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Assessment of readiness of cryptocurrencies usage in Tanzania using Extended Unified Theory of Acceptance and Use of Technology

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Abstract: Cryptocurrencies are decentralized currencies based on blockchain technology which allows recording and transactions without the need of a trusted third party. Blockchains are distributed ledgers that are managed and maintained over a peer-to-peer network relying on cryptography, hash functions, time-stamped logs, and consensus protocols. Bitcoin was the first cryptocurrency that came into existence in 2008, today there are over nine thousand cryptocurrencies in the crypto market. Despite the large number of cryptocurrencies, the user penetration rate is only at 11% all over the world and only at 1.26% in Tanzania. The purpose of this study was to investigate the readiness for the usage of cryptocurrencies in Tanzania using the Extended version of the Unified Theory of Acceptance and Use of Technology. Data was collected using a questionnaire, purposive sampling, and snowballing technique was employed in data collection. The descriptive and inferential statistics of percentage mean were used to answer the research questions. The results show readiness for cryptocurrency usage is affected by facilitation conditions, in the government does not regulate individuals perceive that there is insufficient infrastructure to support cryptocurrency usage, cryptocurrency is not safe to use because the government does not regulate it, the concerns of data breaches and lack of reliable support by cryptocurrency platforms. Performance expectancy, social influence, and hedonic factors positively influence the readiness for cryptocurrency usage. Also, the results show that a large Tanzania population is unaware of cryptocurrency. The study recommends that the government should come up with policies and frameworks that will help regulate cryptocurrency usage and tax collection, thus enabling Tanzanians to benefit from cryptocurrencies and blockchain technology opportunities.

Keywords: Blockchain, Cryptocurrencies, Readiness, Tanzania, UTAUT2

1. Introduction

Unlike conventional digital currency, cryptocurrency is a decentralized currency with no third-party intervention, aiming to enable people to exchange value and conduct transactions without trusted third parties such as central banks (Härdle et al., 2020). Cryptocurrencies are based on blockchain technology, distributed ledger systems that allow the recording and tracking of transactions and assets over peer-to-peer networks (Raza, 2022) thus allowing trust management in transactions between unknown parties (Alam et al., 2021a). Blockchains can be permissionless allowing anyone to join and participate or permission base where only selected members are allowed to join and participate (Bakos & Halaburda, 2023; Solat et al., 2021). Blockchains rely on cryptography, hash functions, timestamped logs, and consensus protocols.

Cryptocurrencies use different mechanisms in generating hash functions and consensus protocols (Johar et al., 2021a; Karame, 2016). Bitcoin uses the SHA-256 hash function and proof of work for consensus protocol. A block is added to the ledger (Blockchain) once it is validated by the majority of nodes in the network, offering an agreed record of truth to distrusting nodes in the system (Alqahtani & Algarni, 2023; Verma et al., 2022).

Bitcoin cryptocurrency was introduced by Satoshi Nakamoto in 2008 (Satochi Nakamoto, 2008), and the first transaction of Bitcoin was done in 2009. Since then, the cryptocurrency market has expanded rapidly. Bitcoin has the largest market share of cryptocurrency market capitalization of $ 1.3 trillion by March 2024 (Coinbase, 2024). The projected revenue in the cryptocurrency market Worldwide is estimated to reach US$56.7bn in 2024 while the user penetration rate is estimated at 11.05% in 2024 (Statista, 2024).

Although cryptocurrencies have no intrinsic value (Jariyapan et al., 2022a), they have proved to have the potential to facilitate fast transfer and it takes less time to transfer money using cryptocurrency than using fiat currency (García-Corral et al., 2022; Grossman, 2022). Furthermore, cryptocurrencies allow for privacy and security in consumer spending (Zaza et al., 2021). Using cryptocurrency allows transparency of transactions while ensuring non-revisable transactions. Adoption of cryptocurrency has the potential to increase financial inclusion to a wider unbanked population (Agbo & Nwadialor, 2020), this is because cryptocurrency is a trustless system that does not require a trusted third party such as banks and does not require to comply with minimum Know Your Customer (KYC) provision which is necessary for financial institution risk assessment (Șcheau et al., 2020; Alam et al., 2021b). Users need to only have accounts in digital wallet platforms to make payments anywhere in the world. According to UNDP, sub-Sahara Africa can leverage the higher penetration of mobile phones to access cryptocurrency solutions, which facilitate cheap, easy, and fast transfer of digital payments (Liu Ankun et al., 2022).

