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Managing Emerging Technologies for Financial Transformation: An Integrative TAM–DOI–RBV Framework

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ABSTRACT

Advances in quantum computing and AR/VR are transforming financial management and consumer interactions, yet their integration continues to face challenges related to adoption, security, and organizational readiness. This study aims to analyze the integration of these technologies into financial management and examine their implications for organizational purpose, financial management strategies, and consumer behavior. A comprehensive literature review was performed utilizing the PRISMA 2020 framework, established inclusion and exclusion criteria, quality evaluation, and content analysis. The data were obtained from open-access scholarly articles published between 2021 and 2026 on financial management, virtual reality, and quantum technology. The findings position quantum technology as an analytical layer and AR/VR as an interaction layer. However, their integration creates value only when supported by data readiness, organizational capabilities, security, governance, and user acceptance. Therefore, aligning technological implementation with organizational purpose is essential for responsible financial transformation.

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INTRODUCTION

Quantum computing and augmented reality/virtual reality (AR/VR) are transforming financial information processing, strategic decision-making, and consumer experiences. Quantum computing offers potential solutions for portfolio optimization, risk assessment, market simulation, and financial security (Kou & Lu, 2025), while AR enables contextual product visualization and VR creates immersive purchasing experiences (Hoffmann & Mai, 2022). However, their organizational integration remains constrained by implementation costs, infrastructure limitations, uncertain business value, and insufficient workforce readiness (Elsholz et al., 2025). Furthermore, quantum computing introduces potential risks to existing cryptographic systems supporting digital financial transactions (Shadan et al., 2025). Therefore, successful integration requires secure, strategic, and consumer-oriented implementation.

Existing research applies the Technology Acceptance Model (TAM), Diffusion of Innovation Theory (DOI), and Resource-Based View (RBV) to explain technology adoption, innovation diffusion, and strategic value. However, TAM must account for experiential factors, including authenticity, emotional involvement, enjoyment, and flow, to explain consumer loyalty (Yan et al., 2022). Similarly, DOI research indicates that technological advantages may influence consumer behavior through satisfaction and flow (Lu et al., 2022). Meanwhile, RBV emphasizes the strategic importance of organizational resources and digital capabilities, although digital transformation research remains fragmented (Reis et al., 2023). Successful transformation also depends on aligning stakeholder interests, interpretations, and motivations (Hoblos et al., 2024). These limitations highlight the need for an integrated framework

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connecting technology acceptance, innovation diffusion, organizational capabilities, financial management, and consumer behavior.

Accordingly, this study examines how quantum computing and AR/VR can be integrated into financial management and how this integration affects organizational objectives, financial strategies, and consumer behavior. Although quantum computing applications increasingly encompass asset pricing, fraud detection, credit assessment, and transaction security, their technical development remains insufficiently connected to consumer acceptance research (Naik et al., 2025). AR/VR may bridge this gap by translating complex financial information into accessible and interactive experiences, with interaction quality, utilitarian value, hedonic value, and technology perceptions shaping consumer responses (Guo et al., 2024).

The study employs TAM to examine technology acceptance, DOI to assess innovation characteristics and diffusion, and RBV to evaluate whether technological infrastructure, data, expertise, and digital capabilities generate strategic value. It also considers security, organizational readiness, workforce competencies, implementation costs, and goal alignment as determinants of successful integration. Although quantum computing offers potential economic and operational benefits, its implementation depends on ecosystem maturity, stakeholder readiness, and competency development (Binder et al., 2024). Its practical advantages also depend on accuracy requirements, data complexity, and application context (Miyamoto, 2022).

This study contributes an integrated perspective by arguing that technological advancement alone does not guarantee improved financial management. Rather, its value depends on aligning computational capabilities, consumer experiences, organizational resources, and strategic objectives. Effective integration may improve financial decision-making, strengthen security, and enhance consumer engagement, whereas inadequate governance may increase costs, security vulnerabilities, competency gaps, and user resistance.

LITERATURE REVIEW

The three principal keywords employed in this study are financial management, virtual reality, and quantum technology.

Conceptual Definition of Financial Management

Financial management involves planning, acquiring, allocating, controlling, and evaluating financial resources to achieve organizational objectives. Beyond transaction recording, it encompasses financing decisions, investment appraisal, liquidity management, risk control, and performance monitoring. Digitalization has enhanced these functions through automation and data analytics, enabling more informed managerial decisions (Bedford et al., 2025). Furthermore, artificial intelligence and machine learning have transformed financial management into a predictive decision-making process that supports the systematic evaluation of alternatives (Pahsa, 2024). However, effective implementation requires attention to data quality, information security, algorithmic transparency, and strategic alignment. Accordingly, this study conceptualizes financial management as a strategic decision-making system that integrates financial resources, risk management, organizational capabilities, digital technologies, and stakeholder interests to create organizational value.

