Disruptive Artificial Intelligence Technologies in Automated Self Service Digital Platforms: The use of Blockchain in the Banking Sector in Zimbabwe

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Abstract

The rapid advancement of AI capabilities has brought the disruptive potential of this technology into sharper focus in Zimbabwe. In the banking sector, disruptive AI is being used to automate a wide range of tasks, from trading decisions to fraud detection. The rapid progress of disruptive AI has also raised a number of ethical and societal concerns. In response to these concerns, policymakers and researchers have been working to develop ethical frameworks and governance structures to ensure that disruptive AI is developed and deployed in a responsible and equitable manner. The study explores the transformative role of the disruptive technology of AI and use of blockchain in Zimbabwe's digital banking sector, focusing on how automated self-service platforms can be shaped by these technologies in online transactions. It adopts a qualitative approach. Data was collected through online interviews with bank managers, and also through the use of literature and document analysis. The target population for the study consisted of 16 individual banks (both Commercial and Building Societies. The data collected from the primary sources was analysed using a thematic analysis approach. The study found out that artificial intelligence technologies have profoundly reshaped the banking sector, ushering in a new era of automated, mobile-based self-service banking transactions. The conclusion of the study is that although disruptive AI and blockchain technologies have the potential to revolutionize Zimbabwe's banking industry by improving efficiency and accessibility, they also present considerable challenges, such as financial exclusion and cybersecurity threats. Tackling these issues

necessitates cooperative initiatives to create strong ethical frameworks that emphasize accountability and transparency.

Keywords: Artificial Intelligence, Automation, Banks, Blockchain, Self-Service.

Introduction

Artificial intelligence (AI) has been a topic of intense fascination and speculation for decades, with visions ranging from utopian futures of abundance and leisure to dystopian nightmares of machines surpassing and enslaving humanity (Jobin, Ienca and Vayena, 2019). The rapid advancement of AI capabilities has brought the disruptive potential of this technology into sharper focus. Disruptive AI, defined as AI systems that fundamentally transform existing industries, practices, and social structures, is poised to be one of the defining technological forces of the 21st century (Florido-Benítez and del Alcázar Martínez, 2025). Disruptive artificial intelligence (AI) refers to the development and application of advanced AI systems that have the potential to significantly transform or disrupt existing industries, markets, and societal structures (Păvăloaia and Necula, 2023). These AI systems are characterised by their ability to rapidly learn, adapt, and make autonomous decisions in complex and unpredictable environments, often surpassing the capabilities of traditional human-driven processes and technologies (Filippucci *et al.*, 2024).

Blockchain technology is a decentralised, distributed ledger system that records transactions across multiple computers in such a way that the registered transactions cannot be altered retroactively without the alteration of all subsequent blocks and the consensus of the network (Crosby *et al.*, 2016). Blockchain enables secure and transparent peer-to-peer transactions by using cryptographic techniques and consensus algorithms, eliminating the need for a central authority (Yli-Huumo *et al.*, 2016). While initially designed for cryptocurrencies like Bitcoin, blockchain technology has evolved into a powerful tool across various sectors, including banking, supply chain management, healthcare, and government services (Tapscott and Tapscott, 2017).

The convergence of disruptive technologies such as Artificial Intelligence (AI) and blockchain is transforming the global banking sector, redefining service delivery through automated self-service digital platforms. These innovations have become increasingly vital in developing economies like

Zimbabwe, where the banking sector is under pressure to enhance efficiency, reduce operational costs, and rebuild public trust amid economic volatility (Nwoke, 2024). The integration of these technologies holds significant potential to address long-standing issues such as currency instability, payment delays, and data security in the country (Lloyd, Misheal and Tavonga, 2024).

The study aims to explore the transformative role of the disruptive technology of AI and use of blockchain in Zimbabwe's digital banking sector, focusing on how automated self-service platforms can be shaped by these technologies in online transactions. Zimbabwean banks and businesses, like many other countries, already manage several digital platforms and payments but are still to introduce and formalize the use of blockchain technology in banks.

Background of the Study

Disruptive technologies such as Artificial Intelligence (AI) and blockchain are reshaping the Global financial services landscape by enabling automation, enhancing operational efficiency, and improving customer experience. These innovations have transformed traditional banking models by supporting real-time data processing, intelligent customer service, fraud detection, and decentralized transaction systems (PWC, 2017; Tapscott and Tapscott, 2017). In developed economies, banks have integrated AI-driven chatbots, machine learning algorithms, and blockchain-based platforms into their core operations to increase transparency, reduce human error, and lower transaction costs (Derrouiche, 2022). As a result, financial institutions are becoming more agile and responsive to changing customer demands and competitive pressures.

The adoption of digital technologies in banking is gaining momentum in Africa, driven by the rapid penetration of mobile technology and the need to reach underserved populations. Fintech innovations, mobile money platforms, and digital banking services are increasingly integrating AI and blockchain to provide more secure, efficient, and inclusive financial solutions (OECD, 2021; UNCTAD, 2021). Countries like Kenya, Nigeria, and South Africa are leading in digital financial inclusion, with AI being used for credit scoring and customer engagement, and blockchain being explored for cross-border payments and identity verification (Kshetri and Voas, 2018).