This study aimed to investigate the attitude of people in developing countries, particularly Tanzania, towards cryptocurrency usage. Cryptocurrency individual usage is approximately 11.05% all over the world while the proportional usage of cryptocurrency by individuals in Tanzania is only at 1.26% (STATISTA, 2024). Thus, this study aims to find the readiness for the usage of cryptocurrencies in Tanzania using an Extended version of The Unified Theory of Acceptance and Usage of Technology (UTAUT2). This study will help understand how individuals perceive cryptocurrencies and their usage. This article is organized into six parts, the first part is introduction, the second part is literature review, the third part is methodology used, forth part is presentation of data collected, the fifth part is discussion and the last part is conclusion and recommendation.

2. Literature review

2.1. Background

Cryptocurrencies are virtual currencies based on blockchain technology and are traded in unregulated market (Sridevi & Thangaraj, 2024). Blockchain is a read and append-only distributed ledger system, that can be utilized to verify and ensure the integrity of data and prevent tampering of previously verified records (Solat et al., 2021). Bitcoin cryptocurrency utilizes Proof of Work consensus algorithm that allows transactions to be verified by multiple nodes in the network without the need for a central system. Proof of work solves difficult computational pulse that require a lot of electricity (Liu Ankun, 2022), the computation is difficult to solve but easy to verify. The high energy consumption poses a question of sustainability in adoption of blockchain cryptocurrency in Africa (Mbaye, 2021). Apart from the Bitcoin blockchain Proof of Work consensus mechanism there are other consensus mechanisms such as Proof of Stake which is utilized by Ethereum, Proof of Elapsed Time, Proof of Space, Proof of Retrievability, and many others (Corso, 2019; De Angelis et al., 2018; Gramoli, 2020; Johar et al., 2021b; Li & Zuo, 2019; Macdonald et al., n.d.; Miller et al., n.d.; Muratov et al., 2018).

According to Investing.com (2024) over nine thousand active cryptocurrencies are being traded in Crypto market. Cryptocurrencies have been received and viewed differently by different nations. Taiwan, China, Canada, and India view cryptocurrency as commodity, Mexico and Honduras as virtual assets, and Thailand and Argentina as digital currencies. Italy as Cyber currency, Israel as assets, Lebanon and Colombia as electronic currency, and Switzerland as token payment which is taxed as a foreign currency (Șcheau et al., 2020). As of June 2024, El Salvador was the only country in the world that accepted Bitcoin as a legal tender (The Investopedia Team, 2024). Cryptocurrency allows easy transfer of money by using platforms such as Binance or Kenyan BitPesa that allow individuals to create digital wallets. With these

digital wallets user can make payment and transfer money to anyone in the world.

Extended Unified Theory Acceptance and Usage of Technology (UTAUT2) model is the extension of Unified Theory of Acceptance and Usage of Technology (UTAUT) model that was formulated by integrating elements of eight Information System models such Technology Acceptance Model, The Innovation Diffusion Theory, Theory of reasoned action, Motivational Model and the theory of planned behaviour (Venkatesh et al., 2003). UTAUT model have four determinants of technology usage in an organization setting which are performance expectancy: individual belief that the technology helps user to achieve their goals, Effort expectancy: ease of technology use, facilitation condition: individual belief in technological infrastructure supporting information technology and social influence: belief on opinion of others as a result of using information technology. Since, UTAUT was a model for an organization setting useful, in determining acceptance of technology in an organization, three more determinants were added to fit in accessing technology acceptance in an individual consumer context. Additional constructs are hedonic motivation: enjoyment when using technology, Price value: monetary cost bared while using technology, and Habit: the extent to which an individual performs behaviour automatically (Venkatesh et al., 2012).

Work by Kamau (2022) accessed the awareness and participation of college students in Kenya, the results showed that there is a higher awareness than participation among youth. The study highlighted challenges for low participation are cryptocurrency price, government regulations, transaction costs, and advice from friends. According to Arias-Oliva et al. (2019) cryptocurrencies can represent the right to an asset or liability or can be speculative based on market expectations, factors for adoption of cryptocurrency are highly affected by performance expectancy and facilitation conditions. The study by (Jariyapan et al., 2022) studies showed that computer anxiety, computer self-efficacy, and perceived ease of use are factors that influence the behavior intention of investors and business-educated people during the COVID-19 pandemic. Furthermore, Duwi, (2019) conducted a study on the adoption of cryptocurrency online trading technologies using the extension of the Technology Acceptance Model in which factors such as complexity was found to influence the ease of use and perceived usefulness of cryptocurrency online trading applications. Factors such as ease of use, the attitude of use, and behaviour intention were found to affect the adoption of cryptocurrency online trading applications.

