore the significance of comprehending how users perceive and interact within metaverse environments, stressing the necessity of aligning services with user expectations and preferences. This resonates strongly with the intended objective of probing into bank customers' perceptions, specifically within the realm of metaverse banking, anchoring the investigation in a user-centric framework.

In the metaverse, where digital immersion and interaction redefine conventional experiences, user perceptions hold immense value. Exploring how users perceive and engage with banking services in this dynamic environment becomes pivotal in designing offerings that resonate with their expectations (Belanche et al., 2022; Visconti-Caparrós & Campos-Blázquez, 2022). This involves delving into user preferences, comfort levels, and inclinations towards utilising financial services within an immersive digital space (Wang et al., 2023).

Banking in the metaverse necessitates a departure from traditional approaches, significantly emphasising providing seamless, intuitive, and user-friendly experiences. Understanding customers' metaverse-related preferences, concerns, and needs enables the tailoring of services to meet their expectations, fostering a user-centric approach that enhances satisfaction and adoption (Toraman & Geçit, 2023). Thus, investigating and comprehending bank customers' perceptions within the context of

metaverse banking forms the bedrock for designing and delivering services that align intimately with user expectations, ultimately driving engagement and acceptance within this futuristic digital domain.

Understanding the determinants that drive user engagement and satisfaction within immersive digital environments, particularly in the context of metaverse banking, is pivotal for shaping compelling user experiences (Kumar & Shankar, 2024). For instance, Belanche et al. (2022) study provides invaluable insights into these factors, shedding light on the elements that significantly contribute to user participation and enjoyment within metaverse banking platforms. Their research findings are directly in line with the proposed objective of scrutinising the factors that influence usage patterns and satisfaction levels, specifically within the sphere of metaverse banking, including perceived risks.

In the intricate landscape of the metaverse, where digital immersion intertwines with financial interactions, various factors significantly shape user behaviour and satisfaction. Radenković et al. (2023) exploration dives deep into these elements, potentially encompassing aspects such as user interface design, the seamless integration of immersive technologies, the personalised nature of banking services, the reliability of security measures, and the overall ease of navigating metaverse banking platforms.

The alignment between Toraman and Geçit (2023) and Seth et al. (2022) research findings and the research objective signifies the critical importance of these factors in cultivating positive user experiences within metaverse banking environments. It underscores the necessity of understanding what drives user engagement and contentment to design and develop metaverse banking platforms that resonate with user preferences and expectations (Nguyen et al., 2023). By scrutinising these factors, this research aims to pave the way for refining metaverse banking experiences, ensuring they are finely tuned to meet user needs and preferences, ultimately fostering heightened engagement and satisfaction within these futuristic digital realms.

Exploring factors driving user engagement and satisfaction within metaverse banking environments is akin to navigating a multifaceted landscape where technological integration and user behaviour intersect. Ooi et al. (2023) study unveils a tapestry of elements that intricately contribute to user participation and enjoyment within these immersive digital platforms dedicated to banking services. These factors might encompass the seamlessness of interactions, the intuitiveness of user interfaces, the provision of personalised financial services, the reliability of security measures, the inclusivity of diverse user demographics, and the innovative utilisation of immersive technologies like AR/VR to enhance financial experiences (Aloulou et al., 2024).

Understanding these factors becomes indispensable when crafting metaverse banking experiences that captivate and retain users. Each element holds the potential to significantly impact user perceptions, engagement levels, and overall satisfaction. For instance, a user-friendly interface coupled with AI-driven personalisation might enhance user comfort and trust, fostering prolonged engagement. Conversely, inadequate security measures or a lack of intuitive design might lead to user apprehensions, hindering sustained usage.

RESEARCH CONTEXT

This research was conducted among public citizens in Klang Valley, Malaysia, and focused on the adoption of metaverse banking. Klang Valley's financial system operates under a framework set by government policies and regulatory authorities. Banking services in Klang Valley are provided by private institutions, with a significant portion of services funded through various financial mechanisms. The banking landscape in Klang Valley includes a network of traditional bank branches, digital banking platforms, and now, is going to emerging virtual banking services within the metaverse. This study aims to understand the public's perception, challenges, and potential of integrating banking services into the metaverse in this specific location.