The Zimbabwean banking sector is navigating a complex economic environment marked by currency volatility, trust deficits, and infrastructural limitations. Makore and Chikutuma (2025) assert that exchange rate instability has historically been a major challenge, negatively impacting bank profitability and economic planning. That was before the Zimbabwe Gold (ZiG) currency was ushered into the economy. The ZiG has relatively stabilised the exchange rate. Nyathi and Mutale (2025) add that, historical episodes of hyperinflation, currency reforms, and depositor losses have created a significant trust deficit in the formal banking system and the local currency. Furthermore, according to Sibanda, Ku-zakwacho, Moyo and Nhliziyo (2025), this has led to high levels of dollarisation and an increase in informal economy activity. Zimbabwe's infrastructure which includes power, transport and water, has suffered from a prolonged period of economic turmoil and underinvestment. These challenges have intensified the need for technological transformation. Zimbabwean banks are increasingly turning to self-service digital platforms such as mobile and internet banking to meet customer demands and enhance service delivery (Mudzingwa, Mbizi and Matowanyika, 2024). The introduction of AI technologies in these platforms such as virtual assistants, automated loan processing, and risk assessment, has begun to redefine how banks interact with clients. Simultaneously, blockchain is being explored for secure digital payments, anti-fraud measures, and decentralized ledger management, particularly in light of historical issues surrounding financial transparency and security (Lloyd, Misheal and Tavonga, 2024).

At the core of disruptive AI is the concept of machine learning, which enables AI systems to learn from data and experience, rather than being explicitly programmed with rules and instructions. These AI systems can use advanced algorithms and neural networks to identify patterns, make predictions, and generate novel solutions to complex problems (Berrell, 2020). As the field of AI continues to advance, the range of applications for disruptive AI has expanded dramatically, with the potential to transform industries such as healthcare, transportation, finance, banking and manufacturing (Makridakis, 2017). Disruptive AI is characterized by its ability to automate or augment a wide range of human tasks, from creative endeavors to high-stakes decision-making. This versatility allows disruptive AI to penetrate diverse sectors of the economy and society, triggering cascading effects that can profoundly reshape entire industries and social structures (Spencer, 2017).

One of the most prominent examples of disruptive AI is the rapid development of autonomous vehicles. Companies like Tesla, Waymo, and Uber, have been at the forefront of developing self-driving car technology, leveraging a combination of computer vision, sensor fusion, and deep learning algorithms to enable vehicles to navigate roads, avoid obstacles, and make real-time decisions without human intervention (Al-Hashedi and Magalingam, 2021). However, the development of these systems has also raised a number of ethical and regulatory concerns, as policymakers and the public grapple with issues such as liability, privacy, and the potential displacement of traditional jobs. Another area where disruptive AI is making significant strides is in the field of healthcare (Esteva *et al.*, 2017; Ting *et al.*, 2017).

In the financial sector in general, disruptive AI is being used to automate a wide range of tasks, from trading decisions, fraud detection, and personalized investment advisory services. This automation is transforming the industry, disrupting traditional business models and posing challenges for financial regulators (Frey and Osborne, 2017). Meanwhile, AI-powered fraud detection systems are becoming increasingly sophisticated, using machine learning techniques to identify patterns of suspicious activity and prevent financial crimes (Al-Hashedi and Magalingam, 2021).

The emergence of disruptive AI has also had significant implications for the labour market. As AI systems become capable of performing an ever-wider range of tasks, there is growing concern about the potential for widespread job displacement, particularly in fields such as manufacturing, customer service, and administrative work (Frey and Osborne, 2017). However, some experts argue that the rise of disruptive AI will also create new job opportunities, as the technology enables the development of entirely new industries and creates demand for specialized skills in areas such as AI development, data science, and human-machine interaction (Manyika *et al.*, 2017).

The rapid progress of disruptive AI has also raised a number of ethical and societal concerns. As AI systems become more autonomous and influential, there are questions about the accountability and transparency of their decision-making processes, as well as the potential for these systems to perpetuate or amplify existing biases and inequalities (Jobin, Ienca and Vayena, 2019).

Additionally, the increasing integration of AI into sensitive domains like healthcare and criminal justice has raised concerns about privacy, data security, and the potential for these systems to be used in harmful or unethical ways (Wang, Chen and Zghari-Sales, 2021).

In response to these challenges, policymakers and researchers have been working to develop ethical frameworks and governance structures to ensure that disruptive AI is developed and deployed in a responsible and equitable manner. This includes efforts to establish guidelines for the design and use of AI systems, as well as the development of mechanisms for public oversight and accountability (Cath *et al.*, 2018).

The rise of disruptive AI represents both significant opportunities and significant challenges for individuals, organizations and society as a whole. As the technology continues to evolve, it will be crucial for stakeholders to work collaboratively to ensure that the benefits of disruptive AI are realized while mitigating its potential harms and unintended consequences.

