



Towards Cryptocurrency Adoption in Tanzania: Potential Risks and Challenges to the Financial Ecosystem

Kirumirah Mubarack¹; Dickson Pastory²; Jane Mmasi³; Allen Mrindoko⁴

¹ Assistant Lecturer, Development Studies, College of Business Education, Dar es salaam, Tanzania

² Senior Lecturer, Accounting and Finance, College of Business Education, Dar es Salaam, Tanzania

³ Assistant Lecturer, Economics, College of Business Education, Dar es salaam, Tanzania

⁴ Lecturer, Accountancy, College of Business Education, Dar es salaam, Tanzania

E-mail: babamuba@gmail.com

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Abstract

The emergence of cryptocurrency financial technology in the world has introduced new global cashless payment system. Researchers, scholars, jurisdictions, central banks and governments all over the world has put much attention in this payment technology. Despite the enormous benefits of cryptocurrency, it has been associated with several risks and challenges including high price volatility, security vulnerabilities and the illegal activities such as money laundering, terrorist financing, corruption and fraud. Moreover, the level of acceptance and adoption of this currency is questionable among the public and especially in the financial sector. This study uses the Unified Theory of Acceptance and Use of Technology (UTAUT), to assess the level of adoption, anticipated risks and challenges. The study used the mixed research design with a qualitative embedded design. The study collected data from 100 respondents obtained through convenient sampling approach. Respondents were sampled from BOT and Commercial banks based in Dar Es Salaam, Cryptocurrency traders among others. Data were analysed by the use of descriptive (quantitative data) and content analysis (qualitative data). Findings reveal that, the rate and intention of adopting cryptocurrency is very low because of ICT related challenges. It was further revealed that in Tanzania, volatility of the currency, security problems and awareness among customers are anticipated challenges. Moreover, it was revealed that because of regulatory landscape and its connection to security threats the public considers cryptocurrency to have several challenges. The study concludes that the rate and intention to adopt cryptocurrency is still low in Tanzania and recommends the government and other financial institutions in the financial sector to set facilitating environment for cryptocurrency because it is a technology that is taking over in the finance sector in the near future.

Keywords: *Risks; Challenges; Cryptocurrency; Bitcoin; Tanzania; Blockchain Technology; Illegal Activities; High Price Volatility; Security Vulnerability*

1. Introduction

The revolution of internet came up with many applications such as cryptocurrencies (Ather et al., 2021). Internet of things applications (IOTA) is one of the cryptocurrency coins that enable transactions between massive heterogeneous and decentralized devices that works on internet of things (IoT) and global information system (Silvano & Marcelino, 2020; Popov, 2018). According to Nadeem et al. (2021) and Carrick (2016) the development of cryptocurrency is facilitated by the rapid technological advancements. Satoshi Nakamoto, the founder of Bitcoin cryptocurrency was trying to solve the issue of trusting a third party such as central banks and governments in order to bring financial freedom (Nakamoto, 2008; Nadeem et al., 2021). Some of the interesting characteristics of cryptocurrency that makes it more attractive to users include anonymity, privacy, peer to peer real time high speed transactions, low transaction charges and irreversible transactions (Mariana, 2021; Kidunda & Pastory, 2021; Nadeem et al., 2021; Jafari et al., 2018). Cryptocurrency such as bitcoin can be used as form of money, mode of exchange and as an asset that can be sold (Vaz et al., 2020). As a form of money, cryptocurrency can be used just as fiat currency to buy or pay for anything in an electronic form. Cryptocurrency differs from other digital payments methods such as mobile money in that, it depends on internet protocols (Ermakova et al., 2017). There are more than 9,300 cryptocurrencies (Kidunda & Pastory, 2021), and some of the most known are Bitcoin and Ethereum.

The idea of cryptocurrency started in 1983 by the American computer scientist and cryptographer; David Chaum (Chaum *et al.*, 1998). It kept getting developed until 2009 where the first decentralized cryptocurrency called bitcoin was created by people or person using an assumed name Satoshi Nakamoto (Wikipedia, 2022; Nakamoto, 2008). Bitcoin being the first and well known cryptocurrency, has gained much attention from scholars, governments, investors, central banks, jurisdictions and medias (Ashimbayev & Tashenova, 2018; Fauzi *et al.*, 2020; Ku-Mahamud *et al.*, 2019; Chang, 2019). The first transaction with bitcoin was made on May 22, 2010 to purchase two pizzas that cost US dollars 25 for 10,000 bitcoins (Rehman *et al.*, 2020; O'Dair, 2018; Tapscott & Tapscott, 2016). Currently, one bitcoin is equivalent to about 43,000 US dollars.

The adoption of cryptocurrency is still in emerging stage. For example, in the entire world, only El Salvador has accepted bitcoin as a legal tender (Oxford Analytica, 2021; Helms, 2021; Kidunda & Pastory, 2021). According to various scholars (Mariana, 2021; Fauzi *et al.*, 2020; Ather *et al.*, 2021; Wilson, 2021; Browne, 2021; Miraz *et al.*, 2022), cryptocurrencies are missing public authority ownership which makes it susceptible to legal uncertainty, low degree of acceptance, market volatility, insecurity and as a platform for illegal activities such as money laundering, corruption, fraud, terrorist financing and so on. China, which performs around 65% of the cryptocurrency mining activities in the world, followed by the United States, Russia and Kazakhstan, has absolutely banned cryptocurrency due to speculative risks (Ather et al., 2021; Taylor, 2021; Nadeem et al., 2021).

