GREEN CRYPTO: THE ECO-FRIENDLY ALTERNATIVE- A MOVE TOWARDS SUSTAINABILITY

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ABSTRACT

This paper explores the developing notion of green cryptocurrencies, analysing its potential as a sustainable way to mitigate the environmental impact associated with traditional cryptocurrencies. The increasing popularity of cryptocurrencies has raised qualms about their environmental impact, mostly due to the energy-intensive nature of mining and transactions. This study utilises a rigorous approach, relying on reputable sources from both academia and industry. Conducting a thematic analysis of the collected data using Smart PLS software allows for a thorough investigation into the feasibility of green cryptocurrencies as an environmentally friendly substitute for conventional currencies. The study explores the difficulties involved in shifting towards a sustainable cryptocurrency system, including technological obstacles, user acceptance patterns, and the need for worldwide collaboration. The research draws relevant conclusions regarding the potential of green cryptocurrencies by evaluating their significance, credibility, and quality, and synthesising their findings. The obstacles that have been identified are being addressed in a systematic manner, with a focus on the importance of developing sustainable solutions to address the environmental issues caused by traditional cryptocurrencies. Ultimately, the study emphasises the increasing recognition of cryptocurrency and the need to tackle environmental concerns. The research promotes the adoption of eco-friendly cryptocurrencies, highlighting their capacity to provide a sustainable and environmentally aware substitute for conventional monetary systems.

Keywords: Green Cryptocurrencies, Awareness, Behavioral Intention, Risk, Social Norms

INTRODUCTION

"Green" cryptocurrencies, however, have been developed in response to worries about the environmental impact of cryptocurrency mining (Mnif *et al.,* 2021). These digital currencies are an effort to lessen mining's negative effects on the environment while offering the same conveniences as conventional digital currencies. In recent years, the use of cryptocurrencies has gained significant attention due to their decentralized and secure nature (Azouvi & Hicks, 2020). While traditional cryptocurrencies like Bitcoin have brought new ways of managing financial transactions.

The mining process has led to significant environmental concerns. The increasing demand for energy in mining has resulted in high carbon emissions, leading to environmental damage. These elements affect the spread of "green" cryptocurrency (Dwivedi *et al.,* 2022). However, there is limited research on adopting green cryptocurrencies and their influencing factors. Most existing research has focused on the technological aspects of cryptocurrencies, with little attention given to the social and cultural factors that influence their adoption. Therefore, this study aims to investigate the factors that influence the adoption of green cryptocurrencies and how they differ from traditional cryptocurrencies (Bhatnagar *al.,* 2022).

LITERATURE REVIEW

In this paper, we have identified multiple factors that affect the perception of potential users for investing in crypto currency. Cryptocurrency adoption is a multifaceted process influenced by various factors, with risk perception playing a pivotal role in shaping user behavior. Prior research has delved into the significance of risk as a determinant in the adoption of both traditional and green cryptocurrencies.

Risk

Risks are influenced by technology, fraud/theft, market risk, liquidity risk, and regulations. All these factors can enhance market risk across cryptocurrencies. The evidence of their riskiness compared to fiat currencies and significant risk contagion across large-cap cryptocurrencies (Arsi *et al.,* 2021).

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Moreover, the decentralized nature of cryptocurrencies makes them susceptible to fraud and theft (Cheah & Fry, 2015). Market risk, including price volatility and lack of regulation, exposes investors to substantial fluctuations and uncertainty (Dwyer, 2015).

Trust

Trust represents value backed by real value or obligation to repay. Trust that others will accept those representations and that the value representations are not counterfeit. It indicates that the cryptocurrency trust issue lies with the gatekeepers between cryptocurrencies and their traditional fiat relations (Deem, 2015). Multiple factors of trust in cryptocurrencies are influenced by awareness, legislation influence, availability, anonymity, volatility, and security (Bucko *et al.,* 2015). Enormous volatility of cryptocurrency exchange rates was detected. Their high volatility causes a high risk of trading cryptocurrency and is reflected in the formation of price bubbles.