The global rise of disruptive Artificial Intelligence (AI) technologies is reshaping nearly every aspect of human interaction, business operation and governance. AI is being deployed globally in industries such as healthcare, finance, banking, education and transportation, offering unprecedented gains in efficiency, accuracy and scale (OECD, 2021). However, alongside these benefits come significant challenges including data privacy concerns, algorithmic bias, job displacement and ethical dilemmas surrounding decision making autonomy (Dalcher, 2022). The rapid pace of technological advancement has created regulatory gaps and raised questions about accountability and transparency in AI driven systems.

Many African nations are embracing AI driven solutions to address systemic issues such as limited access to services, low financial inclusion and administrative inefficiencies (UNESCO 2021). For example, AI powered mobile platforms are being used to expand banking services, offer real time language translation, and support remote medical diagnostics. Yet, the continent faces unique challenges including underdeveloped digital infrastructure, a shortage of AI expertise, and insufficient regulatory frameworks. The risk of technological dependency and the replication of global inequalities through biased AI models remain critical concerns. Regional collaboration and

capacity building efforts are thus essential to harness AI's potential in a manner that addresses Africa's specific socioeconomic needs.

In Zimbabwe, the emergence of AI technologies presents both a promising opportunity and a complex challenge for the banking sector and broader economy. AI is increasingly being integrated into automated self-service digital platforms, enabling banks to provide personalized customer interactions, detect fraud in real time, and automate credit risk assessments (Lloyd, Misheal and Tavonga, 2024). Such innovations are essential in a country grappling with economic instability, trust deficits in financial institutions, and limited access to formal banking services. However, Zimbabwe faces considerable barriers to effective AI adoption, including limited technical expertise, inconsistent electricity and internet connectivity, and policy gaps in data governance and digital ethics (Mbekezeli-Dabengwa, *et al.*, 2025)). Concerns about data privacy, unemployment due to automation, and the digital divide between urban and rural populations, further complicate the national AI landscape.

Digital Business Platforms Today

The proliferation of digital business platforms has dramatically reshaped how organizations conduct operations and interact with customers within the rapidly evolving digital environment (Cusumano, Gawer and Yoffie, 2019). These platforms function as virtual marketplaces, facilitating the exchange of products, services and information, while also enabling the seamless integration of diverse business activities and the leveraging of data-driven insights (Poniatowski *et al.*, 2022).

The impact of digital business platforms on organizations and industries has been profound. Digital business platforms have disrupted traditional business models, forcing organizations to rethink their strategies and adapt to the new competitive landscape (Kowalski, 2020). For instance, the rise of e-commerce platforms like Amazon and Alibaba has transformed the retail industry, allowing for more efficient and personalized shopping experiences, while also posing challenges for traditional brick-and-mortar retailers (Parker, van Alstyne and Choudary, 2016). The emergence of ride-sharing platforms like Uber and Lyft has disrupted the transportation industry, providing consumers with more convenient and on-demand mobility options, while also creating

new challenges for traditional taxi and limousine services (Rai, Constantinides and Sarker, 2019). In the financial and banking sector, the growth of digital payment platforms like PayPal and WeChat Pay has transformed the way consumers and businesses manage their financial transactions, offering greater convenience and accessibility (Oppong-Tawiah, Bassellier and Pinsonneault, 2020).

The success of digital business platforms can be attributed to their ability to create and capture value through innovative business models and value propositions (Peruchi *et al.*, 2022). These platforms often employ strategies such as offering free or subsidized services to one user group in order to attract a larger user base and generate revenue from other user groups, such as advertisers or complementary service providers (Holotiuk and Beimborn, 2017; Rohn *et al.*, 2021). This platform-based approach to innovation allows for the rapid development and deployment of new offerings, catering to the evolving needs and preferences of customers (Liu *et al.*, 2023).

However, the rise of digital business platforms has also brought about a range of challenges and concerns, both for platform owners and for the broader societal and regulatory landscape. One of the primary challenges is the potential for platform monopolies and the concentration of market power, which can lead to anti-competitive practices and the exclusion of smaller players (Kowalski, 2020; Parker, van Alstyne and Choudary, 2016). Another key challenge is the impact of digital business platforms on employment and labor practices. The rise of gig economy platforms, such as Uber and Lyft, has led to the emergence of a more flexible and on-demand workforce, but this has also raised concerns about worker protections, labor rights, and the potential for the exploitation of workers (Rohn *et al.*, 2021; Hein et al., 2020). This has led to increased regulatory efforts, such as the implementation of the General Data Protection Regulation (GDPR) in the European Union, to ensure the responsible and ethical use of user data by platform-based businesses (Rai, Constantinides and Sarker, 2019).

Despite these challenges, the continued growth and evolution of digital business platforms is expected to have a significant impact on the global economy and the way organizations operate and engage with their customers (Michael A. Cusumano, Annabelle Gawer and David B. Yoffie, 2019; Hein *et al.*, 2020). As technology continues to advance and the competitive landscape

becomes increasingly platform-centric, organizations will need to develop strategies to effectively leverage digital business platforms and navigate the complex regulatory and competitive environment (Sedera, Tan and Xu, 2022).