On the contrary, Taylor (2021) explained that there are many countries around the world that have allowed its people to use, market and trade cryptocurrency and have imposed tax laws, Anti-Money Laundering (AML) and anti-terrorist (CFT) policies. These countries include United States, United Kingdom, Canada, Finland, Germany, India, South Africa, Japan, France, Spain, Norway, Netherlands, Malaysia, Denmark, Belgium, New Zealand, South Korea, Romania, Italy, Israel and so on. In addition, Kenya is the only country in East Africa that has allowed its citizens to trade and use cryptocurrency with the application of tax laws only. Moreover, at least 10 banks have invested in cryptocurrencies in the world. Some of these banks with the amount they have invested are Standard Chartered - \$380 million, Citibank - \$279 million, JP Morgan Chase - \$206 million and Barclays - \$12 million (Mozee, 2021). However, despite the presence of contradicting facts regarding adoption of cryptocurrency, successful and complete adoption of these currencies remain low and facts regarding this low adoption remain unknown in the East African context.

1.1 Research Problem

Until 2019 following the BOT's public notice of banning cryptocurrencies, citizens were free to trade with such currencies. Common among them was the Bitcoin. The Bank of Tanzania, clarified that it was against the law for one to trade such currencies (Bank of Tanzania, 2019). Before the banning notice, cryptocurrencies were traded at users' own risks without government involvement. From the beginning of this financial technology in 2009 to date, neither banks nor other financial institutions in the United Republic of Tanzania are allowed to trade, market or use cryptocurrency. This is because the central Bank of Tanzania (BOT) has not yet recognized cryptocurrency as either a form of money, mode of exchange or asset that can be traded.

According to Taylor (2021) Tanzania is among 42 countries in the globe that have implicitly banned the circulation of cryptocurrency within its borders. However, in March 2021, the governor of the central bank (BOT) announced that Tanzania is getting prepared to launch central bank based digital cryptocurrency (CBDC) that will be exchanged in one-to-one with Tanzania shilling (IndianExpress, 2021). The statement followed directives from the President, urging the adoption of cryptocurrency as the arrival of cryptocurrency in East Africa is unavoidable (Reuters, 2021; Mwananchi, 2021; The Citizen, 2021). The CBDC to be introduced by BOT in Tanzania will be the first legal cryptocurrency and will function in the same way as the normal fiat currency. Vaz et al., (2020) clarified that the unregulated cryptocurrency such as bitcoin have trust shortcoming because it exists without financial institution and government. The CBDC will achieve higher level of trust as it will be regulated by the central bank (Zhao, 2021).

Despite the presence of anticipated trust on CBDC (a form on Tanzanian Cryptocurrency), there is dearth in literature regarding the entire adoption, anticipated challenges and risks thereof. The available literature on cryptocurrency adoption report that adoption is still at infancy stage (Nadeem et al., 2021;Chaim & Laurini, 2019). In Tanzania, just like in any other new initiatives, people's readiness, anticipated risks and challenges normally achieved by education is very important. A study by Kidunda and Pastory (2021) reports that the level of education on cryptocurrency adoptions is very low (Kidunda & Pastory, 2021). Therefore, this study, while extending Kidunda and Pastory's (2021) study on peoples' readiness to use cryptocurrency, it aims to find out the potential risks and challenges of adopting cryptocurrency to financial and banking ecosystem in Tanzania.

1.2 Objectives

Specifically, the study will:

- i. Determine the level of people's readiness in the adoption of Cryptocurrency
- ii. Assess the potential risks of adopting Cryptocurrency among banks in Tanzania
- iii. Unveil potential challenges of adopting Cryptocurrency among Banks in Tanzania

2.Literature Review

2.1 Theoretical Framework and Hypothesis Formulation

UTAUT

The unified theory of acceptance and use of technology (UTAUT) was proposed by Venkatesh *et al.* (2003) and further extended to form the UTAUT theory 2 (Venkatesh *et al.*, 2012)). In UTAUT model the behavioural intention of individual to adopt new technology such as bitcoin depends mostly on four factors. These factors are performance expectance, effort expectance, social influence and facilitating conditions. UTAUT model as followed by UTAUT 2 has been used by different academic and research

disciplines such as information technology including digital currency (Miraz et al., 2022; Nordhoff et al., 2020; Ahmer, 2017). This study employs UTAUT model in studying the topic under scrutiny. Researchers on top of four constructs forwarded by UTAUT, they add illegal activities, security vulnerability and high price volatility as the risk and challenge factors for adopting cryptocurrency in Tanzania.

2.2 Research Framework

Performance Expectance and the Intention to Use Cryptocurrency

Venkatesh et al. (2003) defined the term performance expectance as the belief that using a particular system will improve individual performance. Individual will consider that cryptocurrency financial technology has performance expectance if the technology will help to speed up transactions, make transactions at low cost, increase revenue and be a good investment (Chao, 2019; Nordhoff et al., 2020; Venkatesh et al., 2012). Some studies have found positive association between performance expectance and the intention to use cryptocurrency (Miraz et al., 2022). According to Nadeem et al. (2021) scholars pointed that for cryptocurrency technology to be adopted quickly it is very important to remove technological entry barriers. Cryptocurrency network involves the use of digital wallets that works on computer devices such as smart phones, laptops or desktops and special purpose hardware (He et al., 2019; D. He et al., 2020; Jokić et al., 2019).