2.2. Conceptual framework

This study employed UTAUT2, the seven constructs are used in this study to examine readiness and attitude towards usage of cryptocurrency in Tanzania.
The research questions are

i) What is the performance expectancy of cryptocurrencies usage?

ii) What is the perceived effort expectancy with the use of cryptocurrencies?

iii) What is the perceived social influence of the use of cryptocurrencies?

iv) What is the perceived facilitating condition on the use of cryptocurrencies?

v) How does pricing in cryptocurrencies affect the readiness of cryptocurrencies usage?

vi) What is perceived hedonic factors associated with cryptocurrency usage?

vii) How does individual habit affect the use of cryptocurrencies?

3. Methodology

This study followed a descriptive quantitative research method. A questionnaire was used to collect data. The questionnaire was formulated based on UTAUT2 constructs. Data collected captured demographic characteristics, education level, employment status, and participants' perceptions based on UTAUT2. This study utilized purposive and snowballing methods of sampling was utilized. Purposive sampling was utilized to identify people who are aware of cryptocurrencies and were invited to answer the question and then used as referrals to reach other people who are aware of cryptocurrency. This method was utilized to allow for full participation in answering the questionnaire. A simple random sampling technique was not utilized as a result of most people not being aware of the cryptocurrencies. Participants were sent online questionnaire using google forms and participated from different corners of Tanzania. The questionnaire used a Likert scale of five points Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree with values of

1,2,3, 4, 5 receptively. The descriptive and inferential statistics of percentage mean were used to answer the research questions using Statistical Package for Social and Sciences (SPSS) software.

4. Result and discussion

4.1. Demographic of data collected

Table 1 shows a summary of the demographic data collected. The total number of respondents was 117, 30.8% being female and 69.2% being male. The majority of responses came from people below the age of 35, with 35.9% being individuals of the age range 18-25 and 38.9% individuals of the age range 26-35.

Table 1: Summary of demographic

Variable	Classification	Frequency	%
Gender	Female	36	30.8
	Male	81	69.2
Age	18-25	42	35.9
	26-35	45	38.5
	36-45	27	23.1
	46-55	3	2.6

4.2. Awareness of cryptocurrencies

The majority of respondents were aware of cryptocurrencies, 84 respondents out of 117 responded that they were aware of cryptocurrencies while 27 respondents were not aware of any cryptocurrencies. Respondents who are aware of cryptocurrencies are aware of popular cryptocurrencies such as Bitcoin, Ethereum, Dogecoin, Litecoin, Ether, and USDT as shown in Figure 1.

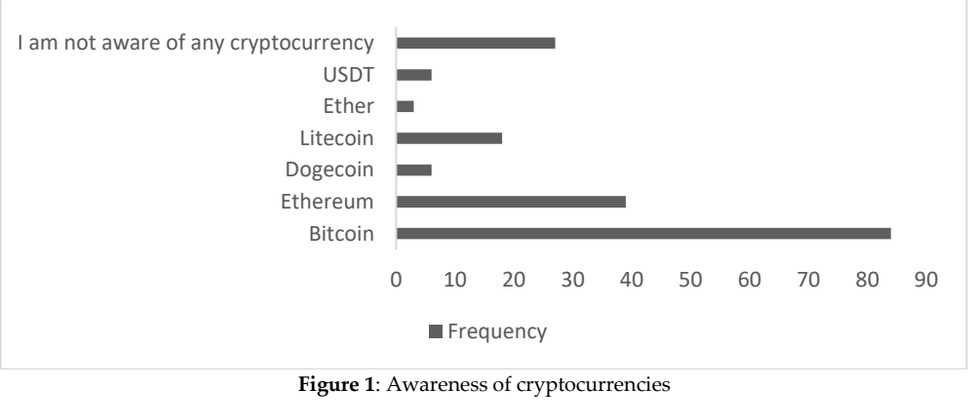

Figure 1: Awareness of cryptocurrencies

4.3. What is the Performance Expectancy in cryptocurrencies usage?

The performance expectancy of cryptocurrency usage was examined by using mean of five constructs in performance expectancy (Table 2). The average mean score of individual perception on performance expectancy is 15.93 out of a total mean score of 25. This is equivalent to 63.7% high enough to conclude that performance expectancy affects readiness in cryptocurrency usage, thus the advantages offered by cryptocurrencies makes individual to use them.