RESEARCH APPROACH

This study on metaverse banking among public citizens in Klang Valley, Malaysia, employs a qualitative approach, specifically using case studies. The research follows an interpretive epistemology, aiming to understand the phenomenon through the experiences and perspectives of the social groups and stakeholders involved in the banking system. Human actors' interpretations shape our construction of reality (Geoff Walsham, 1995; Geoff Walsham et al., 2007). The goal is to develop an initial theoretical framework informed by Stakeholder theories and the Social Construction of Technology (Walsham, 2002).

Case studies are widely used in information systems (IS) research and are particularly effective in contexts involving contemporary events and multiple organisations (Benbasat et al., 1987). This method helps to comprehend both the process and the overall context. In this study, the financial system in Klang Valley is integral to understanding metaverse banking. The interplay between traditional banks, digital banking platforms, regulatory bodies, and various stakeholders is crucial to the system's operation and cannot be overlooked.

DATA COLLECTION STRATEGY

In studying metaverse banking among public citizens in Klang Valley, Malaysia, data were collected using multiple sources: semi-structured interviews with participants, document and text analysis about the banking system, questionnaires, and direct observations. Initial data included documents and texts about the metaverse banking system, regulatory protocols, and user information sheets. This information provided context about the banking systems and their implementation environment. Additionally, general information about financial protocols and user needs was gathered to understand the requirements of both customers and banking professionals.

Four sessions of direct observation of the banking system in use by customers and bank professionals were conducted. Semi-structured open-ended interviews with key stakeholders were the primary data source. These interviews, held at the selected respondents' locations, lasted between 45 minutes and two hours. They were digitally recorded and manually transcribed for

analysis using ATLAS.ti software. A total of 31 interviews were conducted with 21 different respondents over 3 weeks, starting on 6th May 2024 until 24th May 2024.

Additionally, three visits to respondents' banks were conducted, during which the researcher observed interactions between customers and banking professionals. However, the initial plan included semi-structured interviews with respondents, challenges in access and potential biases led to the development of a questionnaire to gather their opinions and perceptions effectively.

ANALYSIS OF THE RESULTS

The analysis of the results is categorised into seven distinct areas: Financial, Technological, Organizational, User-related, Professional, and Security & Privacy aspects. These categories were derived from existing literature and the data analysis from the study conducted in Klang Valley. The Financial category addresses financial management and transactions within the metaverse. Technological issues involve the technical aspects of implementing and maintaining metaverse banking systems. Organisational aspects pertain to the structures and procedures within banking institutions. User-related issues focus on users' experiences and perceptions. Professional issues relate to the work and responsibilities of banking professionals. Economic aspects cover costs and funding considerations. Security and Privacy aspects address the measures needed to protect users' data and ensure secure transactions within the metaverse. The following sections summarise the benefits and challenges identified in each of these categories.

Financial Issues

The study addresses various financial issues in the context of metaverse banking among public citizens in Klang Valley, Malaysia. Since the study focuses on the transformative potential of metaverse banking, participants' perceptions are shaped by the innovative nature of this technology rather than traditional banking improvements. The emphasis is on enhancing financial accessibility, improving transactional efficiency, and minimising security risks.

Benefits

Reduced physical branch visits and operational costs were significant benefits reported in the study and supported by literature. This translates to cost savings for banks and improved financial services for users, enhancing customer satisfaction and expanding service reach. Another benefit identified was the ability better to understand the optimal financial model within the metaverse. Continuous data collection on transaction patterns and user behaviour enables stakeholders to gain insights into financial trends and the impact of different financial products. This understanding, not previously highlighted in the literature, provides valuable scientific data on financial behaviours and assists in overcoming barriers related to system integration. Lastly, improvements in customer support, transaction processing, and service follow-up were also noted as benefits in the study.