Block chaining Improving Monetary Transactions in the Digital Economy

The rapid digitization of the global economy has transformed the landscape of monetary transactions, necessitating the development of innovative financial banking technologies that can keep pace with the evolving needs of businesses and consumers (Tapscott and Tapscott, 2017). One such transformative technology is blockchain, a decentralized and distributed digital ledger that has the potential to improve, or mordenise the way banking transactions in the digital economy are conducted (Iansiti and Lakhani, 2017).

At its core, blockchain technology is a secure and transparent system for recording and verifying digital transactions, without the need for a centralized authority or intermediary (Sheth and Dattani, 2019). This decentralized nature of blockchain allows for the creation of a tamper-resistant and distributed digital ledger, where each transaction is recorded in a series of interconnected blocks, verified by a network of peer-to-peer nodes, and secured through cryptographic techniques (Zheng *et al.*, 2017).

The application of blockchain technology in the realm of monetary transactions has been particularly transformative, as it addresses several key challenges faced by traditional financial systems (Guo and Liang, 2016). One of the primary benefits of blockchain-based monetary transactions is the increased efficiency and speed of the transaction process, as the decentralized nature of the technology eliminates the need for intermediaries, such as banks or financial institutions, to verify and process transactions (Mhlanga, 2023; Xie *et al.*, 2023). This increased efficiency translates to reduced transaction costs, as the elimination of intermediaries and the associated fees can lead to significant cost savings for both businesses and consumers (Panda *et al.*, 2021). The impact of blockchain-based monetary transactions on the digital economy has been far-reaching, with a wide range of applications and use cases (Tapscott and Tapscott, 2017). One of the most prominent examples is the rise of cryptocurrencies, such as Bitcoin and Ethereum, which leverage blockchain technology to facilitate decentralized, peer-to-peer transactions without

the involvement of traditional financial institutions (Iansiti and Lakhani, 2017). The availability of these blockchain-based cryptocurrencies has opened up new avenues for cross-border payments, remittances, and international trade, as they eliminate the need for costly and time-consuming traditional banking processes (Sas and Khairuddin, 2017). This has particularly benefited individuals and businesses operating in regions with limited access to traditional banking services, as blockchain-based transactions can provide a more inclusive and accessible alternative (Yadav *et al.*, 2022).

Beyond cryptocurrencies, blockchain technology has also found applications in other areas of the digital economy, such as supply chain management, digital identity management, and smart contract-based transactions (Alsmadi *et al.*, 2023). In the supply chain management area, blockchain can enhance transparency and traceability, allowing for better tracking of goods and materials throughout the supply chain, as well as the verification of the authenticity and provenance of products (Buthelezi *et al.*, 2022). The use of blockchain-based digital identity management systems can also help address the challenges of identity theft and data breaches, as the decentralized and secure nature of the technology can provide individuals with greater control over their personal information and enhance the security of online transactions (Panda *et al.*, 2021). The integration of blockchain with smart contract technology has the potential to automate and streamline a wide range of banking transactions, from invoice payments to insurance claims, further enhancing the efficiency and reliability of the digital economy (Rangga Gelar Guntara, Muhammad Naufal Nurfirmansyah and Ferdiansyah, 2023).

However, the widespread adoption and implementation of blockchain-based monetary transactions in the digital economy is associated with challenges. One of the primary concerns is the potential for regulatory uncertainty and the lack of clear governance frameworks, as the decentralized nature of blockchain technology can create regulatory blind spots and compliance issues (Zheng *et al.*, 2017). The scalability and performance limitations of certain blockchain networks, particularly in terms of transaction throughput and processing speed, can hinder their widespread adoption in high-volume, real-time banking applications (Miraz and Ali, 2018). The volatility and speculative nature of some blockchain-based cryptocurrencies has also raised concerns about their stability and suitability as a reliable medium of exchange (Yadav *et al.*, 2022). Despite these challenges,

the potential of blockchain technology to transform the landscape of monetary transactions in the digital economy remains significant (Iansiti and Lakhani, 2017; Tapscott and Tapscott, 2017). As the technology continues to evolve reaching maturity levels, and as regulatory frameworks and governance models are further developed, the integration of blockchain-based solutions into the digital economy is likely to accelerate, driving increased efficiency, security, and inclusivity in the financial sector (Zheng *et al.*, 2017).

The application of blockchain technology in monetary transactions has the potential to significantly impact the digital economy, offering a range of benefits, such as increased efficiency, reduced costs, enhanced security, and greater banking inclusion. As technology continues to evolve and overcome existing challenges, the integration of blockchain-based solutions into the digital economy is expected to gain further momentum, transforming the way we conduct banking transactions in future.