Table 2: Perception of performance expectancy in usage of cryptocurrency.

SN	Item	Mean
1	Ease of Use	3.13
2	Faster transaction process	3.16
3	Accuracy in transaction	3.24
4	Transaction records	3.29
5	Increases security	3.11
	Total	**15.93**

4.4. What is the perceived the effort expectancy with the use of cryptocurrencies?

To determine effort expectancy in readiness to use cryptocurrencies, five items were identified and used as shown in Table 3. The average total mean score is 14.74 out of 25 which is equal to 59%. This shows that there is a relative effort required in using cryptocurrency as the average item regarding the use of cryptocurrency platforms is slightly above average. This concludes that there is effort required in order to use cryptocurrencies.

Table 3: Effort expectancy in usage of cryptocurrency.

SN	Item	Mean
1	Effort is required to use cryptocurrencies	3.18
2	Easy to understand procedures and steps involved in conducting transaction	3.03
3	I find cryptocurrency platforms and user interfaces straight forward	2.84
4	Learning curve of using cryptocurrency platforms is steep	2.87
5	I am comfortable troubleshooting any issues or errors that may arise while using cryptocurrency platform	2.82
	Total	**14.74**

4.5. What is the perceived social influence of the use of cryptocurrencies?

Social influence associate with the belief on how surrounding people will views on use of technology, how is the people around contribute to the usage of technology. The social influence determinant was formed by three construct Table 4. The average total mean was 9 out of 15 which is 60%. The results shows that social influence plays a role in adoption and usage of cryptocurrencies.

Table 4: Social Influence effect in usage of cryptocurrencies

SN	Item	Mean
1	Recommendations or endorsements from friends or family members are influential in my decision to use cryptocurrency for business transactions	3.08
2	I frequently observe my peers and colleagues using cryptocurrency in their business transactions	2.95
3	I am likely to adopt cryptocurrency by seeing influential figures endorsing payment by using cryptocurrency	2.97
	Total	**9**

4.6. What is the perceived facilitating condition on the use of cryptocurrencies?

Facilitation conditions encompass the belief that the infrastructure and support required to support the technology including security issues, government regulation, and data protection are available. The facilitating condition was made of eight constructs as seen in Table 5. The average total mean score was 22.23 out of 40, which is 55.6%. This result shows that people's perception of facilitation conditions is slight low, especially on technological infrastructure and the safeness of cryptocurrencies, this could be because it is not regulated by the government as well as the reliability of cryptocurrencies platforms.

Table 5: Facilitating condition on cryptocurrency usage

SN	Item	Mean
1	There is sufficient technological infrastructure (Internet, mobile networks) for using cryptocurrency	2.38
2	I am comfortable with level of security provides by cryptocurrency platforms	2.87
3	Cryptocurrency platforms and mobile application are accessible and user-friendly	3.19
4	It is easy to find business or merchants that accept cryptocurrency in my local region	2.82
5	Cryptocurrency is not safe to use because it is not regulated by the government	2.57
6	Cryptocurrency platforms and mobile application are reliable	2.59
7	There are reliable customer support services by cryptocurrency platforms	2.97
8	I am concern with data breaches when using cryptocurrency platforms	2.84
	Total	**22.23**

4.7. How does pricing in cryptocurrencies affect readiness of cryptocurrencies usage?

Price value in UTAUT2 model associate the individual trade off in benefit of using technology and the cost of using technology. If the benefit of using the technology is greater than the cost of using them, there is a positive price value (Venkatesh et al., 2012). The price value construct was formed by three elements as shown in Table 6. The average total mean score was 8.45 out of 15 with 56%. This shows that the price value of cryptocurrency has a low influence in the usage of cryptocurrency.

Table 6: How pricing affect cryptocurrencies usage

SN	Item	Mean
1	Low charge on fund transfer when using cryptocurrency that traditional method	2.68
2	Price volatility of cryptocurrency make it difficult to conduct business using cryptocurrency	2.82
3	Price volatility of cryptocurrency require business to reprice goods and services frequently	2.95
	Total	**8.45**

4.8. What is perceived hedonic factors associated with cryptocurrency usage?

Hedonic factors consider individual motivation in using technology, it can also include experience of using the technology over time. Three items were included in hedonic factor as shown in Table 7. The average mean score total was 9.43 out of 15 which is 62.9%. The result shows that there is positive perception of hedonic factor in regard to usage of cryptocurrencies.

