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**ANALYZING THE IMPACT OF FACTORS AFFECTING THE ADOPTION OF
BLOCKCHAIN TECHNOLOGY IN BANKS IN THE UAE**

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Abstract

Telecommunication and information technology deployments have also impacted the banking industry. A disruptive innovation that is shifting the banking industry almost everywhere is blockchain (BC) technology. Banks consider it essential to find ways to offer better and faster transactions to serve customers efficiently, which aligns with the expectations of transparency and cost-effectiveness from both banks and regulators. Consequently, banks have a pressing need for new technologies to provide real-time, single-instant execution of transactions, which helps them eliminate intermediaries and log bank transactions in an immutable ledger. A review of the relevant, previous literature indicates that the foremost barriers to the integration of BC Technology in Banks in the United Arab Emirates are regulatory and legal constraints, security and privacy concerns, trust in technology, techno-managerial support, insufficient technology infrastructure, and technology adoption barriers. According to the outcomes of this specific research, BC Technology can advance and automate the Inter-bank communication system processes. This information is valuable for scholars, public administrators, and banking institutions in the United Arab Emirates.

Keywords: Blockchain Technology, Banking Sector, Regulations, Security, and Privacy

Introduction

The application of BC technology in enhancing transaction efficiency, reducing costs, improving security, and increasing transparency is being thoroughly studied by financial institutions (Liu et al., 2023; Javaid et al., 2021). The application of BC technology eliminates intermediaries while providing real-time transaction processing, secure, and immutable transaction records. It consequently improves customer satisfaction by reducing instances of fraud, expenditure on human resources, and operational inefficiencies (Raja Santhi & Muthuswamy, 2022). Other benefits of the system include the ability to conduct transactions without relying on trust in the counterparty, protection against fraud and theft, enhanced evidence of asset ownership, and increased system transparency (Guo & Yu, 2022). While financial institutions still exercise concern with the cryptocurrency through the lens of complex regulations, BCs are, however, being increasingly adopted within the sector. These BCs, while enhancing the security of the system, address scalability and compliance with regulations, thereby improving security tiered compliance (Wang & Su, 2020).

Compliance, reporting, and settlements, along with the enhanced global adoption of BC technology, are expected to reduce costs (Javaid et al., 2021). The government of the UAE is using BC as a fundamental part of the country's digital transformation strategy.

Mhlanga (2023) and Wang and Su (2020) state that the Emirates Blockchain Strategy 2021 has the Sheik's vision to utilize 50% of the government's transactions through BC technology by the year 2026. The specific aim of the program is to save billions of Dirhams and utilize marketing and operational systems effectively (Sun et al., 2021).

Perhaps opportunities exist, but the literature lacks a clear understanding of how the banking industry is integrating BC technology. Most of the literature focuses on the pros and cons of BC technology, with nearly zero attention paid to the integration process (Javaid et al., 2022; Garg et al., 2021). The adoption process of technology is a continuum, marked by a pre-

decision stage, an indecision stage, and a post-decision stage (Trivedi, Mehta, & Sharma, 2021). Most researchers focus on barriers because they lack a complete understanding of the sequence of actions needed to fully comprehend these phases (Kumari & Devi, 2022). It is a common observation that many BC technology applications in the banking sector are still at the pilot stage, which reinforces the claim that emphasis on the pre-decision stage is crucial, both theoretically and practically (Cucari et al., 2022). This is the gap that this research aims to fill: the use of BC technology by banks in the UAE. The financial sector's productivity, security, and competitiveness are the three key areas of focus and potential enhancement following the implementation of BC technology.

Literature Review

Blockchain

Nestled in the center of the fourth industrial revolution, BC technology has ushered in a new era in several domains, showcasing its powerful, yet nuanced impact over the years (Mougayar, 2016). As noted by Muflih (2023), a BC is a unilateral, decentralized, and open system with transactional capabilities. The absence of a central custodian (Liu et al., 2023) in synchronizing transactions is addressed by a replicated, distributed ledger system that can be shared among the transacting entities. The system is append-only; hence, new entries can be made. However, alterations, also known as revocation, cannot be made without the requisite permissions (Garg et al., 2021).