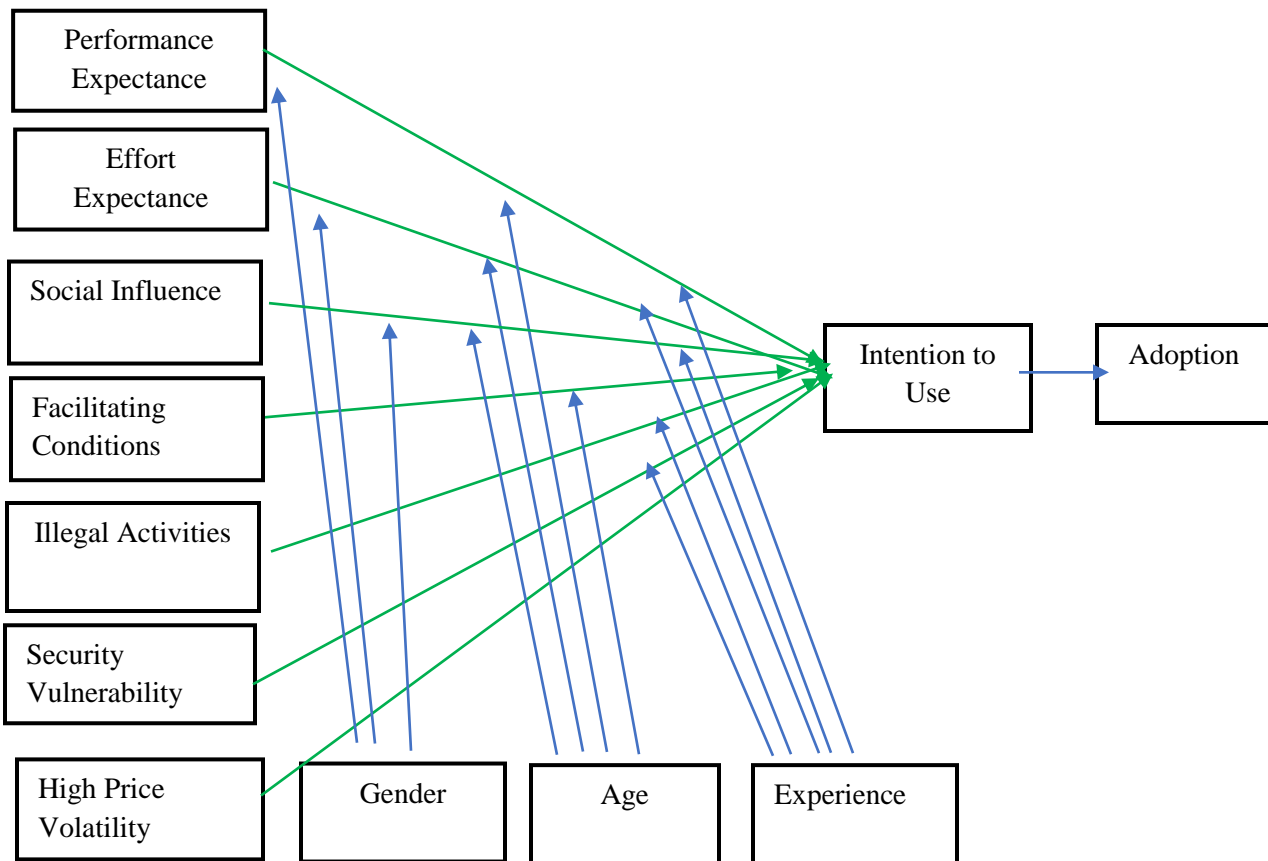


Figure 1: Study framework

Effort Expectance and the Intention to Use Cryptocurrency

Effort expectance refers to how easy the system can be used with no or less complexity (Venkatesh et al., 2003). In other words, technology such as cryptocurrency is said to use less effort if it is easy to use (Davis, 1989; Davis, 1986; Venkatesh et al., 2012). Some studies found positive relationship between effort expectance and the intention to use cryptocurrency (Chao, 2019; Miraz et al., 2022). This study consider that effort expectance will be improved if cryptocurrency users will think crypto technology can be used with less or no effort.

Social Influence and the Intention to Use Cryptocurrency

Nuryyev et al. (2020) defined the term social influence as the extent to which social groups such as family members or friends inspire an individual to use the new information system such as cryptocurrency. Social influence will be moderated by gender, age, experience and voluntariness (Venkatesh et al., 2003). An individual can be influenced by people, senior management or the organization through their support in using such technology. Literatures shows positive association between social influence and the intention to use cryptocurrency (Nordhoff et al., 2020; Nuryyev et al., 2020).