Categories and Manifestations of Financial Management

Financial management encompasses investment decisions, financing decisions, dividend policy, working capital management, risk control, financial reporting, and performance analysis. Investment and financing decisions determine asset allocation and funding sources, while dividend policy balances shareholder distributions with retained earnings. Working

capital management maintains liquidity and operational continuity through the management of current assets and liabilities, with working capital serving as an indicator of operational efficiency and liquidity (Liu et al., 2024). Risk control addresses financial, operational, technological, and information-security risks. Digital technologies, including enterprise resource planning, blockchain, artificial intelligence, and data analytics, enhance financial monitoring and decision-making. Their adoption can also influence corporate cash-holding policies by improving transparency, oversight, and information efficiency (Pu, 2025). As these financial functions become increasingly interconnected through data, quantum computing may enhance complex financial analysis, while AR/VR can support financial visualization and interactive decision-making.

Conceptual Definition of Virtual Reality

Virtual reality (VR) is a computer-based technology that creates a three-dimensional digital environment in which users can observe, explore, and interact with simulated objects or situations. Unlike conventional digital displays, VR seeks to create a sense of presence—the psychological experience of feeling situated within a virtual environment. This experience is produced through a combination of visual devices, audio systems, motion sensors, controllers, and interactive feedback that adjusts the digital environment in response to users' actions. The quality of a VR experience can be described through five dimensions: immersivity, interactivity, explorability, plausibility, and believability. Together, these dimensions distinguish VR from the mere presentation of three-dimensional content (Hameed et al., 2024). Immersivity denotes the strength of the user's sense of being within a virtual environment, whereas interactivity refers to the user's ability to influence digital objects and conditions. Explorability represents the freedom to navigate the environment, while plausibility and believability indicate the extent to which virtual events and representations are perceived as coherent experiences. Although a greater degree of immersion may strengthen presence, immersive devices do not invariably improve user performance because outcomes are also influenced by cognitive load, spatial ability, and simulation sickness (Thorp et al., 2024). Thus, this study conceptualizes VR not merely as a device but as a digital experience system that integrates technology, perception, action, and user responses to communicate information and support decision-making.

Categories and Manifestations of Virtual Reality

Virtual reality is classified by its degree of immersion into non-immersive, semi-immersive, and fully immersive categories. Non-immersive virtual reality presents a digital environment via a conventional computer screen, enabling user interaction through devices such as a mouse, keyboard, or joystick, while maintaining user awareness of the distinction between physical and virtual spaces. Semi-immersive virtual reality utilizes large displays or projection systems to diminish this distinction. Fully immersive virtual reality employs head-mounted displays or cave automatic virtual environments to envelop users perceptually and dynamically adjust visualizations in response to head and body movements (Stracke et al., 2025). In addition to immersion level, VR manifestations can be distinguished by function, including simulation, training, collaboration, entertainment, consumer services, data visualization, marketing, and decision support. Within organizations, VR can be used to simulate risk scenarios, provide virtual meeting spaces, visualize portfolios, and help stakeholders interpret complex data. Immersive technologies may also enhance engagement and comprehension of complex concepts, although their effectiveness remains dependent on interaction design, user context, and implementation objectives (Tene et al., 2024). From a consumer perspective, VR is manifested through virtual stores, product demonstrations, digital financial-service environments, and brand experiences that enable users to evaluate offerings more interactively. Accordingly, this study categorizes VR according to device configuration, degree of immersion, mode of interaction, purpose of use, and the quality of the experience generated in organizational activities and consumer relationships.

Conceptual Definition of Quantum Technology

Quantum technology harnesses quantum mechanical principles, including superposition, entanglement, and interference, to enable capabilities beyond conventional computing systems. Unlike classical computers that process information using binary bits, quantum computers use qubits to explore complex computational problems. However, their performance remains constrained by noise, decoherence, gate errors, scalability, and error-correction requirements (Memon et al., 2024).

Beyond computing, quantum technology encompasses information networks that use entanglement and quantum-state teleportation to enhance connectivity, sensing, and communication security (de Forges de Parny et al., 2023). In financial management, it offers potential applications in optimization, risk simulation, pattern detection, asset pricing, and transaction security. Accordingly, quantum technology is conceptualized as an emerging technological infrastructure whose practical value depends on algorithmic maturity, hardware development, integration with classical systems, organizational expertise, and effective governance.