The initial conception of the technology can be attributed to the work of Satoshi Nakamoto, with the emergence of Bitcoin, a means for individuals to send and receive money digitally without the involvement of banks. The Nakamoto BC, in contrast, has a vague explanation - a chain of digital blocks and signatures with proof-of-work that works together to validate and capture transactions without needing a central authority (Raja Santhi &

Muthuswamy, 2022). He postulated that the primary significance of BC lies in its ability to facilitate transactions without the need for intermediaries (Mougayar, 2016).

Mougayar (2016) has thoroughly analyzed BC and divided it into three dimensions. These include: a piece of technology with a distributed back-end database, a business that allows exchange of value directly between users, and a legal system that replaces trust for transaction approval. Any advancement made in technology, with Bitcoin being the most prominent, BC has more features than that. There are the centralization and distributed ledgers, immutability, and the ability to track assets (Raja Santhi & Muthuswamy, 2022). BC records transactions in blocks that can be distributed to the entire network and are immutable.

This arrangement, compared to traditional centralized systems, enhances efficiency, security, and trust (Javaid et al., 2021). Since the system is decentralized, intermediaries are eliminated, leading to greater efficiency and lower costs. The system's immutability feature enhances safety and trust by ensuring that approved records are never changed (Mhlanga, 2023).

Technology, Organization, and Environment Framework

The Technology, Organization, and Environment (TOE) framework, developed by Tornatzky and associates since 1990, views technology adoption differently than Rogers' linear model of 2003 (Mhlanga, 2023), arguing for a more iterative and non-linear approach. This theory delineates three significant areas — tech, organizational, and environmental — that synergistically determine the adoption process. Regarding this, the aforementioned context refers to a specific type of context that encompasses market competition, legal and other regulations, and certain infrastructural elements that may act as barriers to or enablers of the adoption of sustainability practices (Kouhizadeh et al., 2021).

The framework has been extensively applied across a plethora of technologies. For instance, it has been used to study ERP adoption (Mhlanga, 2023), big data analytics (Verma et al., 2018), electronic data interchange (Orji et al., 2020), knowledge management (Wang & Su, 2020), and BC in the areas of supply chain, logistics, and even hospitality (Nam et al., 2020). The data indicate that technology readiness, managerial support, endorsement, compatibility, trust, and regulatory frameworks are vital.

BC adoption is influenced by a multitude of factors, including its relative advantage, scalability, organizational readiness, and the competitive and regulatory environment (Orji et al., 2020). Emerging technologies, such as BC, are uniquely positioned in relation to these factors and benefit from the individual adaptable model proposed by Govindan et al. (2024).

This study employs the TOE framework and emphasizes the organizational tier of adoption as the model's primary departure point from the Technology Acceptance Model (TAM), Reasoned Action (TRA), Planned Behavior (TPB), and UTAUT, which focus on user-level acceptance (Sabry, Kaittan, & Majeed, 2019). Institutional theory is concerned with the boundaries of physical constraints externally imposed, whereas the diffusion of innovation (DOI) focuses on the interplay between organizational and technical phenomena. The TOE framework, on the other hand, offers a more balanced view by incorporating technology, organization, and environment attributes (Liu et al., 2023). The model is also supported by various studies (Muflih, 2023) and exhibits ample versatility across different sectors.

Thus, the TOE framework provides a multidimensional structure that outlines the technological, organizational, and environmental factors influencing the adoption of BC technology in the banking industry.

This study employs the specified paradigm to gain a deeper understanding of the enablers and barriers to the adoption of BC technology, as suggested for broader use in the innovation space (Orji et al., 2020).

Factors Affecting the Adoption of Blockchain

Regulation

Using BC technology presents a unique challenge due to its legal boundaries. The innovative BC technology poses challenges to global legal systems, particularly in contract law, data privacy, and intellectual property rights (Orji et al., 2020). Its decentralized nature raises issues with regulatory jurisdiction, which deepens concerns about accountability in crises and the arrangements for resolving conflicts (Verma et al., 2018). In addition, the absence of universally accepted benchmarks adds to the confusion for businesses and financial services (Govindan et al., 2024). The complexity of BC systems does not warrant regulatory governance. Transactions are entirely irreversible, and the BC system's structure conflicts with specific laws, such as GDPR, particularly the 'right to be forgotten' (Chang et al., 2020). Even with its simplicity and effectiveness, the technology has not been fully absorbed because the policy surrounding it is incomplete.