Facilitating Conditions and the Intention to Use Cryptocurrency

Venkatesh et al. (2003) explained that technology is said to fulfil facilitating conditions if it has all necessary technical infrastructure to support the system. It further implies that users can control the system, have all necessary resources, have clear instructions on how to use the system, and system is compatible with the existing organizational requirement. In order to adopt cryptocurrency such as bitcoin, four key stakeholders must be facilitated. These are users (cryptocurrency senders and receivers), developers (programmers), miners (who get new crypto coins as a reward for solving cryptographic puzzle in the effort of creating new blocks) and transaction validators (who ensures that the transaction has not been double spent) (Ather et al. 2021; Rehman et al. 2020). Users will depend on the blockchain database, wallet application programs, computer hardware and other actors (Jafari et al., 2018; D. He et al., 2020). Due to education gap on cryptocurrency in Tanzania, Tanzanians will also need cryptocurrency user guide and taskforce centre that will be dealing with cryptocurrency issues, among other conditions. Provided that all facilitating conditions are offered to cryptocurrency user, it is likely for such user to adopt this technology.

Illegal Activities and the Intention to Use Cryptocurrency

Cryptocurrency has been narrated to support criminal activities such as drug trafficking, tax evasion, corruption, crypto-jacking, fraud, illegal weapons, terrorism and money laundering (Kethineni & Cao, 2020; Taylor, 2021; Mariana, 2021; Barone et al., 2019; Kidunda & Pastory, 2021; Buttigieg et al., 2019; Limba, 2019). According to Kethineni and Cao (2020), bitcoin is leading in supporting illegal activities. Reuters, (2022) elaborated that cryptocurrency related crime involved illegal addresses that received \$14 billion last year. Although, Chainalysis Team, (2022) found that only 0.15% cryptocurrency transaction volume of the year 2021 was related to illegal transactions, Lennon, (2021) found that in the year 2020, a total of \$10 billion transaction volume which is equal to 0.34% was involved in illegal activities. In addition, it is estimated that the global annual GDP is connected to 2% to 5% (\$1.6 to 4 trillion) of the money laundering and illegal activities which is very small percentage compared to money laundering and illegal activities generated from fiat currency (Lennon, 2021). All these mixed thoughts can reduce the confidence level of central banks and users of cryptocurrency from finding the perceived usefulness and benefits of this cashless financial technology.

Security Vulnerability and the Intention to Use Cryptocurrency

Security is defined as the circumstances, events and conditions that may cause economic hardship to network resources or data in terms of restrictions, disclosure of data, modification, violation of privacy, abuse, fraud and denial of service (Nadeem et al., 2021). According to Sadowsky et al. (2003) security is required because of the value of hardware equipment and software programs, business data, personal data and computer criminals. They further elaborated that malicious software such as virus, worm, trojan horse, bonus software, modification software, backdoor software, keyboard loggers, plug-ins and Add-ons are designed to damage, disrupt computer system or cause financial theft.

Santhanamery & Ramayah, (2018) defined security as the protection of data from unauthorized access or unlawful alteration. Based on the study done by Trozze et al. (2022), users of cryptocurrency will need to overcome several risks and challenges including fake wallets, ransomware, mining malware (crypto jacking), pump and dump, market manipulation, fake initial coin offerings (ICO), identity theft and fraud. Ng & Griffin (2018) explained that national cryptocurrency can negatively affect central banks in terms of security, data privacy, governance and in the case of global financial crisis situation. Moreover, banks may incur loss due to some corporate customers to opt using the national cryptocurrency which doesn't depend on banks. In addition, national cryptocurrency may replace local payment providers such as PayPal, Visa and the Society of Worldwide Interbank Financial Telecommunication (SWIFT) which further negatively affects employment.

Cryptocurrency security involves three layers namely; protocol, exchange and personal wallet (Novikov, 2018). Protocols are hard to hack while wallets are too distributed, that's why hackers target exchanges because they consist of thousands of accounts and huge amount at once. Generally, in the year 2021 alone, the decentralized financing (DeFi) caused investors to incur a loss of more than 10 billion US Dollars due to cryptocurrency hackers and other crimes (Wilson, 2021; Browne, 2021). The report explained that, regulators are now paying attention to these decentralized finances after the Binance crackdown (ban) in some countries due to failure to comply with fiat currency policies (CNBC, 2021).

High Price Volatility and the Intention to Use Cryptocurrency

Miraz et al. (2022) and Reuters (2021) recommended that Bitcoin which is the most known cryptocurrency faces the risk of high price volatility. This volatility characteristic causes instability and lack of integrity to the banking and financial ecosystem. After Salvadorians president announced bitcoin as a legal tender, the International Monetary Fund (IMF) and the governor of the bank of England (BOE) were negative to the decision. According to Reuters (2021) IMF stated that due to high price volatility that bitcoin has, using it as a legal tender may result into financial instability, lack of consumer protection and financial integrity. On the other hand, other experienced individuals like the Governor of Bank Of Britain expressed their worries regarding the decision and their main worry was based on if Salvadorians understand the nature and volatility of bitcoin (Helms, 2021b). For example, on 31st December 2021 1BTC reached \$48,300 just for short time. On 24th January 2022 1 Bitcoin dropped to \$33,330 (CoinMarketCap, 2022). Figure 2 shows the Bitcoin price fluctuation. The above arguments lead to our last hypothesis.



Figure 2: High Price Volatility of Bitcoin. Source: (CoinMarketCap, 2022)

3. Methods

3.1 Study Area and Population

The study was conducted in Dar es Salaam and the target population was of informal traders, BOT workers, bankers, potential persons who are aware of Cryptocurrency. Being number one business hub in Tanzania, with a collection of so many educated individuals with knowledge on cryptocurrency, Dar Es Salaam was a better choice for this study to be conducted. Apart from having many cryptocurrencies well-versed individual and traders, the city still hold numerous BOT officials, and acts as headquarters to many commercial banks in the country. Thus, it was considered a perfect point from which the required participant and data was obtained.