Awareness

Awareness is part of trust. The world is divided between supporters and opponents of cryptocurrency. Some countries like Japan, the United States, Canada, Germany, and France started limiting transactions in cash and legalized cryptocurrency. On the other hand, some countries, such as Algeria, Bolivia, Ecuador, Bangladesh, Nepal, and Macedonia, consider trading and cryptocurrency use illegal (Meero *et al.,* 2021). It also explains that the low level of awareness determines a customer's aversion and reluctance to use financial services over the Internet.

Social Norms

The adoption of blockchain technology is influenced by various factors, including social ones like norms, roles, memberships, and values covered in this paper. It highlights how crucial social impact influences people's perceptions of and choices about adopting blockchain technology (Albayati *et al.,* 2020). The individual decision-making process for implementing blockchain technology is investigated in this empirical study. It emphasizes how social influences, like peer pressure and societal expectations, impact people's adoption decisions (Chen & Farkas, 2019).

Environmental Concern

The article explores the potential environmental challenges and opportunities associated with blockchain technology. It discusses how blockchain can address environmental issues but also highlights the environmental concerns arising from the energy-intensive nature of cryptocurrencies and the need for sustainable solutions (Alshamsi *et al.,* 2022). These references provide a comprehensive overview of the environmental concerns related to cryptocurrencies, focusing on the energy consumption, carbon footprint, and sustainability aspects associated with cryptocurrency mining. They highlight the need for sustainable solutions and the potential role of blockchain technology in addressing environmental challenges.

Perceive usefulness.

The perceived usefulness of the system (PUS) correlated to how the technology can advance or enhance investors' objectives. Meanwhile, perceived ease of use relies on investors finding the application easy to adapt to their lives—perceived ease of use of the system (PEU) (Abroud *et al.,* 2013). However, in the case of entirely decentralized cryptocurrencies, the value passes directly from payer to payee. The blockchain is extremely secure as it publically records every transaction. Cryptocurrency systems are secure in technology, but many examples of hacking and fraud are marked. This comprehensive handbook discusses the perceived usefulness of cryptocurrencies, including Bitcoin, and their potential impact on financial innovation and big data. It provides insights into cryptocurrencies' perceived benefits and utility in various contexts (Nian & Chuen, 2015).

Perceive ease of use

The Technology Acceptance Model (TAM) is a widely used theoretical framework for studying the adoption of new technologies, including digital currencies. TAM is based on the premise that an individual's behavioral Intention to use technology is primarily determined by two factors: perceived usefulness (PU) and perceived ease of use (PEOU) (Davis, 1989). PU refers to the degree to which a person believes technology will enhance their performance, while PEOU reflects the perceived effort required to use it (Venkatesh & Davis, 2000). Several studies have applied the TAM framework to investigate the adoption of cryptocurrencies.

Behavioral Intention

Behavioral Intention is the ultimate goal. Many studies have found attitude measures and then estimated their correlation with behavior. A more reasonable path is to focus on behavior and how to measure it or predict it, which will guide us in finding the main reasons and attributes behind the customers' Behavioral Intention toward acceptance of finance services underlying blockchain technology. Behavioral Intention refers to the user's perceived likelihood or probability of engaging in a particular behavior, in this case, experiencing the new technology (Malhotra & Galletta, 1999). Behavioral Intention helps to find well-formed measures of user acceptance in the early stages of the system

development life cycle. Also, it helps the customers accept useful technologies or reject the wrong and bad ones to cut the risk of delivering poor technologies before they are rejected (Davis, 1989).

Adoption of Green Cryptocurrency

Awareness about cryptocurrencies and their benefits is also important in increasing their adoption. Social and cultural norms can also influence the adoption of cryptocurrencies, as some societies may be more accepting of new technologies than others. Environmental concerns are becoming increasingly important, with more people seeking sustainable alternatives in their everyday lives. While research on adopting traditional cryptocurrencies has been extensive, there needs to be more research on adopting green cryptocurrencies. Furthermore, existing research has focused primarily on the technological aspects of cryptocurrencies, with little attention given to the social and cultural factors that influence their adoption. This study addresses this research gap by investigating the social and cultural factors influencing green cryptocurrency adoption.