Benefits of Automated Self-Service Transactions with Blockchain Technology

The rapid evolution of digital technologies has fundamentally transformed the landscape of commercial transactions, ushering in an era of increased convenience, efficiency, and accessibility for both businesses and consumers (Kuperberg, 2020). At the forefront of this digital transformation is the emergence of blockchain technology, which has the potential to revolutionize the way we conduct automated self-service transactions in the digital economy (Nofer *et al.*, 2017). Blockchain is a decentralized, distributed digital ledger that records transactions across many computers in a network, without the need for a centralized authority or intermediary. This unique architecture allows for the creation of a transparent, tamper-resistant, and secure system for recording and verifying digital transactions, which is particularly well-suited for the development of automated self-service solutions (Sas and Khairuddin, 2017).

One of the primary benefits of utilizing blockchain technology for automated self-service transactions is the enhanced efficiency and speed of the transaction process (Zheng *et al.*, 2018). By eliminating the need for intermediaries, such as banking institutions or third-party service providers, blockchain-based transactions can be executed in near real-time, significantly reducing the processing time and associated costs for both businesses and consumers (Tapscott and

Tapscott, 2017). The decentralized and distributed nature of blockchain technology can help to enhance the reliability and resilience of automated self-service transactions, as the network of peer-to-peer nodes verifies and records each transaction, reducing the risk of single points of failure or service disruptions (Panda *et al.*, 2021; Kshetri and Voas, 2018).

The integration of blockchain technology with smart contract functionality further enhances the potential for successful automated self-service transactions. Smart contracts are self-executing, programmable agreements that are stored and executed on the blockchain, allowing for the automation of various transactional processes, such as invoicing, payments, and asset transfers (Khan *et al.*, 2021). By leveraging smart contracts, businesses can create highly customizable and autonomous self-service solutions that can execute transactions with minimal human intervention, further improving efficiency and reducing the risk of human error (Lin *et al.*, 2022).

One of the most prominent examples of successful automated self-service transactions facilitated by blockchain technology is the rise of decentralized finance (DeFi) applications. DeFi platforms leverage blockchain and smart contract technologies to offer a wide range of banking services, such as lending, borrowing, and trading, without the involvement of traditional financial intermediaries (Kuperberg, 2020). This has enabled the development of highly efficient and accessible self-service banking solutions, particularly for individuals and businesses that have limited access to traditional banking services. (Nofer *et al.*, 2017).

The banking sector in Zimbabwe

The banking sector in Zimbabwe includes a mix of commercial banks, building societies, and microfinance institutions, all supervised by the Reserve Bank of Zimbabwe (RBZ). Key players include commercial banks like CBZ Bank, FBC Bank, Stanbic Bank, and Steward Bank, alongside building societies such as CABS and ZB Building Society. There are also state owned banking institutions such as AFC Commercial Bank and the Infrastructure Development Bank of Zimbabwe (IDBZ) (IOBZ, 2025).

The banking industry in Zimbabwe has undergone considerable changes owing to the emergence of automated self-service digital platforms, which are essential for fostering financial inclusion

and enhancing service delivery in a context characterized by economic difficulties (Mutale, 2024). Historically burdened by hyperinflation and liquidity crises, the sector's demand for innovative solutions has resulted in the widespread adoption of mobile banking applications, internet banking, and automated teller machines (ATMs) (Ndlovu et al., 2022). These digital platforms provide banking services to marginalized communities, especially in rural regions where conventional branches are scarce (Mookerjeeet al., 2025). With a substantial proportion of mobile device ownership, banks have leveraged this trend to market their services, supported by financial literacy programmes designed to educate consumers (Verma, 2024).

Theories underpinning the study

This study is underpinned by two key theories: The Technology Acceptance Model (TAM) and the Diffusion of Innovation (DOI) Theory. These frameworks provide a robust lens through which to understand how new technologies such as Artificial Intelligence (AI) and blockchain are adopted within banking systems, particularly in a developing economy like Zimbabwe.

Technology Acceptance Model (TAM)

The Technology Acceptance Model, developed by Davis (1989), posits that two key factors, namely, Perceived Usefulness and Perceived Ease of Use, determine the likelihood that users will accept and adopt a new technology. Perceived usefulness refers to the degree to which a person believes that using a particular technology will enhance their job performance, while perceived ease of use relates to the degree to which they believe using the technology will be free of effort.

In the context of this study, TAM is highly relevant as it helps explain how bank employees, customers, and decision-makers evaluate the utility and usability of AI-powered self-service platforms and blockchain-enabled systems. For example, if Zimbabwean banking clients perceive AI-based chatbots or blockchain-secured transactions as beneficial and easy to use, they are more likely to adopt these technologies. On the other hand, poor user experiences, lack of digital literacy, or perceptions of complexity, may hinder acceptance.

Diffusion of Innovation (DOI) Theory

The Diffusion of Innovation Theory, proposed by Rogers (2003), explains how new ideas and technologies spread within a society or organization over time. The theory outlines five key

attributes that influence adoption: Relative Advantage, Compatibility, Complexity, Trialability, and Observability. It also categorizes adopters into groups (innovators, early adopters, early majority, late majority, and laggards) based on their readiness to embrace innovation.