Barriers

A lack of uniformity in regulatory protocols was highlighted in the study and existing literature. This barrier is related to the challenge of implementing a metaverse banking system adaptable to the diverse regulations and guidelines used by different financial institutions. Another barrier mentioned is the difficulty in producing scientifically rigorous outcomes from pilot studies. Financial research is typically evidence-based, requiring scientifically validated outcomes. However, studies on metaverse banking often focus on variables such as cost reduction, user experience enhancement, or service efficiency, which may not be considered strictly scientific. This different approach complicates the establishment of evidence-based outcomes, thus hindering widespread adoption.

Technological Issues

Benefits

Technological advantages are not particularly emphasised, except for those highlighted in the literature review, which typically applies to systems integrated into regular banking services. However, such integration has not yet been achieved in either of the case studies conducted in Klang Valley.

Barriers

Technological challenges were prominently discussed in the studies, with consensus on the most significant issues. Concerns include the systems' immaturity, the necessity for precision in system functionalities, and apprehensions regarding technological malfunctions, as identified across various sources. Usability concerns are also critical, particularly as target users may have limited technological familiarity, necessitating alternative data capture methods. Additionally, the absence of standardised practices and the immature state of mobile communications were highlighted. Establishing universal standards for data coding among professionals and ensuring reliable, 24-hour operational communications were identified as essential needs. Further study needs to emphasise the necessity for seamless system integration across diverse organisations involved in metaverse banking initiatives.

User-related Issues

Benefits

The benefits related to users are widely recognised in the context of metaverse banking among public citizens in Klang Valley, Malaysia. Users stand to gain significant advantages, primarily in terms of improved quality of life and enhanced satisfaction with banking services. Minimising the need for physical visits and commuting, as noted in the literature review, was also highlighted. Additionally, there is recognition that receiving banking services at home supports independent living and enhances the social connections of elderly individuals.

Barriers

The sole user-related barrier identified was the lack of self-management skills among some individuals, although only a minority of participants raised this concern.

Organisational Issues

Benefits

In the context of metaverse banking among public citizens in Klang Valley, Malaysia, three organisational benefits have been identified through the study and literature. Firstly, there is an improvement in access to banking services in remote or difficult-to-reach locations, which is particularly crucial in rural areas with low population density, akin to telemedicine applications. Secondly, there is an increase in access to specialised expertise, enhancing resource utilisation and diagnostic capabilities from primary banking services. Lastly, there is a noted improvement in collaboration among banking professionals, facilitating integrated service delivery and formalised collaboration methods.

Barriers

Two key barriers have been consistently highlighted in both case studies and literature. The first is inadequate training for banking professionals to use metaverse banking systems effectively. The second barrier is insufficient managerial support for the implementation and maintenance of these systems. The study and literature review specifically noted challenges in coordinating various stakeholders and resistance to change among professionals, likely influenced by the complexity of the case study and the organisational structure within the Malaysian banking system. Furthermore, the collaboration among different banking levels in Malaysia remains somewhat independent, with formalised collaboration still in the development stages.

Professional Issues

Benefits

The ability to provide primary banking professionals access to specialised expertise was highlighted as a significant benefit across all sources. Additionally, transforming conventional practices was seen both as a benefit and a challenge. Despite resistance to change, there is a perceived benefit in enhancing current practices. Improving inter-professional relationships and enhancing the role of banking professionals, particularly bankers, were noted in both case studies but were less emphasised in the literature.

Barriers

All barriers mentioned in this study were also echoed in literature review. These include the challenge of adapting to new work methods, closely tied to resistance to change. Difficulties in sustaining pilot projects without overtime compensation were also noted as barriers, underscoring the importance of strong personal motivation for project support. It was also observed in both cases that making banking professionals project leaders rather than relying solely on technology specialists could mitigate resistance to change and boost motivation. However, banking professionals' inherent reluctance towards new technologies and concerns about losing personal contact with users were additional barriers highlighted in this study and the literature review.