Table 7: Perceived hedonic factors in cryptocurrency usage

SN	Item	Mean
1	There is no third party involved in the course of transactions	3.08
2	Once transactions are committed, they cannot be revoked	3.13
3	Cryptocurrency have high potential of reducing corruption	3.22
	Total	**9.43**

4.9. How does individual habit affect the use of cryptocurrencies?

Habit effect in usage of cryptocurrency was determined using three items as seen in Table 8. The average mean total score was 8.47 out of 15 with 56.5%. The result shows that individuals who use cryptocurrency relies on cryptocurrency for fund transfer (average 3.03) and can reach for cryptocurrency applications automatically (average 3.13) which are both above average. Another interesting result shows that people do not associate use of cryptocurrency with gambling.

Table 8: Individual habit in cryptocurrencies usage

SN	Item	Mean
	Using cryptocurrency has become a habit for me	3.13
	I rely on cryptocurrency for fund transfer	3.03
	I associate cryptocurrency with gambling	2.31
	Total	**8.47**

5. Discussion

The results show that the majority of participants (71.8%) were aware of Bitcoin cryptocurrency, the finding is in line with data from Coinbase, (2024) which identifies Bitcoin as a cryptocurrency with the largest market capitalization. 23% of participants were not aware of cryptocurrencies which is higher than the 1.26% awareness level stated by STATISTA, (2024) this can be attributed to the sampling method used. Majority of those aware of cryptocurrencies identified themselves as forex traders.

There is a highly perceived performance expectation factor of 63.7% (Figure 2). Performance expectancy factors such as faster transaction process, transaction accuracy, and records as well as increased security in money transfer highly influence people to use cryptocurrencies (Table 2). The result is in line with the results of previous studies by Arias-Oliva et al., (2019) Where performance expectancy positively influences the usage of cryptocurrencies. Works by Jariyapan et al. (2022) an Sagheer et al. (2022) concur with this finding as also their results reflected that there is a positive influence of perceived usefulness in the usage of

cryptocurrencies. These results shows that the advantages offered by cryptocurrency such as reduced cost of money transmission, facilitation of cross border money transfer which takes short time with low cost and privacy offered by cryptocurrencies (Mavilia & Pisani, 2020) are among the performance expectations factors that influence the usage of cryptocurrencies.

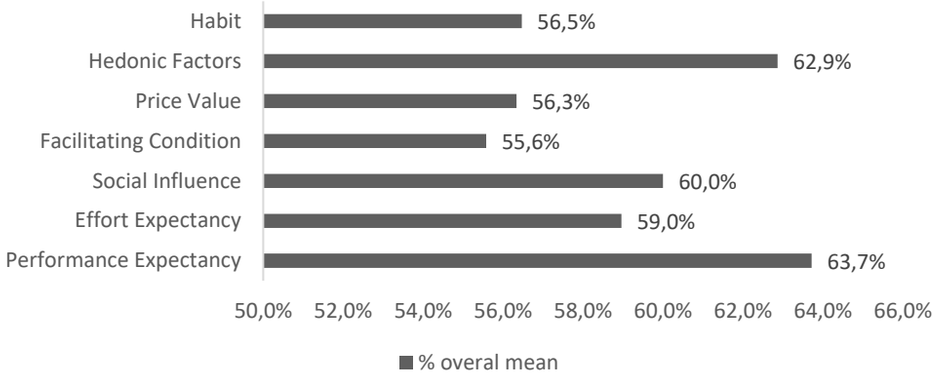

Figure 2: Percentage score of UTAUT2 determinant in readiness of cryptocurrency usage

Hedonic factor highly influences readiness to use cryptocurrencies by 62.9% (Figure 2) including lack of third-party involvement in the course of transactions, inability for the transaction to be revoked once committed, and high potential to reduce corruption (Table 7). These results can be associated with the properties of transaction immutability, transaction visibility, and transaction traceability offered by cryptocurrencies (Alam et al., 2021). Cryptocurrencies allow real-time reporting and easy auditing of financial transactions. Also, the use of smart contracts associated with cryptocurrencies has the potential for corruption reduction since some processes are automated reducing human involvement (Nwaiwu, 2021). In cryptocurrencies and blockchain applications trust is created by cryptographic information sharing with all participating nodes in the blockchain network facilitating data integrity and security (Mavilia & Pisani, 2020).