Categories and Manifestations of Quantum Technology

Quantum technology comprises three main categories: quantum computing, quantum communication, and quantum sensing, connected by the broader field of quantum information processing. Quantum computing includes gate-based systems, quantum annealing, simulators, and hybrid quantum–classical systems for optimization, simulation, and machine learning. Quantum communication encompasses quantum key distribution, teleportation, and quantum networks to enhance information security, while quantum sensing enables precise measurements of physical phenomena. Quantum computing receives greater attention in the scientific literature than communication and sensing (Karami & van Lente, 2026).

In financial management, quantum computing offers potential applications in portfolio optimization, Monte Carlo simulation, credit assessment, fraud detection, derivatives pricing, and risk analysis. Quantum communication may strengthen payment-network security and financial-data exchange, whereas quantum sensing can support precise time measurement and infrastructure synchronization. Advances in photonic chips have further enabled developments in quantum key distribution, teleportation, and integrated quantum communication devices (Luo et al., 2023). Accordingly, quantum technologies should be evaluated based on their functional applications, technological maturity, implementation requirements, and strategic value to organizations.

RESEARCH METHODOLOGY

Research Object

The object of this study was the integration of quantum technology and augmented reality/virtual reality (AR/VR) into financial management, particularly its relationship with organizational purpose, financial management strategies, adoption readiness, system security, and consumer behavior. Quantum technology has been increasingly developed to support portfolio optimization, risk simulation, credit assessment, fraud detection, financial instrument pricing, and digital transaction security. Recent technical studies indicate that quantum computing applications in finance include optimization, machine learning, simulation, and security. However, practical benefits are currently limited by hardware constraints, error-correction requirements, scalability challenges, and the necessity for integration with classical systems (Hlatshwayo et al., 2026). In consumer-facing contexts, augmented reality (AR) and virtual reality (VR) enable organizations to present information, products, and services in more

visual, interactive, and immersive formats. Features of AR, such as interactivity and visual vividness, can enhance telepresence, consumer engagement, and purchase intention, although user responses depend on the perceived quality of the experience (Yang et al., 2024). The units of analysis were not organizations or consumers directly but scholarly articles addressing the application, acceptance, diffusion, capabilities, risks, and implications of these technologies. Each article was treated as a unit of evidence providing conceptual or empirical information. Accordingly, the research object was limited to the relationships among technological capabilities, organizational readiness, financial management practices, and changing consumer responses within the integration of quantum technology and AR/VR.

Research Design and Data Sources

The research utilized a Systematic Literature Review (SLR), which systematically identifies, selects, appraises, and synthesizes evidence based on predetermined procedures. The SLR approach was selected because it facilitates transparent knowledge mapping while reducing source-selection bias through research questions, search strategies, eligibility criteria, and quality assessments that can be independently examined. A systematic literature review (SLR) allows for the interpretation of a research body using standardized methods and a predefined protocol for identifying, appraising, synthesizing, and interpreting findings (Kim et al., 2022). The principal data comprised information extracted from empirical and conceptual articles concerning the integration of quantum technology and AR/VR into financial management, technology acceptance, security, organizational readiness, organizational purpose, and consumer behavior. Original research articles were treated as primary sources within the SLR corpus, while review articles, academic books, scholarly conference proceedings, and institutional documents served as supplementary sources for clarifying concepts, theories, and the technological context. The literature-sampling procedure was reported transparently because decisions concerning database coverage, publication period, language, and document type can influence the conclusions of a review (Hiebl, 2023). Secondary sources focused on the study's three keywords: financial management, virtual reality, and quantum technology. This distinction indicates that the study relied exclusively on synthesizing previously published scientific evidence rather than collecting data through surveys or interviews.

Theoretical Foundations

This study integrated the Technology Acceptance Model (TAM), Diffusion of Innovation Theory (DOI), and the Resource-Based View (RBV) as its theoretical foundations and analytical assumptions. Fred D. Davis introduced TAM in 1989 to explain that technology acceptance is primarily shaped by perceived usefulness and perceived ease of use, which influence users' attitudes, behavioral intentions, and actual usage. Recent research indicates that TAM remains an important framework in marketing and user-behavior studies, although its application is frequently extended by incorporating trust, risk, social influence, and technology-readiness constructs (Musa et al., 2024). Everett M. Rogers first introduced the Diffusion of Innovations (DOI) theory in 1962 and refined it in later editions to explain the spread of innovations based on factors such as relative advantage, compatibility, complexity, trialability, observability, communication channels, time, and the social system. The DOI framework also categorizes adopters as innovators, early adopters, early majority, late majority, and laggards (Ibrahim et al., 2025).