3.2 Research Design and Approach

We employed a mixed methods approach in this study. Accordingly, the use of this approach allowed us to collect both qualitative and quantitative data in the same study. Through this approach, we were in a better position of addressing weaknesses of each individual methodology while capitalizing on the strength of one another. The use of a mixed research approach allowed us to corroborate supplement and validate data obtained from individual research method, thereby making the study more valid and strong (Shorten & Smith, 2017) In this, the researchers were in better position to collect data on peoples' knowledge, feelings, perceptions and opinions over the adoption of cryptocurrency and anticipated risks and challenges. The qualitative embedded (nested) design was used in this study as proposes by Creswell, Plano Clark, Gutmann, and Hanson (2003) and Greene and Caracelli (1997). With this design, the researchers collected quantitative dataset and for further interpretation collected qualitative data from well informed individuals. This was done to validate findings obtained in the quantitative part of the study. Thus, quantitative findings were primary and dominant, yet qualitative findings were secondary and nested in Quantitative data but helped in data interpretation and conclusion drawing (Creswell & Pablo-Clark, 2017)

3.3 Sample Size

Based on the nature of the study, the study recruited 100 respondents from commercial banks, BOT, potential traders, and anticipated users of cryptocurrency in Tanzania. Researchers determined the sample size based on the nature of the population from which the sample was drawn. Because the nature

of the population was regarded to be infinitive, 100 respondents were considered to be enough in making a thorough analysis and being a representative of the population. According to Nirathron (2006) for unknown population, a sample of 100 is sufficient to be a representative of the population. While respondents from BOT were sampled purposively, respondents from commercial banks were obtained conveniently. Based on the nature of the study and the requirement of respondents, other respondents were obtained by snowball. In general, we obtained 10 respondents from the central bank (BOT), 30 from commercial banks, and 30 from traders and anticipated users respectively. The BOT respondents were recruited purposively because of vast knowledge, information and experience regarding cryptocurrency and blockchain business. Respondents understand the weaknesses of convenient sampling in generalizing data, thus, following suggestions from Chandler and Shapiro (2016) researchers used different groups of individual and methods upon which individuals were sampled. This ensured that the possibility of having a biased generalization is tamed down.

3.4 Data Collection and Analysis

The data was collected using a Likert scale questionnaire administered to 100 respondents. The questions were centred on readiness to use cryptocurrency, anticipated risks and challenges in case the system is adopted. Under each aspect, there were four statements. For instance, under readiness, a statement like, *'ICT personnel are competent to handle troubleshoots in cryptocurrency transactions'* was used. Regarding risks, statements like, *"Increased volatility"* and *"Difficult to manage loan portfolio"* were used. On Challenges, researchers used statements like, *"Cryptocurrency transactions are complex to execute"* and *"Regulatory landscape of cryptocurrency is uncertain"*. From these statements, respondents were required to show their level of acceptance or rejection based on a five-point Likert scale where 1= Strongly disagree and 5= Strongly agree. These were administered by the researcher based on Drop on and Pick Up (DOPU) where the researchers dropped questionnaires to respondents, left them there and picked them later. This allowed respondents to fill them independently without any researchers' intervention. With regard to qualitative data, researchers conducted In-depth Interviews with officials from the central bank of Tanzania. Their interview was focused on how prepared are they, the regulatory framework regarding the use of cryptocurrency and other anticipated challenges. Interviews were held in Dar es Salaam at BOT offices following the schedule each officer had given to researchers. Each interview lasted up to 20 minutes.

Quantitative data obtained was entered in SPSS, organized, cleaned before any analyses were done. These data set was analysed descriptively where descriptive data on the demographic characteristics were obtained. Further analysis was conducted to determine the level of people's readiness, potential risks and unveil challenges anticipated after adopting the use of cryptocurrency. To ensure the validity and reliability of the tools, a pilot study that involved 10 respondents was done. The pilot was done with people who did not participate in the main study. This provided researchers with insights regarding weaknesses of the study tools and identified weaknesses were cleared. We ensured that data were collected after official permission was granted to respective organizations and all respondents were informed of the aim of the study and expected outcomes. With regards to qualitative data, content analysis was used. Data collected through interviews was subjected to tables through which coding was done and important cods that yielded in contents were identified contents were enumerated based on predetermined categories and in a systematic and replicable manner (Bryman, 2012).

4. Findings and Discussion

4.1 Demographic Characteristics of Respondents

We thought of determining the demographic characteristics of participants in this study. These characteristics serves to inform the audience the nature of respondents and what to expect out of their

characteristics. In Most cases demographic characteristics including experience and level of education explain the nature of responses obtained in the study and the quality of data therein. In this study, the demographic characteristics are portrayed in Table 1.