Social influence is also a contributor with 60% (Figure 2), this shows individuals are influenced by surrounding people such as friends and colleagues to use cryptocurrencies (Table 4). The results are in line with findings from the study by Kamau (2022) which highlights that advice from friends contributes to the usage of cryptocurrencies as well as studies by Robkob and Pankham (2023) which shows that social media positively influences the usage of cryptocurrencies.

Effort expectancy was at 59% (Figure 2), showing that individuals perceived that there is relative effort required in using and learning to use cryptocurrencies and cryptocurrencies platforms (Table 3). Studies by Jariyapan et al. (2022) and Sagheer et al. (2022) are consistent with this finding where they both show that factors such as easy to use and easy to learn have a positive influence on the usage of cryptocurrencies, when a system is easy to use it boosts users' confidence to use the system/ technology. On the contrary study by Arias-Oliva et al. (2019) shows that effort expectancy is neither the most influential nor critical factor in the usage of cryptocurrencies.

On habit at 56.5% (Figure 2), the result shows that participants rely on cryptocurrency for fund transfers and reach for cryptocurrency applications automatically to perform fund transfers (Table 8). The reliance of participants on cryptocurrencies could be associated with the level of trust they perceive in using cryptocurrencies, the study by Albayati et al. (2020) highlights that trust positively affects attitude towards the usage of cryptocurrencies. In another case, the result shows that there is little association between cryptocurrencies and gambling.

Furthermore, the results show that the price value at 56.3% (Figure 2) has a low perception of the trade-off of benefits with the cost of using cryptocurrency (Table 6). Factors that lead to a low perception of price value is cryptocurrencies price volatility which makes it difficult for individuals to conduct business using cryptocurrency. Since most cryptocurrencies are converted in US dollars there is a vague advantage to low charges offered by cryptocurrencies (Hairudin et al., 2022). The result by Kamau (2022) shows current price of cryptocurrencies has a negative influence on the usage of cryptocurrencies, and the cost of transactions has a positive influence on the usage of cryptocurrencies.

There is low perception on facilitation condition 55.6% (Figure 2), people perceived that there is insufficient technological infrastructure to support cryptocurrencies, cryptocurrency platforms are not safe

to use, cryptocurrencies are not accepted by local vendors, cryptocurrencies are not being regulated by the government and there is no reliable customer support offered by cryptocurrencies platforms (Table 5). Users perceive that there is high risk associated with using cryptocurrencies, this result is in line with the results of studies by Sagheer et al. (2022) and Jariyapan et al. (2022). According to Venkatesh et al. (2003, 2012) facilitating conditions are the strongest predictor of intention to use technology. Perception of facilitating condition factor highly affects the readiness of usage of cryptocurrencies despite the advantages which are offered by using cryptocurrencies (Arias-Oliva et al., 2019; Lissah et al., 2024).

6. Conclusion and Recommendation

This study was conducted to determine the readiness of cryptocurrency usage in Tanzania. This study highlighted that the majority of citizens in Tanzania are not aware of cryptocurrencies thus the purposive sampling and snowballing method of data collection needed to be employed. Those who are aware of cryptocurrencies perceive that there is not enough technological infrastructure and support to use cryptocurrency that affects their readiness to use cryptocurrencies. Other factors that affect the readiness to use cryptocurrencies are lack of government involvement, price volatility, safety issues in using cryptocurrencies, and lack of reliable customer support from cryptocurrency platforms. Other challenges associated with the use of cryptocurrency in Tanzania are the lack of legislation and regulatory framework that guide the usage and protection of customers using cryptocurrencies, most people not having internet access, and lack of knowledge of cryptocurrencies.

This study recommends that the government should take the lead in promoting the usage of cryptocurrencies by establishing a legal framework and policy that will guide cryptocurrency usage in Tanzania, facilitate tax collection, and protect users on cryptocurrency applications. Since the individual adoption rate of cryptocurrency is low all over the world, the public should be educated on cryptocurrencies and blockchain technology applications which will help in the adoption of cryptocurrencies by the masses. Once people understand the technology behind cryptocurrencies and the benefits and risks associated with using cryptocurrency, they can be in good condition to make the decisions on whether and how to adopt cryptocurrencies. Furthermore, apart from the financial sector, blockchain technology is evolving in other sectors such as agriculture, supply chain, human health, and e-commerce, the study recommends blockchain technology be added to the school curriculum, as this will help Tanzania to reap blockchain technology opportunities.

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