Security and Privacy

Although people view BC as one of the most secure technologies, concerns about privacy and security weaknesses are still very real. Public BCs allow anyone to access the data, which increases the likelihood of potential fraudulent activities. On the other hand, private BCs have more security (Govindan et al., 2024). Theft of cryptocurrencies and hacking are examples of vulnerabilities, which include the so-called '51% attack' (Slatvinska et al., 2022; Pećarić, Peronja, and Mostarac, 2020). Cryptographic systems, such as those designed to provide confidentiality, authenticity, and non-repudiation, are the custodians of users' privately held keys (Liu et al., 2023). Privacy in the realm of BC technology is a topic deserving serious scrutiny. While the still unresolved issue of the right to privacy of individuals whose data is being processed on the BC is of utmost importance, the immutability of the technology, which

commands the most attention, is not privacy-friendly (Javaid et al., 2021; Raja Santhi & Muthuswamy, 2022). Mistrust and uncertainty regarding the security and privacy of sensitive personal information are the most pressing questions to be addressed for the broader acceptance of streamlined processes based on BC technology.

Skills Availability

This has also led to challenging the potential speed of adoption in addressing the gap in BC technology proficiency in the contemporary world. This high current landscape suggests the number of vacancies in the BC space is much more than the available specialists in the field. Many companies are increasingly addressing this issue by either outsourcing or partnering with numerous fintech startups (Chavalala et al., 2024). Traditional banks, in this case, are more than just scalable fintech companies, with the agility to employ BC technology. There are also many more costs associated with BC technology. In this case, the high costs of recruitment and retention affect much more than adoption or advancement. Addressing this issue has led to the rising popularity of frameworks for collaboration, acquisition, and improving talent resourcing and development. Combinations with this developed shift gap are also the reason why low BC knowledge represents the single most troubling factor in the adoption and diffusion of the technology today.

Lack of Understanding and Trust in Technology

The challenges presented by end-users and stakeholders with a limited understanding of BC technology include its adoption and utilization (Cozzio et al., 2023; Kouhizadeh et al., 2021). Organizations often operate with poorly defined learning timelines and processes, rendering BC technology unsuitable for their needs (Liu et al., 2023). When managers lack an understanding of a technology, it has a poor chance of being adopted and is likely to face resistance (Mhlanga, 2023). Trust is challenging to establish because many people have doubts about BC technology regarding its governance, longevity, benefits, and practicality (Javaid et

al., 2021). There is a severe lack of understanding about BC technology that is preventing managers from appreciating its value. Consequently, investment activity remains shy, which is counterproductive to its practical application by businesses in day-to-day use.

Cost and Efficiency

Another problem analyzed is the high cost in relation to the value added to the features. Setting up the necessary infrastructure for BC technology is expensive, including hiring personnel trained in BC (Guo & Yu, 2022). Integration is more expensive with existing systems (Wang & Su, 2020). All nodes in the network must confirm transactions, which is adversely affected by the increase in network scale, as processing speed slows (Wenhua et al., 2023). This is a type of operational cost inefficiency. Systems such as Bitcoin are costly, with the added disadvantage of high energy consumption, which leads to adverse ecological effects (Liu et al., 2023). Organizations are hesitant to adopt BC technology due to the high cost of implementation and the difficulties of scaling, which are the main reasons its advancements are not utilized (Trivedi, Mehta, & Sharma, 2021).

Management Support

The role of top-tier managers is pivotal to the successful integration of BC technology. The leadership's support is crucial for effective resource distribution, allocation, and organizational preparedness. According to Kouhizadeh et al. (2021) and Kumari and Devi (2022), stagnation of projects and a reluctance to change are common traits when there is no support from the top. The opposite is true when it comes to the support of top management; the latter supports the former, which is accepted through the change and integration of new ideas along with the organizational BC initiatives (Mhlanga, 2023). In banking, managers' refusal to change due to their rigid mindsets is deeply rooted in the fear of risk, which they tend to underestimate, hindering growth (Mhlanga, 2023). The integration of BC, on the other hand, requires support from top management.