This theory is very essential as it provides a macro-level view of how disruptive technologies like AI and blockchain diffuse through the Zimbabwean banking ecosystem. It accounts for both organizational and socio-cultural factors, including economic conditions, regulatory environments, institutional readiness, and the digital divide. For instance, banks in Zimbabwe may adopt blockchain at different rates depending on their technological capacity, leadership vision, and ability to manage change.

Together, TAM and DOI offer a comprehensive theoretical foundation for this study. While TAM emphasizes the psychological and behavioral dimensions of individual technology acceptance, DOI captures the broader socio-organizational processes that influence how innovations spread. Applying both models enriches the analysis by addressing micro and macro-level adoption dynamics, thereby offering a well-rounded understanding of how disruptive technologies can be successfully implemented in Zimbabwe's banking sector.

Methodology

The research design for this study followed a qualitative approach. Online interviews were carried out (through zoom platform) with bank managers to collect comprehensive facts to enable proper analysis of the status quo in the Zimbabwean banking sector. The interviews were carried out separately with each bank manager on different time and day. The target population for the study consisted of individual banks (both Commercial and Building Societies) operating in the banking industry. Purposive sampling was used, where selection of the participants was intentional, based on their specific knowledge, experiences, and characteristics relevant to the research question. This was more cost-effective and time-efficient, as it allowed the researchers to focus on bank managers who provided in-depth and relevant data. The primary aim was to find out the kind of adopted AI embedded in the banking software that enhances bank processes.

A total of sixteen (16) bank managers from the individual banks participated in the study. These were from the following institutions: **Commercial Banks:** AFC Commercial Bank, BancABC Limited, CBZ Bank Limited, Ecobank Zimbabwe Limited, FBC Bank Limited, First Capital Bank Limited, Infrastructure Development Bank of Zimbabwe (IBDZ), Nedbank Zimbabwe Limited (formerly MBCA Bank Limited), Metbank Limited, NMB Bank Limited, Stanbic Bank Zimbabwe Limited, Steward Bank Limited (TN CyberTech Bank Limited), and ZB Bank.
Building Societies: CABS, FBC Building Society, National Building Society.
Savings Bank: People's Own Savings Bank.

The topic involves potential risks, particularly as these technologies impact sensitive financial data and human participants (customers and employees). As such, ethical clearance was a critical requirement. Ethical considerations for Artificial Intelligence include bias and fairness, transparency and explainability, accountability, job displacement and informed content. For Blockchain technology, it involves privacy versus transparency, data security, regulatory uncertainty and financial inclusion. As such, the study was cleared by the Great Zimbabwe Research Ethics Committee. Furthermore, each participant was requested to fill in a Consent Form to be part of this study.

In addition, the study also utilised literature analysis and document reviews as the secondary data collection method. This approach was used to gain a deep, contextual understanding of the phenomenon under investigation (Cheteni, Matsongoni and Umejesi, 2024). According to Mhlanga (2023), combining primary and secondary data sources in research offers a more comprehensive and robust understanding of the topic.

The data collected from the primary sources was analysed using a thematic analysis approach. This analytical method involves the systematic identification, organisation, and interpretation of recurring patterns and themes within the data, allowing researchers to uncover the core concepts, underlying meanings, and critical insights that emerge from participants' narratives and experiences (Braun and Clarke, 2022). In addition, secondary data was analysed through literature (case studies of blockchain implementations and industry trends) and document analysis. The study adopts a twin approach in the analysis of data by using both descriptive and inferential

methods. According to Giwa and Ngepah (2024), the descriptive method has the advantage of summarising and presenting data, offering a clear picture of what the data shows, while inferential method allows for generalising findings beyond the sample to a larger population.

Results and Discussion

The proliferation of mobile devices and the widespread adoption of smartphones has profoundly reshaped the Zimbabwean banking sector, ushering in a new era of automated, mobile-based self-service banking transactions. This relates to all the major local banks such as CBZ, FBC and CABS as well as international banks such as Stanbic and First Capital bank. According to the findings, if the disruptive blockchain technology is used, this emerging model of banking services in the country holds the potential to fundamentally transform the way individuals and organizations manage their transactions, promising greater convenience, accessibility, and operational efficiency (Omrani *et al.*, 2023). Table 1 shows summarised study results.

Table 1: Research Results

Aspect	**Disruptive AI Technologies in Automated Self-Service Digital Platforms**	**The Use of Blockchain in the Banking Sector in Zimbabwe**
Current Adoption Level	Low but emerging	Very Limited to Non-existent in current mainstream operations. Research discusses its potential as a disruptive technology.
Primary Use Cases	• Fraud detection • Risk management • Operational efficiency • Basic customer service	Potential applications include secure, transparent transaction ledgers, cross-border payments, trade finance, and smart contracts.
Key Drivers	Customer satisfaction, cost reduction, need to better manage risk, enhancing	The potential for increased transparency, enhanced security, decentralisation, and reduced need for third parties in transactions.

	security, and overall operational efficiency.	
Major Barriers	Lack of AI knowledge, high implementation costs, weak infrastructure e.g., power outages and regulatory uncertainty.	Regulatory uncertainty/conservative stance of regulators, lack of understanding/knowledge.
Identified Opportunities	Improved operational efficiency, enhanced customer service, better fraud detection, financial inclusion	Potential to build trust in digital financial services, create new business models, improve efficiency.
Overall research findings summary	AI is primarily embedded in existing banking software for back-end processes. Standalone AI applications like advanced analytics or comprehensive self-service platforms are in early phases.	While recognised as a major disruptive technology in global finance literature, its use in Zimbabwe's banking sector is largely in exploratory stages.