Table 1: Demographic Characteristics Of Respondents, N=100

VARIABLE	Category	Frequenc y	Percentage
GENDER	Male	60	60.0
	Female	40	40.0
AGE	18 - 25 years	8	8.0
	26-35 years	36	36.0
	36-45 years	28	28.0
	Above 45 years	28	28.0
EDUCATION	Diploma	4	4.0
	Bachelor degree	48	48.0
	Masters degree	44	44.0
	PhD	4	4.0
WORKING EXPERIENCE	Less than 1 year	4	4.0
	1-5 years	32	32.0
	6-10 years	36	36.0
	Above 10 years	28	28.0

Table 1 presents demographic information of the respondents involved in this research data. As depicted in Table 1, male made up a large part of the sample (60%) while female made up the remaining 40%. This implies that there is great dominance of males in different working sector. However, the 60% and 40% reality signify that the level of disparity between men and women in jobs is decreasing days after the other. With regards to age, the dominant age group of the respondents was 26–35 years (36%), with the next largest number of respondents being aged 36–45 (28%). Age groups of 36-45 years and those above 45 years each made 7% of the sample respondents respectively, while 8% were between 18-25 years. This implies that, in respect to cryptocurrency, the young generation in interested and is practicing and willing to participate as compared to the old generation who in most cases, apart from trust and security issues, mastery of computer-based systems is a great challenge to them. The age group relates to the working experience which shows majority are in the mid-career of 6-10 years (36%) as well as above 10 years (28%). This implies that the study used a mixture of inexperienced and well experienced individuals. It may be inferred that the young generation may be inexperienced with around 1-5 years of working experience.

4.2 Readiness to Adopt Cryptocurrency

This was the first objective of the study. It was meant to find out the level of users’ readiness to using cryptocurrency. Readiness to adopt cryptocurrency was determined by analyzing the responses from the sampled respondents on the key constructs that relates to readiness. Questions were based on the 5-point Likert scale, where by 1=strongly disagree, 2= disagree, 3=Neutral, 4 =agree and 5= strongly agree. Findings are presented in Table 2

Table 2: Readiness to adopt cryptocurrency

Descriptions	1	2	3	4	5	Total
The existing technology can support the cryptocurrency transactions	8 8%	32 32%	24 24%	20 20%	16 16%	100 100%
ICT personnel are competent to handle troubleshoots in cryptocurrency transactions	4 4%	16 16%	40 40%	24 24%	16 16%	100 100%
We have effective risk management guidelines to safeguard cryptocurrency transactions	12 12%	32 32%	24 24%	20 20%	12 12%	100 100%
We have stable internet to support cryptocurrency transactions	16 16%	36 36%	28 28%	12 12%	8 8%	100 100%

Table 2, presents findings in relation to the readiness to adopt cryptocurrency. Majority of the respondents 32% indicated that the country’s existing ICT infrastructures are not supportive of the cryptocurrency adoption. This was also observed during the interview where respondents were of the opinion that at the moment the existing infrastructures in most parts are outdated and inadequate and thus cannot handle full adoption of the cryptocurrency transactions. Similarly, 52% of respondents (36% disagree and 16% strongly disagree) were of the view that stability of the existing internet cannot handle cryptocurrency transactions. Just like many other technology-driven systems, their adoption has taken time to be realized in the Tanzanian context because of internet connectivity. This implies that the system will only bear meaning in urban centers where there is strong internet connection. If adopted, then, it will be difficult to facilitate the flow of cash to people in remote localities. This was also observed during the interview, where it was noted that there are several reported incidences of internet disruptions and unstable internet across different organizations. This may defect full adoption of cryptocurrency transactions unless the adoption is done in phases. Regarding the risk management practices, most respondents (32%) opined that the practices and guidelines are not strong enough to support the adoption of the cryptocurrency transactions. In the sense that, this is the reason as to why back then it was allowed but at trader’s discretion and risk. During an interview, one participant was quotes saying: “...we currently have no regulatory framework governing the use of any form of cryptocurrency. Adopting it with no clear laws and protocols attracts more challenges to our financial sector”.

Moreover, regarding adoption in connection with available IT personnel, majority of respondents seem to see the potential of the ICT personnel. They (40% of respondents) believed in the competence if their IT personnel to handle and troubleshoot any problems regarding cryptocurrency in case they happen. On this note however, there were several respondents who maintained their neutral stance on the same issue. Having 40% of respondents with such stance means that they are not sure if IT personnel have that capacity. This raises a concern. Are IT personnel well versed with skills to troubleshoot any cryptocurrency related challenge? During an interview, it was mentioned that because cryptocurrency is a new thing in the Tanzanian economy, it may as well be new to IT personnel. The results suggest that the rate of readiness to adopt cryptocurrency is still very low. Findings suggest that the ICT infrastructure and IT personnel, absence of laws and regulations are issues of great concern that raises the level of skepticism among anticipated adopters of the system. Results on the readiness are consistent with findings by Pastory& Mahwera, (2023) who found that there is low readiness of bank sector towards adoption of cryptocurrency. Also, findings are in support of the studies by Kosgei (2020) and Rejeb et al. (2022) who reported that the level of readiness among people countries and organizations is still low. In the same way, studies by Berger (2016) report that the adoption of cryptocurrency is still low in South Africa as people are not ready for the system. Moreover, Johnston and Walton (2018) report that even if there are

no regulatory challenges in south Africa, the adoption of cryptocurrency is still reported to be a mystery. In relation to these findings, studies by Ham et al. (2015) and Steyn (2018) report that because there are many cases of IT related crimes in the contemporary financial sector, bringing more internet based financial systems lowers people’s readiness to adopt it. They connect it to the prevailing crimes and seem themselves vulnerable and potential future victims of cyber-crimes through cryptocurrency. In line to the UTAUT theory, security and facilitating conditions are vital in the adoption of any technology. Thus, in the situation where facilitating conditions including IT infrastructure and personnel are poor, readiness to adopting the technology (cryptocurrency) is low (Venkatesh et al., 2003).