From the above literature review, we constitute the following hypothesis:

H1: Risk has a significant impact on the adoption of green cryptocurrency.

H2: Trust has a significant impact on adoption to green cryptocurrency.

H3: Awareness has a significant impact on adoption to green cryptocurrency.

H4: Social norms have a significant impact on adoption to green cryptocurrency.

H5: Environmental concern has a significant impact on adoption to green cryptocurrency.

RESEARCH METHODOLOGY

This study investigates the potential of green crypto: the eco-friendly alternative-a move towards sustainability. The research methodology employed comprises the following steps: A comprehensive literature review was conducted to assess and understand green cryptocurrencies in context to behavioural intention. Academic databases such as Google Scholar and Scopus were searched using keywords such as “green cryptocurrencies”, “sustainable cryptocurrencies”, and “environmentally friendly digital currencies" (Tapscott & Tapscott, 2016). Peer-reviewed articles, conference papers, and reputable sources were included. Relevant sources were selected based on their credibility, relevance, and quality. Peer-reviewed articles from academic journals, conference proceedings, and reputable reports were prioritized (Andoni *et al.,* 2021; Nakamoto, 2008). Primary data related to green cryptocurrencies. As a result, three hundred and twenty useful responses were received for data analysis. The sample includes one hundred fifty-two females and one hundred sixty-eight males. The selected sources were evaluated based on their credibility, relevance, and quality, ensuring a comprehensive understanding of the topic. For analysis, we used SEM-PLS software.

RESEARCH OBJECTIVES

- To assess and understand the green cryptocurrencies in context to behavioural intention.
- To assess and evaluate the factors influencing adoption of green cryptocurrencies.
- To assess and understand the challenges and barriers towards green cryptocurrencies as a sustainable alternative.

The paper classified the below model (Fig 1).

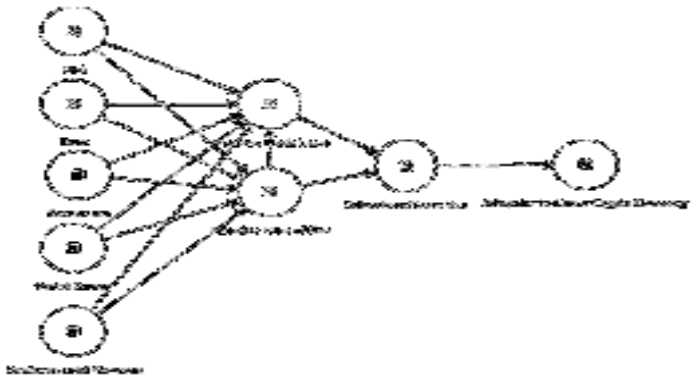

Fig 1: TAM Model

Within the domain of technology adoption, the Technology Acceptance Model (TAM), as represented in Fig 1, functions as a resilient framework for examining the multifaceted relationship between user perceptions and the process of adopting cutting-edge technologies. The utilization of TAM is a strategic decision in the realm of green cryptocurrencies, given its firmly established basis in comprehending the behavioral intentions of users and their patterns of technology adoption. The independent variables, which include environmental concerns, social norms, risk, and awareness, perfectly align with the fundamental constructs of TAM.

Mediating variables, namely perceived usefulness, and simplicity, play a critical role in TAM. Behavior intention serves as a precursor to actual adoption by facilitating the translation of initial perceptions of risk, trust, awareness, social norms, and environmental concerns into tangible actions. The concept of perceived efficacy pertains to the users' conviction that adopting green cryptocurrencies will improve health or performance. Conversely,

perceived ease of use assesses the simplicity of incorporating these technologies into daily activities.