The results show that disruptive Artificial Intelligence technologies in automated self-service digital platforms are still in their infancy in Zimbabwe. The foundation of automated mobile self-service money transactions using AI technology of blockchain lies in the advancements made in mobile banking and digital payment technologies (Kaseke and Chirume, 2023). Mobile banking applications in Zimbabwe, frequently integrated with digital wallets and contactless payment systems, enable users to conduct a diverse array of banking activities directly from their smartphones (Slade *et al.*, 2015). These mobile banking services, if AI and blockchain are used, are designed to be intuitive, user-friendly, and seamlessly integrated into the daily lives of consumers resulting in flexible and fast transactions being done easily (Tam and Oliveira, 2017).

A key factor driving the growth of automated mobile self-service money transactions in Zimbabwe is the rising adoption of smartphones and the ubiquity of mobile internet access. Pew Research Center (2021) found that approximately 85% of adults in the United States own a smartphone, with even higher ownership rates among younger demographic groups (Pew Research Center, 2017). This pervasive smartphone ownership now applicable in Zimbabwe, coupled with the proliferation of high-speed mobile internet networks, such as 4G and 5G, has facilitated the seamless integration of banking services into the daily lives of consumers (Shaikh and Karjaluoto, 2015). In Zimbabwe such transactions include online payments for goods and services acquired both locally and abroad.

Moreover, the rise of digital payment technologies in Zimbabwe, has further accelerated the adoption of automated mobile self-service money transactions. These technologies leverage the convenience and security of mobile devices to facilitate instant, secure, and hassle-free banking transactions, reducing the reliance on traditional payment methods like cash and physical credit cards. The integration of biometric authentication, such as fingerprint and facial recognition in banks, has also contributed to the enhanced security and user experience of these mobile financial services (Morosan and DeFranco, 2016).

For Zimbabwean banks and businesses, the use of blockchain technological advancements offer a range of benefits, including cost savings, increased operational efficiency, and the ability to reach previously underserved or underbanked population segments (Ozcan and Santos, 2015). By automating routine banking tasks and reducing the need for in-person interactions, banks can lower their operational costs and redirect resources towards innovation and the development of more tailored financial products and services (Slade *et al.*, 2015). This data-driven approach to banking services can lead to improved customer experiences, increased customer loyalty, and the development of new revenue streams for banking institutions (Shaikh and Karjaluoto, 2015).

However, the widespread adoption of automated mobile self-service money transactions in Zimbabwe, has also given rise to a range of challenges and concerns. One of the primary issues is the potential for increased banking exclusion, such as the elderly, low-income individuals, and those with limited access to mobile technology or digital literacy as already realized by Ozcan and

Santos (2015). Another key consideration is the heightened risk of cybersecurity threats and data privacy breaches associated with the digital nature of automated mobile self-service money transactions like blockchain (Morosan and DeFranco, 2016).

Despite these challenges, the potential benefits of automated mobile self-service money transactions, such as blockchain, remain compelling, and the trend towards increased adoption is likely to continue. Banks and policymakers are actively exploring ways to address the issues of financial inclusion, cybersecurity, and regulatory oversight, ensuring that the benefits of these technologies are accessible to all and that the risks are effectively managed (Ozcan and Santos, 2015). One potential solution to the challenge of financial inclusion is the development of tailored digital banking services and the integration of mobile technology into existing banking infrastructure in underserved communities.

Similarly, the issue of cybersecurity and data privacy can be addressed through the implementation of robust security protocols, the adoption of advanced encryption and authentication methods, and the establishment of comprehensive regulatory frameworks to govern the storage, processing, and usage of consumer financial data (Morosan and DeFranco, 2016). Banking institutions and technology providers are also investing in the development of innovative solutions, such as blockchain-based payment systems and biometric authentication, to enhance the security and privacy of automated mobile self-service money transactions (Slade *et al.*, 2015).

To maintain the stability and resilience of the financial system, which includes banks, in the face of disruptive innovations, policymakers and regulators are actively engaging with the financial technology (fintech) industry to develop regulatory sandboxes, where new technologies and business models can be tested and evaluated in a controlled environment (Tam and Oliveira, 2017). In Zimbabwe, FinTech Hackathon competitions have been on the rise for such major banks like the Commercial Bank of Zimbabwe (CBZ), and for such renowned yearly events as the Zimbabwe Trade Fair (ZTF) (Shaikh and Karjaluoto, 2015).