Risks in Adoption of Cryptocurrency Among Banks

This was the second objective of the study. In this objective the researchers were focused at the potential risks that may arise as a result of adopting cryptocurrency and blockchain. Just like any other new system, its adoption attracts a number of various challenges. Researchers intended to look into these challenges so that they can open eyes to the financial sector, users and local traders as the system is just opening its doors in the country. Findings regarding potential risks are presented in Table 3.

Table 3: Risks in the adoption of cryptocurrency

Descriptions	1	2	3	4	5	Total
Increasing volatility	4	12	24	40	20	100
	4%	12%	24%	40%	20%	100%
Difficult to manage loan portfolio	8	16	24	36	16	100
	8%	16%	24%	36%	16%	100%
Banks are exposed to security risk with adoption of cryptocurrency	8	20	24	36	12	100
	8%	20%	24%	36%	12%	100%
Customers are not fully aware of the cryptocurrency transactions	12	12	20	40	16	100
	12%	12%	20%	40%	16%	100%

Findings as depicted in Table 3 indicate several issues regarding potential risks in the adoption of Cryptocurrency. In the first instance the increasing level of volatility was considered to be of greater risk. Findings show that 60 5 of respondents’ regard cryptocurrency to be more volatile This is considered to be risk in banking operations as currency might not remain a stable investment vehicle over time and will negatively affect the performance of the banks. During the interview, some respondents further explained that the volatility and instability of cryptocurrencies can exacerbate the credit and liquidity risks from loans provided to banks, which would lead to losses and liquidity concerns at the related banks. These findings are in line with those of Miraz et al. (2022) who reported that among the greatest risks of adopting cryptocurrency is that it is prone to volatility. Such a situation creates difficulty in determining the real value of assets and the economy in general. Moreover, a study by Schupp and Festa (2018) indicate that the great risk of cryptocurrency adoption is its high rate of value volatility. Several other scholars (Omane-Adjepong et al, 2021; Zhu et al, 2021; Carrick, 2016) report the risk of volatility. In general, it is likely to be hard for people to invest in something considered to be volatile like cryptocurrency.

Considering the reality that the great business of banks to manage loans and make profits out of them, the presence of cryptocurrency posits a great risk regarding the management of loan portfolio. Findings indicate that 52% (36% agree and16% strongly agree) are in agreement that, the adoption

cryptocurrency will cause difficulty in managing loan portfolios. The idea stems from the reality that different from fiat currency, the management of loan portfolio in form cryptocurrency will be a great risk. Moreover, the greatest risk of all is causing the downfall of profitability of banks and bankruptcy at the end. This was supported by some arguments raised during the interview where one of the officials said: *"...the risks associated with loan provision was emanating from those loans collateralized by crypto portfolios whose value is volatile... you cannot know the exact value of these loans"*. Such loans are difficult to manage and may lead to losses to the banks. These findings are contradicting with those given by various scholars (Chao, 2019; Nordhoff et al., 2020; Venkatesh et al., 2012) who note that, cryptocurrency will be considered economically and financially performing well if it lowers transaction costs and facilitates investment. However, in the case of the value of loans being more volatile, it leads to losses rather than profits in loans.

Findings are further giving a narration that the adoption of cryptocurrency puts financial institutions on the risk of being vulnerable to security issue. Findings depict that 48% of respondents were of the opinion that banks are exposed to security risk with adoption of cryptocurrency. There is always a risk related to consumer protection, privacy, and cybersecurity in the adoption of cryptocurrencies. It is reported in most cases that users of any system, and most especially relating to money, will be conscious about security. They do not want to be victims of internet-based system related crimes. It was noted during the interviews, a participant clarified that because of having less regulations it is easier for fraudulent transactions to occur especially when involving peer-to-peer payments. Although Lukiyanchuk et al. (2020) and Van Loo, (2019) confirm that that online platforms through which cryptocurrency runs are secure, several concerns have been noted. Trozze et al. (2022) warn that users of cryptocurrency will need to be vigilant on security issues including fake wallets, ransomware, mining malware (crypto jacking), pump and dump, market manipulation, fake initial coin offerings (ICO), identity theft and fraud. A study by Ng & Griffin (2018) as supported by Alzahrani and Daim (2019) affirms that adopting a national cryptocurrency can negatively affect central banks in terms of security, data privacy, governance.

Another risk as viewed by majority of respondents relates to the awareness to this new technology among the customers. Majority of respondents (40%) thought that customers are not fully aware of the cryptocurrency transactions. This may have an implication on the adoption of the technology and may result to fewer transactions which will reduce the profitability of the banks. The findings obtained in this study are in line with the study of Al-Amri et al. (2019) which reports that among other important risks and success factors for the adoption of cryptocurrency in the economy, knowledge and awareness are vital. Similarly, an earlier study by Gibbs and Yordchim (2014) conducted in Thailand revealed that low awareness of people is a great risk in case cryptocurrency is adopted in the economy.

In general, although there is a need of adopting cryptocurrency in the Tanzanian economy due to external forces and technological advancement, the study provides several risks that might come around after its full adoption. This implies that, responsible organs including the central bank, have to take serious cautions before allowing the full operation of cryptocurrency in the country's economy. Cautious steps need to involve serious efforts of minimizing or totally eliminating awareness, security and volatility aspects of the currency.