The RBV originated in Wernerfelt's 1984 work and was further developed by Barney in 1991. It assumes that sustainable competitive advantage arises from resources that are valuable, rare, difficult to imitate, and difficult to substitute. In digital transformation, the RBV assesses technology, digital literacy, security, competencies, and dynamic capabilities as organizational resources (Civelek et al., 2023). Integrating these three theories enabled the study to examine individual acceptance, innovation diffusion, and strategic value creation at multiple levels.

Research Procedures and Data Collection

This study followed the Systematic Literature Review (SLR) principles and PRISMA 2020 guidelines. The process involved formulating research questions, developing a review protocol, conducting database searches, screening and assessing studies, and extracting relevant data. The protocol specified databases, search terms, publication period, eligibility criteria, quality appraisal, and data-extraction procedures to ensure transparency and replicability (Sauer & Seuring, 2023).

Searches were conducted in Scopus, Web of Science, ScienceDirect, SpringerLink, Emerald Insight, and DOAJ using Boolean combinations of terms related to financial management, quantum technology, and AR/VR. Eligible studies were peer-reviewed, open-access articles published in English or Indonesian between 2021 and 2026. Duplicate records, nonacademic sources, inaccessible full texts, and irrelevant publications were excluded. Screening proceeded through titles, abstracts, and full texts, with study selection documented using a PRISMA flow diagram (Page et al., 2021). Eligible articles were assessed for quality, and their bibliographic details, theoretical foundations, methods, contexts, findings, and limitations were recorded in a standardized extraction form.

Data Analysis

The data were analyzed using qualitative content analysis to identify concepts, patterns, relationships, similarities, differences, and research gaps across the literature corpus. Content analysis was selected because it enables the systematic reduction and description of textual data while allowing researchers to interpret the meanings emerging from the findings. This method treats analysis as a reflexive process linking coding, category construction, contextual interpretation, and theme development without eliminating the researcher's analytical involvement (Nicmanis, 2024). The analytical process began with a comprehensive reading of all included articles, followed by identifying units of meaning and recording relevant information in the extraction matrix. Initial coding focused on financial applications, technological benefits, security risks, adoption barriers, organizational readiness, consumer experiences, and implications for organizational purpose. These codes were subsequently organized into descriptive categories, including computational capabilities, immersive visualization, user acceptance, innovation diffusion, strategic resources, governance, and behavioral outcomes. Qualitative content analysis can be conducted through four stages: developing an overview of the material, identifying and extracting relevant units of meaning, condensing those units into descriptive categories, and generating explanatory themes across the categories (Lyhne et al., 2025). The categories were then compared using TAM, DOI, and RBV to identify relationships among individual acceptance, innovation characteristics, and organizational capabilities. The final synthesis was presented narratively and through a thematic matrix, while contradictory findings were retained to ensure that the interpretation did not represent only evidence supporting the study's argument.

RESEARCH RESULTS

Description of the Financial Management Literature

Existing literature on financial management examines investment management, financing structures, working capital, cash flow, financial reporting, internal control, risk management, and performance evaluation. Recent literature has also extended the scope of financial analysis beyond liquidity, solvency, and profitability ratios to encompass sustainability reporting; environmental, social, and governance information; and nonfinancial disclosures (Danci & Danci, 2025). The reviewed literature identifies digital transformation through technologies such as artificial intelligence, machine learning, process automation, data analytics, blockchain, digital financial services, and decision-support systems. In financial services, artificial

intelligence is applied to credit assessment, fraud detection, digital insurance, robo-advisory services, and expanding access to financial services (Vuković et al., 2025). The literature further highlights a shift in the finance function from primarily historical record-keeping to real-time data processing, forecasting, risk monitoring, and providing information for management. At the organizational level, these advancements are evident in accounting, treasury, financial planning and analysis, internal auditing, budgeting, procurement, and asset management. At the organizational level, these practices occurred in accounting, treasury, financial planning and analysis, internal auditing, budgeting, procurement, and asset management. In this study, financial management data were organized into four descriptive areas: financial decision-making, information processing, risk control, and value creation. These four areas established the initial data structure for documenting where quantum technology and AR/VR were applied without first establishing causal relationships among the identified variables.