Security and Privacy Issues

Benefits

In the realm of metaverse banking, prioritising security and privacy brings forth several advantages:

a) Enhanced Data Security

Robust security measures implemented within metaverse banking systems bolster the protection of sensitive customer data. This includes encryption protocols, secure authentication methods, and mechanisms to ensure data integrity across virtual platforms.

b) Improved User Trust

By focusing on stringent security practices, banks can cultivate stronger trust relationships with their customers. Assuring the safety and confidentiality of personal and financial information in virtual environments enhances customer confidence in adopting metaverse banking services.

c) Regulatory Compliance

Adhering to strict security and privacy standards ensures compliance with evolving regulatory requirements. This proactive approach not only mitigates legal risks but also creates a secure operational framework essential for sustainable metaverse banking operations.

Barriers

However, integrating comprehensive security and privacy measures in metaverse banking encounters several challenges:

a) Complexity of Security Measures

Implementing effective security protocols in the metaverse environment is inherently complex. Challenges include ensuring robust encryption, reliable authentication processes, and maintaining data integrity across diverse virtual platforms.

b) User Awareness and Education

Many users may lack awareness of virtual security risks and best practices. Bridging this gap requires extensive educational efforts to empower users with the knowledge and skills necessary to safeguard their financial activities in virtual spaces.

c) Regulatory Uncertainty

The regulatory landscape governing metaverse banking is still evolving. Navigating through ambiguous regulatory frameworks poses challenges for banks, requiring adaptive strategies to comply with emerging security and privacy regulations effectively.

d) Integration with Existing Systems

Seamless integration of security protocols between traditional banking systems and virtual platforms is crucial yet challenging. Ensuring compatibility and mitigating vulnerabilities across interconnected systems demands substantial technological investments and expertise.

In conclusion, while prioritising security and privacy in metaverse banking offers substantial benefits in terms of data protection, user trust, and regulatory compliance, overcoming barriers such as technological complexity, user education, regulatory uncertainties, and system integration remains imperative for sustainable adoption and success in virtual banking environments.

DISCUSSION AND CONCLUSIONS

The potential benefits of metaverse banking for enhancing customer interaction and service delivery are evident, although measuring these benefits objectively remains challenging. Both case studies underscored the importance of continuous data access to improve customer service quality and optimise operational models, as highlighted by local banking experts and regulatory authorities. These insights pave the way for future epidemiological, clinical, and technological research to objectively quantify these advantages.

However, virtual interactions in metaverse banking present unique challenges for professionals who are accustomed to traditional face-to-face interactions. Concerns persist regarding potential misunderstandings of customer needs due to the absence of contextual cues such as body language and vocal intonations. Addressing these challenges necessitates innovative approaches to capture and interpret nuanced customer information effectively within virtual settings.

Financial considerations emerged prominently in both case studies and literature reviews. Initial setup costs for metaverse banking services were cited as significant barriers by stakeholders. Despite this, stakeholders recognised the potential for cost savings through reduced physical infrastructure and operational efficiencies, particularly in terms of customer service and transaction management. Yet, the overall cost-effectiveness of these innovations remains uncertain, requiring further in-depth economic analyses to justify investments and redistribute resources effectively across banking sectors.

Moreover, organisational issues loom large, particularly regarding the integration of metaverse banking into existing bank organisational structures. Financial institutions in Klang Valley, Malaysia, are complex and resistant to rapid change, posing challenges for the adoption of innovative banking practices. Decision-making processes involve multiple stakeholders with varied interests, necessitating careful adaptation of global organisational models to suit local contexts and foster collaborative working environments.

In conclusion, while metaverse banking holds promise for revolutionising customer engagement and operational efficiencies in Klang Valley, Malaysia, addressing challenges related to virtual interactions, economic viability, and organisational adaptation remains critical. Future research should focus on developing robust economic models, enhancing virtual interaction capabilities, and fostering organisational agility to realise the full potential of metaverse banking in the region.

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