Insufficient Technology Infrastructure and Data Availability

The successful application of BC technology hinges on the development of supportive and accurate data infrastructures. A vast number of businesses report deficient IT support, aging technology, and the high cost of modernizing their infrastructure as key pain points (Kowalski, Lee, and Chan 2021; Rijanto, 2024). The infrastructure of systems hinges on the BC technology's data storage, processing, and access; all of which Orji et al. (2020) posit will increase. The adoption gap for BC technology is greatly exacerbated by the lack of standardization in adoption metrics (Ahluwalia, Mahto, & Guerrero, 2020). The gap in data and infrastructure hinders the operational IT and predictive maintenance capabilities of BC systems in low-resource settings, as highlighted by Garg et al. (2021).

Summarizing the Empirical Studies on BC Adoption

The factors surrounding the adoption of BC technology mostly centre around what drives people to use it. Within this scope of inquiry, researchers have tended to identify two types of elements: individual adoption intention (Chang et al., 2020) and organizational adoption decisions (Mohammed, 2019; Ahluwalia, Mahto, & Guerrero, 2020; Yadav et al., 2022; Nguyen et al., 2021). At the individual level, studies often apply the TAM, TPB, and UTAUT models to analyze behavioral factors such as perceived usefulness and attitude, as well as subjective norms (Kend & Nguyen, 2020; Tiron-Tudor et al., 2021). The individuals who are subjects of this study have been examined in different studies in Malaysia, India, and the USA (Kamble et al., 2019; Cai et al., 2021; Dounas, Lombardi, & Jabi, 2021). The organizational level of analysis is also a popular approach. Here, researchers use frameworks such as TOE, DOI, and institutional theory to analyze the drivers of adoption.

As highlighted in the research conducted by Muflih (2023), Hiran & Henten (2020), and Kouhizadeh et al. (2021), the impact of regulatory, industry standards, and competition may, in some cases, overshadow the technological and organizational aspects. In the literature

concerning banking, supply chains, healthcare, public administration, and real estate, the presence of managerial backing, trust, legislative components, and cost aspects offers a unique value (Mosteanu & Faccia, 2020; Garg et al., 2021; Li et al., 2021).

There does, however, appear to be a noticeable gap in the literature regarding the use of BC technology across various sectors, particularly in the accounting field. In their in-depth research, Rawashdeh, Bakhit, and Abaalkhail (2023), along with their colleagues, argue that applying rigorous, multi-stakeholder, context-sensitive frameworks remains a vital gap that analysts have yet to explore (Raja Santhi & Muthuswamy, 2022). This research aims to fill a gap in the literature by examining the intersection of BC technology and accounting.

UAE and the Banking Industry

Over the years, with the abundance of oil, trade, and tourism, the UAE has evolved into a significant economic hub in the region. As of 2022, the UAE's GDP was ranked 32nd in the world (Tariq, 2024). Currently, the financial technology space is valued at \$39.3 billion and is expected to grow at a rate of over 15% annually, indicating a significant shift in banking innovation (Chavalala et al., 2024). The UAE Money Transfer System, governed by the Central Bank's laws, enables the transfer and receipt of trillions of dollars worldwide within a framework of sound supervision, effective control, and customer confidence (Rijanto, 2024; Chavalala et al., 2024).

Recent studies indicate that financial institutions are in a strong position, with positive returns on equity exceeding 15%, and healthy liquidity and capital (Liu et al., 2023). The robust banking system in the UAE encourages the adoption and application of innovative new technologies, such as BC, which can enhance the transparency, speed, and security of financial transactions (Ernst & Young, 2023). Agencies, such as the Abu Dhabi Global Market (ADGM), streamline the use of BC technology by encouraging regulations that provide a framework for

its implementation. Trust and satisfaction from the customer's perspective are viewed as variables of the perceived value and the service's profitability.

The role of credit risk management in cost management is critical to financial performance (Javaid et al., 2021). Other equally important factors include the service experience, emotional engagement, and brand relationships (Javaid et al., 2022). Nevertheless, challenges persist: cash remains the primary payment method, and 35% of the population, mostly low-income expatriates, are unbanked, thereby increasing the risk of financial exclusion (Khalil, Khawaja, & Sarfraz, 2022).