Explanation of the Financial Management Data

Analysis of financial management data indicates that digitalization of the finance function has progressed through two primary channels: automation of routine tasks and the application of analytics to inform decision-making. Automation includes invoice processing, reconciliation, transaction recording, compliance control, and reporting. Analytics involves the use of interactive dashboards, simulations, forecasting, risk assessment, and data processing for managerial objectives.

A survey of finance professionals found that the use of automation and analytics aligns with corporate digitalization strategies and supports the objectives of the finance function, including efficiency and business-partnering goals (Bedford et al., 2025). Additional evidence demonstrates that technology adoption does not result in uniform financial outcomes across organizations, as industries vary in resource availability, financing constraints, and digital maturity. In the context of liquidity management, digital technology adoption correlates with changes in corporate cash holdings, and the strength of this relationship varies among firms depending on their financing constraints (Pu, 2025). The literature also identified data quality, interoperability, workforce competencies, security, and oversight as conditions accompanying technology use. Consequently, the dataset encompassed not only the technologies involved but also their purposes, organizational units, implementation requirements, and reported financial outcomes. This explanation provided an operational account of how technology was incorporated into financial processes without determining which technology was the most effective.

Relationship Between Financial Management Data and the Research Problem

The relationship between financial management data and the research problem reflects the gap between increasingly complex financial-processing needs and uneven organizational readiness to adopt emerging technologies. Although digital financial services improve transaction speed, accessibility, personalization, and efficiency, their adoption depends on trust, perceived risk, costs, infrastructure, and institutional support (Albuainain et al., 2025). Consumer adoption is further influenced by digital financial literacy, government support, regional characteristics, and behavioral intentions (Setiawan et al., 2025). At the organizational level, barriers include legacy systems, skills shortages, security concerns, uncertain benefits, and investment requirements. The literature also suggests that back-office financial technologies are not always integrated with consumer-facing interfaces. These findings highlight the research problem as a lack of functional integration among analytical capabilities, risk management, organizational purpose, and consumer services. Accordingly, integrating quantum technology and AR/VR requires a coordinated approach that addresses both technological potential and organizational readiness.

Description of the Virtual Reality Literature

The literature on virtual reality encompassed devices, immersion levels, interaction patterns, presence, user experience, and application areas. The documented devices included head-mounted displays, motion controllers, positional sensors, projection systems, spatial audio, hand tracking, and haptic interfaces. Data on user experience frequently employed the concept of presence, or the feeling of "being there," as a characteristic that differentiates VR from ordinary screen-based media. Recent literature described presence as a psychological experience shaped not only by technological features but also by users' attention and characteristics, virtual content, and the context of use (Triberti & Brivio, 2025). Based on immersion level, the reviewed articles identified non-immersive, semi-immersive, and fully immersive forms. Based on content type, VR manifestations included interactive three-dimensional environments, simulations, 360-degree videos, virtual tours, collaborative spaces, and digital representations of objects or locations. A review of panorama-based XR technologies documented the use of 360-degree imagery in static and dynamic experiences and its applications in training, tourism, education, and environmental documentation (Tukur et al., 2025). Within the research corpus, VR data also overlapped with AR and mixed reality because all three technologies were used to present digital information contextually. The data were therefore classified according to technological form, experiential characteristics, organizational context, and reported user responses.

Explanation of the Virtual Reality Data

The VR data reflected a usage sequence beginning with the presentation of a digital environment, followed by user interaction, experience formation, and responses to a service or product. In consumer environments, commonly documented features of augmented reality (AR) applications include product visualization, virtual try-ons, simulated touch, spatial exploration, interactive demonstrations, and personalized information. Studies examining AR adoption in retail strategies indicate that product visualization and virtual try-ons deliver more comprehensive product information and decrease consumer uncertainty during online shopping (Ibrahim et al., 2025). Behavioral metrics related to these applications encompass perceived usefulness, perceived ease of use, enjoyment, engagement, trust, attitudes, usage intention, and purchasing decisions. Research on AR-based cosmetic try-on platforms has identified associations among Technology Acceptance Model (TAM) dimensions, emotional experiences, product evaluation, and application usage decisions (Micheletto et al., 2025). In organizational contexts, VR was used for training, process simulation, workplace design, collaboration, marketing, and information delivery. The literature also reported variations in outcomes according to the device employed, graphical quality, latency, user skills, comfort, and task compatibility. Documented user barriers included cybersickness, cognitive load, device discomfort, connectivity requirements, and privacy concerns. This explanation presented VR as a sequential configuration of technical and experiential components, while outcomes were recorded as reported by each study without comparing the effectiveness of individual applications.