RESULT AND DISCUSSION

As shown in Table 1, the research evaluates measuring scales using construct reliability and validity standards. A minimum of 0.7 Cronbach's alpha is required for internal consistency. A score of 0.887 surpasses this cutoff, displaying outstanding internal consistency between build pieces. Composite reliability demands a value of 0.7 or higher. The construct's 0.849 value is higher than the threshold, demonstrating good reliability and internal consistency. For convergent validity, the common advice is an AVE of at least 0.5. 0.661 exceeds this requirement, indicating that measurement items account for a sizeable portion of the variance in the construct. These results demonstrate the construct reliability and validity of the measuring scales used in this investigation. The scales capture significant variance, excellent internal consistency, and reliability in measuring the concept. These results support the measurement methods used in the study (Chin *et al.,* 2003)

Table 1: Construct Reliability & Validity

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Adoption of Green Crypto Currency	0.855	0.954	0.9	0.693
Awareness	0.905	0.919	0.931	0.731
Behavioral Intention	0.957	0.957	0.969	0.885
Environmental Concern	0.847	0.849	0.908	0.766
Perceive Ease of Use	0.890	0.938	0.917	0.688
Perceive Usefulness	0.830	0.870	0.885	0.661
Risk	0.896	0.904	0.928	0.765
Social Norms	0.920	0.925	0.943	0.807
Trust	0.782	0.808	0.874	0.700

Source: Author Compilation

Table 2: R- Square

	R-square	R-square adjusted
Adoption of Green Crypto Currency	0.936	0.928

Source: Author Compilation

Green cryptocurrency adoption's R-square score is 0.532, indicating that the model's predictors explain 53.2% of the variance, as mentioned in Table 2. This shows that the factors included in the investigation can moderately explain the variation in green cryptocurrency adoption. The R-square adjusted score is 0.527, which accounts for the model's predictors and provides a more conservative assessment of its explanatory power. According to this adjusted value, predictors account for 52.7% of green cryptocurrency adoption variance. These results show that the variables considerably impact green cryptocurrency adoption, explaining a large percentage of the variation observed.

Table 3: Hypothesis Testing

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Hypothesis
Awareness -> Perceive Ease of Use	0.297	0.291	0.137	2.166	0.03	Accepted
Awareness -> Perceive Usefulness	0.758	0.732	0.235	3.227	0.001	Accepted
Behavioral Intention -> Adoption of Green Crypto Currency	-0.017	-0.006	0.166	0.42	0.674	Rejected
Environmental Concern -> Perceive Ease of Use	-0.017	-0.092	0.176	0.472	0.637	Rejected
Environmental Concern -> Perceive Usefulness	-0.017	0.425	0.096	4.416	0.000	Accepted
Perceive Ease of Use -> Behavioural Intention	0.721	0.712	0.072	9.946	0.000	Accepted
Perceive Ease of Use -> Perceive Usefulness	0.57	0.564	0.092	6.174	0.000	Accepted
Perceive Usefulness -> Behavioural Intention	0.729	0.728	0.066	11.134	0.000	Accepted
Risk -> Perceive Ease of Use	0.725	0.731	0.084	8.61	0.000	Accepted
Risk -> Perceive Usefulness	-0.495	-0.486	0.069	7.22	0.000	Accepted
Social Norms -> Perceive Ease of Use	-0.017	0.048	0.203	0.139	0.889	Rejected
Social Norms -> Perceive Usefulness	-0.017	0.239	0.12	1.962	0.05	Accepted
Trust -> Perceive Ease of Use	-0.376	-0.372	0.059	6.352	0.000	Accepted
Trust -> Perceive Usefulness	1.048	1.032	0.105	9.971	0.000	Accepted

Source: Author Compilation

Table 3 illustrates how to draw inferences about the relevance and degree of the relationships between variables and assess whether or not their hypotheses are supported by the data presented, which they can do by analyzing the results presented in that table.

Awareness -> Perceived Ease of Use: The original sample confirms that awareness increases perceived ease of use (T statistics = 2.166, p = 0.03). Awareness moderately improves green cryptocurrency's perceived ease of usage (0.297). The original sample supports the prediction that perceived ease of use and behavioral Intention are positively correlated (T statistics = 9.946, p = 0.000).