Studies have shown that factors such as trust, human interface, and compatibility are crucial in the effective use of Internet banking. On the other hand, the use of mobile payments is primarily affected by the practicality of the payment system and the creativity of the payer (Kowalski, Lee, & Chan, 2021). Empirical research based on Expectation Confirmation Theory suggests that the adoption of fintech is influenced by its economic benefits, service quality, and customer loyalty (Mhlanga, 2023). The government of the UAE is promoting the adoption of BC technology through various strategies, including the UAE BC Strategy 2021 and the Dubai BC Strategy.

As stated in their aims, these programs aim to optimize processes in government domains through the use of technology, while also creating an ecosystem that fosters the nurturing of new ideas. (Tariq, 2024; Chavalala et al, 2024). "The programs still focus on the banking industry, especially in areas of digital commerce, trade finance, and international payment processing."

The UAE banking system is robust and enthusiastic about technology, which particularly favors the growth of BC. However, the public's confidence, accessibility to financial services, and ease of use are still critical issues that need to be addressed for BC technology to be widely adopted.

Conclusion

Scholarship demonstrates many elements at play in an organisation's decision to implement various forms of technology, and the TOE framework helps assess these elements. The TOE framework has been expanded to include technological, organisational, and environmental elements in the adoption (Rijanto, 2024; Wenhua et al, 2023; Liu et al., 2023). Studies have noted that value creation, management support, government policies, competition, trust, and data security are key drivers of adoption in banking, healthcare, e-commerce, and green innovation (Guo & Yu, 2022; Cucari et al., 2022). In the UAE, BC technology is gaining significant traction in the banking and finance industries.

Benefits include increased security, greater transparency, improved speed, and cost efficiency (Slatvinska et al., 2022). Research by Yadav et al. (2022) and Nguyen et al. (2021) suggests that numerous other operational efficiencies, such as real-time, decentralized transactions, fraud removal, and ease of compliance, can be achieved through the integration of advanced systems and BC technology. Mhlanga (2023) noted that governing documents, strategic national policies, and UAE initiatives, such as the “UAE BC Strategy,” encourage joint efforts among the private sector, state, and academic community towards the implementation of BC technology. For organizations within the banking sector of the UAE, the application of the TOE framework in combination with BC technology provides benchmarks, insights, and operational streamlining guidance to enhance the level of technology usage, operational efficiency, and customer care within their organizations.

Particularly notable is the UAE’s geography, complemented by favorable regulations for conducting business activities, which thematically positions the UAE as a business hub. The proposed tax regimes introduce low-level tax exposure for companies, offering attractive business tax opportunities, which is deemed beneficial by enterprises that exist for tax-minimized economic pursuits. Dubai’s regulatory structure has been coined the “Virtual Asset

Law," which enhances the protection surrounding virtual investments, particularly investments in cryptocurrency (Chong et al., 2019). The integration of the Internet of Things (IoT) with BC in FinTech and Banking promises increased, custom-tailored, secure, and efficient service delivery (Rijanto, 2024). The application of such technology brings potential changes, including the facilitation of trustless transactions, decentralized control of data, promotion of communication through automation, reduction of trustless fraud, streamlining of processes through operational efficiencies, and driving organizations towards innovative outcomes. However, these solutions do come with a price in the form of existing unresolved problems, such as data privacy concerns, compliance with regulations and policies, reducing the cost of implementation, scaling, and the age-old challenge of governance.

During the COVID-19 pandemic, there was an increased use of automated financial service functions, highlighting enhancements in cost, customer experience, and service speed through the application of BC technology (Rijanto, 2024). The most recent research suggests that enterprises may strategically block access, enhance decision-making for internal policies, and develop proactive systems to persuade employees towards a BC technology policy.

While both the government and technology providers have their own tasks, they need to collaborate on the ground and invest in the necessary learning and infrastructure (Abdulahakeem & Hu, 2021). Liu et al. (2023) state that BC technology has the potential to improve the functioning of banks, but limitations and ethical issues must be carefully considered.

The impact of this research is that BC technology can aid in accelerating, improving, and simplifying automated communications. These results are significant to scholars, the government, and the banking institutions in the UAE. The author suggests examining the impact of factors such as a lack of trust in technology, costs and inefficiency, insufficient management, inadequate technology and data, insufficient skills, and inadequate privacy and

security frameworks on the use of BC technology in UAE banks from a quantitative perspective. Particular organizational research is helpful in the future, as other research can build on the findings from specific banks. Different banks have different strategies.

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