Potential Challenges of Adopting Cryptocurrency among Banks in Tanzania

Apart from risks identified by researchers in the previous objective, it was considered important to look into challenges of adopting cryptocurrency in the Tanzanian economy in the contemporary moments. The idea behind this was that, following the adoption of any new system, there are challenges that are normally reported. Thus, it was considered important to anticipate potential challenges before the system is adopted. This might give an insight to the central bank on what to do first to level the ground. Findings are depicted in table 4.

Table 4: Challenges of Cryptocurrency Adoption

Descriptions	1	2	3	4	5	Total
Cryptocurrency transactions are complex to execute	4 4%	12 12%	24 24%	40 40%	20 20%	100 100%
Regulatory landscape of cryptocurrency is uncertain	4 4%	16 16%	24 24%	40 40%	16 16%	100 100%
Cryptocurrency transactions are prone to criminal activities	8 8%	20 20%	24 24%	36 36%	12 12%	100 100%
Customers do not trust cryptocurrency transactions	12 12%	12 12%	16 16%	44 44%	16 16%	100 100%

Findings as given in Table 4 provide different respondents' opinions regarding the given statements. With regards to Complexity of the system, findings report that 60 % of respondents agree that it is difficult to execute cryptocurrency transactions. This implies that, it is only those with vast knowledge and IT skills that might be familiar with the transactions. Cementing this, during the interview session, a participant confirmed that: "...the process involved in buying, storing, and using cryptocurrencies is complex for many people...". As a result, the banks may find it difficult to adopt for the fear of losing out on customers.

Another challenge that received attention of the respondents was on the uncertainty of the regulatory framework. Due to such regulatory uncertainty, banks as potential adopters and other businesses considering incorporating cryptocurrencies into their operations find it a challenge to adopt. This view is consistent with about 56% (40% agree and 16% strongly agree) of respondents as shown in Table 4. About 48% of the respondents also opined that Cryptocurrency transactions are prone to criminal activities. There are always challenges in using digital wallets to store cryptocurrency holdings as there are risks of theft and hacking. Lack of trust among customers on cryptocurrency transactions is viewed to be a challenge by about 60% of the respondents.

In general, these challenges outlined in this study are in line with others outlines elsewhere in the world by various scholars. For instance, the UTAUT model, give it that a new technology is considered to use less technology if and only if it is easy to use, otherwise it is difficult and will not be adopted (Davis, 1989; Davis, 1986; Venkatesh et al., 2012). Moreover, in another study by Chao (2019) and Miraz et al. (2022) it is revealed that easy systems are easily adopted and there is a positive relationship between easy to use and intention to use cryptocurrency. Thus, with a greater percentage of people with limited skills on transactions through cryptocurrency, there is a great possibility of banks and other financial sectors to lose their esteemed customers after full adoption of the technology.

Regarding criminality and cryptocurrency, findings report what was reported before. In line with various scholars (Kethineni & Cao, 2020; Taylor, 2021; Mariana, 2021; Kidunda & Pastory, 2021; Limba, 2019), cryptocurrency has been associated to drug trafficking, tax evasion, corruption, crypto-jacking, fraud, illegal weapons, terrorism and money laundering. Moreover, a study by Kethineni and Cao (2020) add that, bitcoin is leading in supporting illegal activities. Other scholars (Eaddy, 2019; Vital, 2023; Sukumaran & Bee, 2022) associate cryptocurrency to terrorism and other forms of crimes around the world. This indicates that, the adoption of the system is an invitation to various cases of criminal challenges in the financial ecosystem.

In general findings provide a bitter reality that even though times call for the adoption of cryptocurrency in the financial ecosystem, however, it vital to note that security issues, trust among users, complexity of the system and absence of regulatory framework will not only lead to challenges in the use,

but also in who benefits what when and how. Moreover, the adoption of such currency will not only lead to financial security issues but also crimes and multiplicity of illegal activities including terrorism.

Conclusion

In this study we investigated the possibility of adopting cryptocurrency in the Tanzanian financial ecosystem. The intention was to determine people's readiness, potential risks and anticipated challenges. We employed mixed research with Qualitative embedded design. The study has revealed that readiness of adopting cryptocurrency in that banking sector in Tanzania is still low, owing to doubts over the ability of the existing technology to support the cryptocurrency transactions, absence of effective risk management to safeguard cryptocurrency transactions as well as absence of reliable and stable internet to support cryptocurrency transactions. Similarly, the study has shown there are risks associated with adoption of the cryptocurrency among the banks and there are several challenges that are associated with such adoption. Through this study, we conclude that Tanzania's financial system, following potential risks and anticipated challenges, might be ready to adopt the currency in future after the outlined risks and challenges have been tamed down. Thus, we recommend to the central Bank of Tanzania, financial institutions among others that, it is high time to propose the enactment of laws to govern cryptocurrency related transactions. In the same vein, it is high time for the same institutions to urge for changes in the curriculum in higher learning institutions to accommodate aspects of cryptocurrency in their courses and most especially among IT and finance related courses. We in this paper also put it clear to the central Bank of Tanzania that, cryptocurrency, good as it is, should only be adopted after areas posing to be risks and anticipated challenges are clearly clarified and levelled

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