The findings of the study show that the Technology Acceptance Model (TAM) offers a foundational perspective for explaining adoption behaviour of disruptive technologies (Artificial

Intelligence and Blockchain) even in the context of Zimbabwe's banking sector. According to Lai, et al. (2023), TAM posits that a user's intention to adopt a new technology is driven primarily by their perceptions of its usefulness and ease of use. In the Zimbabwean banking sector, AI-powered self-service platforms demonstrate clear utility to customers and banks. For the banks in Zimbabwe this includes benefits like cost reduction, improved operational efficiency, better risk management, and enhanced customer satisfaction. For the customers, the usefulness relates to the ability to perform banking tasks quickly, accurately, and without human assistance. For the ease of use for customers, user-friendly interfaces, clear instructions, and intuitive navigation have been crucial for adoption. The customers' confidence in their own technical abilities, or self-efficacy, have influenced their perception of ease of use. Additionally, for banks, ease of use also applies to the internal implementation process. The ease of integrating a new AI system with existing infrastructure affects a bank's willingness to adopt it, according to Khan, et al. (2021).

For disruptive technologies like blockchain, the basic TAM framework needs significant expansion to account for its complexity and the risk environment of Zimbabwe. According to Dehghan, et al. (2022), Blockchain's benefits extend far beyond those of typical information systems. The issues at hand are the financial stability, trust and transparency; and cost and speed. Furthermore, for users, blockchain technology is highly abstract and complex, which creates significant hurdles for adoption. The user experience of blockchain applications (for example, wallet management, and transaction confirmation) must be made as simple as possible to overcome this barrier.

The findings of the study also show that the Diffusion of Innovation (DOI) theory explains well the adoption of disruptive AI technologies and blockchain in Zimbabwe's banking sector. It does this through its core concepts of perceived innovation characteristics, communication channels, social systems, and adopter categories. For both banks and customers, the adoption process is a phased trajectory that is shaped by the perception of the benefits these innovations bring with them, as well as risks within a Zimbabwean banking context. Păvăloaia and Necula (2023) assert that the adoption process begins with the introduction of the disruptive technologies and the subsequent spread of information about them. This is then followed by the characteristics of the innovation, and finally we have the social system and communication channels and the adopter categories in

the Zimbabwean context. The adoption of AI and blockchain followed a timeline driven by different types of adopters which are innovators and early adopters (banks), innovators and early adopters (customers), early and late majority (banks), early and late majority (sustomers) and then the laggards.

The rise of automated mobile self-service money transactions in Zimbabwe represents a significant transformation in the financial banking landscape. Driven by the convergence of mobile technology, the growing demand for convenient and accessible banking services should result in digital payment systems like blockchain being successfully used and supported.

Recommendations

Development of Comprehensive Ethical Frameworks

To effectively regulate the use of disruptive AI and blockchain technologies, it is essential to create thorough ethical frameworks that encompass accountability, transparency and fairness. These frameworks must incorporate explicit accountability mechanisms that clarify who holds responsibility for the actions and decisions made by AI systems and blockchain applications. This entails defining liability in instances of errors or harm resulting from these technologies.

Promotion of Digital Literacy and Financial Inclusion

Maximizing the benefits of automated self-service technologies necessitates initiatives to enhance digital literacy and promote financial inclusion, particularly for underserved populations. Establishing partnerships between financial institutions, educational organizations, and community groups can facilitate tailored educational programs aimed at improving digital literacy.

Investment in Cybersecurity Initiatives

With the growing dependence on digital technologies, it is essential to implement strong cybersecurity initiatives to safeguard sensitive information and uphold consumer confidence. Financial institutions and tech companies ought to allocate resources towards advanced security measures, which encompass multi-factor authentication, encryption, and biometric identification systems to protect transactions and personal data.

Encouraging Cooperation between Conventional Financial Institutions and Fintech Enterprises

The connection between conventional financial institutions and fintech enterprises holds the promise of fostering innovation while ensuring stability within the financial ecosystem. The creation of collaborative innovation hubs can unite banks and fintech startups to jointly develop new solutions, thus promoting knowledge exchange and swift prototyping.

Conclusion

The incorporation of disruptive technologies such as Artificial Intelligence (AI) and blockchain into Zimbabwe's banking sector signifies a crucial transformation in the financial services landscape. The results suggest that AI-driven innovations, including automated self-service platforms and predictive analytics, in conjunction with blockchain's secure transaction features, can greatly enhance service delivery within Zimbabwe's banking sector. Nevertheless, the implementation of these technologies is accompanied by considerable challenges. Factors such as digital literacy, cybersecurity threats and regulatory deficiencies, present risks that must be mitigated to guarantee fair access to financial services. The dependence on mobile technology and automated systems may unintentionally worsen financial exclusion for at-risk populations, highlighting the need for targeted measures to address these disparities. To fully leverage the potential of disruptive AI and blockchain, a cooperative strategy involving financial institutions, policymakers and technology experts is crucial. Establishing comprehensive ethical guidelines, fostering digital literacy and investing in cybersecurity measures, is essential for cultivating a secure and inclusive financial environment.

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