Relationship Between Virtual Reality Data and the Research Problem

The relationship between VR data and the research problem was evident in the contrast between the broad potential of virtual experiences and their limited integration into routine organizational practices. From retailers' perspectives, the literature reported that existing VR applications continued to function primarily as marketing tools, while fully operational virtual stores with integrated purchasing processes had not been widely adopted. Reported barriers included technology and implementation costs, limited recognition of consumer benefits, device limitations, compatibility with organizational systems, and market conditions (Elsholz et al., 2025). These data were relevant to the present study because applying AR/VR to financial management requires connections among user experiences, transaction systems, analytics,

budgeting, and risk control. The VR ethics literature also identified concerns involving consent, privacy, potential harm, behavioral-data collection, and the absence of consistent oversight frameworks (Raja & Calvo, 2025). In financial services, immersive devices may generate data concerning gaze direction, bodily movements, interaction choices, attention duration, voice, and transactions. The research problem consequently included the need for organizations to manage these data securely and explain their purposes to consumers. The corpus further demonstrated that high-quality experiences were not necessarily accompanied by infrastructure readiness or user acceptance. This descriptive relationship positioned VR as an interaction interface requiring governance, resources, financial systems, and consumer protection before it could become fully embedded in organizational processes.

Description of the Quantum Technology Literature

The literature on quantum technology can be classified into three principal categories: quantum computing, quantum communication, and quantum sensing. In the context of financial management, quantum computing is most frequently discussed due to its significance for optimization, simulation, risk modeling, and high-dimensional data processing. A systematic review of quantum computing in finance has documented its applications in portfolio optimization, derivatives pricing, risk analysis, fraud detection, credit assessment, and Monte Carlo simulation (Bunescu & Opriş, 2024). The primary approaches identified include quantum annealing, variational algorithms, quantum amplitude estimation, quantum machine learning, and hybrid quantum–classical systems. Within the field of security research, the articles examined threats to public-key cryptography as well as advancements in post-quantum cryptography. The literature also documented the use of quantum processing in market research through clustering, optimization, preference analysis, and the processing of consumer data involving numerous possible combinations (Sáez-Ortuño et al., 2024). In quantum communication, the data covered quantum key distribution, quantum information networks, and quantum-state transfer.

The recorded stages of implementation varied from conceptual models, simulations, experiments on limited hardware, and cloud-based quantum services to organizational pilot projects. Accordingly, the quantum technology data were structured according to technology type, algorithm, financial use case, infrastructure model, and level of implementation maturity.

Explanation of the Quantum Technology Data

The quantum technology data indicated that each financial use case corresponded to a different type of computational problem. Portfolio optimization is defined as the selection of asset combinations that satisfy specific risk and return constraints. In contrast, derivatives pricing and risk simulation are characterized by the evaluation of multiple potential market scenarios. Credit assessment and fraud detection rely on pattern recognition and data classification techniques. Transaction security is addressed through two primary approaches: quantum communication and the adoption of cryptographic algorithms designed to withstand quantum attacks. Studies on financial regulation indicate that quantum computing presents opportunities for enhanced risk modeling and transaction efficiency, but also introduces challenges related to cryptographic security, regulatory clarity, and systemic stability (Zafar, 2025). The accounting and finance literature identifies post-quantum cryptography and quantum key distribution as essential elements of long-term security strategies (Shadan et al., 2025). Implementation challenges include limited qubit counts, noise, decoherence, gate errors, error-correction demands, and ongoing reliance on classical computing systems. Hybrid architectures assign selected computational tasks to quantum processors, while data preparation and result interpretation remain within classical computing environments. This explanation described the reported functions and technological requirements without establishing an absolute advantage over conventional computational methods.