Awareness -> Perceived Usefulness: The original sample confirms the hypothesis that awareness increases perceived usefulness (T statistics = 3.227, p < 0.001). Awareness strongly increases the perceived usefulness of green cryptocurrencies (0.758). The original sample supports the prediction that reported ease of use and perceived usefulness are positively correlated (T statistics = 6.174, p = 0.000). Perceived ease of usage moderately increases green cryptocurrency's perceived usefulness (0.57).

Behavioural Intention -> Green Crypto Currency: The original sample does not support the hypothesis that behavioral Intention is associated with green cryptocurrency adoption (T statistics = 0.42, p = 0.674). The effect size (-0.017) implies that behavioral Intention may not directly affect adoption. The original sample supports the prediction that perceived usefulness and behavioral Intention are positively correlated (T statistics = 11.134, p =

0.000). Perceived utility strongly increases behavioral Intention to embrace green cryptocurrency (0.729).

Environmental Concern -> Perceived Ease of Use: The original sample did not support the hypothesis that environmental Concern and perceived ease of use are related (T statistics = 0.472, p = 0.637). The effect size (-0.017) suggests that environmental Concerns may not greatly affect the perceived ease of usage.

Environmental Concern -> Perceive Usefulness: The original sample supports the prediction that environmental Concern negatively correlates with perceived usefulness (T statistics = 4.416, p = 0.000). The effect size (-0.017) shows that environmental Concern decreases green cryptocurrency's perceived value.

Risk -> Perceived Ease of Use: The original sample supports the hypothesis that risk and ease of use positively correlate (T statistics = 8.61, p = 0.000). Lower perceived risk strongly improves green cryptocurrency's perceived ease of use (0.725).

Risk -> Perceived Usefulness: The original sample supports the hypothesis that risk and perceived usefulness are negatively correlated (T statistics = 7.22, p = 0.000). Green cryptocurrency's perceived utility decreases significantly with increased perceived risk (-0.495).

Social Norms -> Perceived Ease of Use: The original sample does not support the hypothesis that social norms affect perceived ease of use (T statistics = 0.139, p = 0.889). The effect size (-0.017) implies that social norms may not greatly influence perceived ease of usage. The original sample confirms the hypothesis that social norms positively affect perceived usefulness (T statistics = 1.962, p = 0.050). Social norms slightly increase the perceived usefulness of green cryptocurrencies (-0.017).

Trust -> Perceived Ease of Use: The original sample supports the hypothesis that trust and perceived ease of use are negatively correlated (T statistics = 6.352, p = 0.000). Higher trust is connected with a substantial decrease in the perceived ease of use of green cryptocurrency (-0.376).

Trust -> Usefulness: The original sample supports the hypothesis that trust and perceived usefulness are positively correlated (T statistics = 9.971, p = 0.000). Trust strongly increases the perceived usefulness of green cryptocurrencies (1.048).

5. Conclusion

In conclusion, this study's hypothesis testing illuminates varied relationships. Some variables have significant effects, while others do not. Table 3 shows that various hypotheses are supported. Awareness, Usefulness, perceived ease of Use, Trust, and Adoption of Green Crypto Currency are statistically significant. However, Behavioural Intention and Environmental Concern do not significantly affect the dependent variable. These findings imply these characteristics may not affect the acceptance of green cryptocurrency. The original sample values and standardized coefficients show that impacts differ across variables. Larger effect sizes impact the dependent variable more than smaller effect sizes. These findings aid green cryptocurrency adoption researchers and practitioners. The key links can be used to build strategies and interventions to increase green cryptocurrency uptake and use. The study's sample size and generalizability must be considered.

Further research is needed to confirm the current findings and identify other factors affecting green cryptocurrency acceptance. This study adds to understanding green cryptocurrency adoption and shows how specific aspects affect users' views and behavior. The findings support further study and promote sustainable and environmentally friendly bitcoin operations.

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