Relationship Between Quantum Technology Data and the Research Problem

The findings suggest that the integration of quantum computing and AR/VR in financial management should be viewed as the creation of a comprehensive decision architecture that connects analytics, visualization, interaction, and organizational objectives. Quantum computing serves as the processing layer, supporting financial optimization, simulation, prediction, security, and modeling. In contrast, AR/VR functions as the interaction layer, translating data into visual experiences and facilitating user decision making. Research on quantum computing in business contexts demonstrates its potential value in financial modeling, forecasting, optimization, machine learning, and cybersecurity. However, the realization of these benefits depends on the selection of suitable problems and the effective integration of quantum capabilities with classical systems (Sarin et al., 2026). Similarly, AR/VR can enhance consumer engagement and experiences through visualization, interactivity, and immersion, although these advantages are contingent upon design quality and user acceptance (Fan et al., 2025). These components corresponded directly to the adoption, security, and organizational-readiness issues examined in this study. Quantum communication research also documented requirements for network architecture, entanglement distribution, standardization, interface devices, and performance targets before networks could operate across locations (de Forges de Parny et al., 2023). Within financial management, these requirements interacted with legacy systems, compliance obligations, service continuity, data confidentiality, and real-time decision-making demands. The corpus contained limited evidence of implementations directly connecting quantum-computing outputs with AR/VR interfaces for consumers or decision-makers. Quantum technology and AR/VR generally appeared as separate streams of development in the literature. Consequently, the research problem was represented by the separation of data, applications, competencies, and governance across quantum analytical capabilities, organizational financial management, and the virtual experiences used by consumers.

DISCUSSION

Substantive Summary of the Findings

The findings suggest that integrating quantum computing and AR/VR in financial management creates a decision architecture connecting analytics, visualization, interaction, and organizational purpose. Quantum computing offers potential capabilities in optimization, simulation, forecasting, and cybersecurity, while AR/VR enhances information visualization, interactivity, and consumer engagement. However, their value depends on appropriate applications, integration with classical systems, design quality, and user acceptance (Sarin et al., 2026; Fan et al., 2025). Thus, analytical sophistication must be complemented by understandable, trustworthy, and purpose-driven user experiences.

Discursive Relationship and the Study's Contribution

Previous research has largely examined technology adoption, digital transformation, and quantum computing separately. Diffusion of Innovation (DOI) theory explains adoption conditions but provides limited insight into how computational outputs shape consumer experiences (Kwon et al., 2026). Similarly, digital transformation research emphasizes organizational strategy and capabilities without specifically examining the integration of quantum computing and immersive technologies in financial management (Paul et al., 2024). This study integrates the Technology Acceptance Model (TAM), DOI, and Resource-Based View (RBV) to explain user acceptance, technological diffusion, and strategic resource development. Its principal contribution is a framework positioning organizational purpose as the guiding principle for selecting financial applications, designing consumer experiences, and managing technological risks.

Reflection on the Benefits of the Findings

The findings indicate that technological value depends on organizational capabilities rather than technology ownership alone. RBV emphasizes the strategic value of resources combined with distinctive capabilities, while dynamic capabilities explain how organizations adapt and reconfigure resources to respond to change. Evidence from SMEs suggests that digital orientation requires dynamic capabilities to translate technological investments into improved performance (Escoz Barragan & Becker, 2025). Likewise, AR/VR acceptance depends on interface compatibility, perceived benefits, emotional experiences, and trust (Wang et al., 2025). Accordingly, organizations should align technological investments with clearly defined purposes, such as improving financial decision-making, strengthening security, enhancing financial understanding, or developing consumer services. Success should therefore be evaluated through financial outcomes, user trust, and alignment with organizational purpose rather than computational speed or immersion alone.

IMPLICATIONS OF THE FINDINGS

The findings have strategic, operational, behavioral, and governance implications. Strategically, organizations should position quantum computing as a long-term analytical capability and AR/VR as an interaction capability, linking both technologies through clearly defined business requirements. Operationally, their integration could support portfolio simulations, risk mapping, cash-flow scenarios, investment education, and virtual advisory services. However, these applications require consistent data and interfaces that do not mislead users. Behaviorally, increasingly persuasive visualizations may strengthen engagement while simultaneously increasing the risk of impulsive decisions. Consumer protection should therefore be incorporated into the design process. From a governance perspective, the quantum threat to cryptography necessitates that financial institutions integrate security as a core component of transformation, rather than as an ancillary function added post-implementation. A quantum-readiness framework for the financial sector prioritizes cryptographic inventories, awareness development, migration planning, security by design, cryptographic agility, and defense in depth (Auer et al., 2025). In the context of AR/VR, governance considerations encompass the processing of biometric, movement, gaze, and behavioral data. Consequently, user consent and explicit restrictions on data use must be incorporated into system design (Peña-Acuña, 2024). Accordingly, the findings can inform investment policies, technology architectures, consumer-experience standards, and performance measures aligned with organizational purpose and accountability principles.

Explanation of the Findings

The observed pattern emerged because quantum computing and AR/VR differ in their levels of maturity, functions, and user groups. Quantum computing continues to develop through algorithmic experiments, limited hardware, cloud-based services, and hybrid systems. In contrast, AR/VR is more directly accessible to users through retail, education, training, marketing, and entertainment applications. This difference explains why the quantum literature focuses primarily on technical capabilities and security, whereas AR/VR research emphasizes experiences, acceptance, and behavior. The separation between these research streams also accounts for the limited evidence directly integrating both technologies into financial management. Research on dynamic capabilities demonstrates that digital transformation is jointly influenced by technological, organizational, and environmental conditions. Implementation outcomes therefore cannot be explained solely by the quality of technological devices (Abdurrahman et al., 2024). Similarly, AR adoption requires organizational readiness, relevant performance measures, managerial support, integration capabilities, and assessments of compatibility with user needs (Mohammadhossein et al., 2025). From the TAM perspective, users are likely to reject interfaces that are difficult to use, untrustworthy, or unable to provide tangible benefits. According to DOI, complexity can impede diffusion, while RBV suggests

that skills shortages and ineffective resource orchestration constrain value creation. The findings therefore resulted from interactions among technological immaturity, organizational complexity, security risks, and heterogeneous consumer responses.

RECOMMENDED ACTIONS

Based on the findings, organizations should adopt a phased approach integrating value exploration, security enhancement, capability development, and consumer protection. The first stage should identify use cases directly associated with organizational purpose, such as portfolio optimization, risk simulation, fraud detection, financial education, or decision visualization. The second stage should include a comprehensive readiness assessment that addresses data quality, legacy systems, cryptographic dependencies, organizational competencies, budget constraints, technology partners, regulatory compliance, and user acceptance. In the third stage, organizations should establish limited hybrid pilot projects benchmarked against classical systems. The benefits of quantum computing and AR/VR should be evaluated using accuracy, processing time, cost, security, user comprehension, and decision quality. Assessing progress in quantum computing requires indicators covering the technological ecosystem, application capabilities, human resources, research, and stakeholder support rather than qubit counts alone (Binder et al., 2024). In parallel, organizations should develop a cryptographic inventory and post-quantum migration roadmap because delays may prolong the exposure of sensitive, long-lived data. Research on global roadmaps highlights the importance of coordinating standards, migration schedules, testing procedures, and governance across financial institutions (Kuka et al., 2026). The final stage should involve the establishment of a cross-functional team comprising representatives from finance, technology, security, legal, marketing, and consumer sectors to maintain accountability throughout the integration process.

CONCLUSION

The most significant finding is that the transformative potential of quantum computing and AR/VR in financial management depends not on technological sophistication alone, but on their integration within a purpose-driven decision architecture. Quantum computing can support optimization, risk simulation, credit assessment, fraud detection, and transaction security, while AR/VR translates analytical outputs into interactive visual experiences. However, successful integration requires data readiness, workforce competencies, system interoperability, information security, user acceptance, and effective governance. The literature also reveals that quantum computing research predominantly focuses on algorithms and security, whereas AR/VR research emphasizes user experiences and behavior, leaving their integrated application in financial management relatively underexplored.

This study contributes an integrative framework combining the Technology Acceptance Model (TAM), Diffusion of Innovation (DOI) Theory, and Resource-Based View (RBV) to explain technological integration at individual, organizational, and strategic levels. TAM addresses perceived usefulness and ease of use, DOI explains innovation diffusion through relative advantage, compatibility, complexity, trialability, and observability, while RBV highlights the organizational resources and capabilities required to generate competitive advantage. Practically, the framework supports use-case selection, readiness assessment, pilot implementation, competency development, performance measurement, and consumer protection. It helps organizations distinguish technology investments that follow emerging trends from those that genuinely advance strategic objectives.

The study's limitations stem from its SLR scope, which focused on recent open-access publications and the concepts of financial management, AR/VR, and quantum technology. This approach may have excluded related areas, including spatial computing, extended reality, quantum artificial intelligence, post-quantum cryptography, and immersive financial services.

Moreover, the literature demonstrates different levels of maturity: AR/VR applications have undergone extensive user testing, whereas quantum-finance applications remain largely at the simulation, experimental, and proof-of-concept stages. Future research should validate the framework through organizational case studies, quantitative investigations of technology acceptance and organizational readiness, and experiments comparing conventional financial visualizations with AR/VR interfaces incorporating quantum-algorithm outputs. Incorporating the perspectives of regulators, technology providers, employees, and consumers would further strengthen the development of secure, measurable, and context-sensitive implementation models.

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