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Recommended Citation
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Adoption and Use of Blockchain-Based Social Media Platforms: An Empirical Study

Short Paper

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Abstract

This study explores the adoption factors of blockchain-based social media platforms, applying a revised Technology Acceptance Model (TAM). Survey responses from blockchain social media users were analyzed to understand the impact of perceived usefulness, social influence, trust, financial incentives, privacy protection, and subjective knowledge on adoption attitudes. Results highlight that privacy protection is the most crucial factor, followed by trust, underlining the significance of transparent and secure features for user acceptance. Conversely, financial incentives had minimal impact on perceived usefulness. This research enriches the theoretical framework of technology acceptance in the realm of new digital platforms and provides actionable strategies for enhancing user engagement and platform development.

Keywords: Blockchain Social Media, Technology Acceptance Model (TAM), Privacy, Decentralization

Introduction

In recent years, the dominance of social media as a primary tool for communication and information exchange has significantly influenced social dynamics. However, the centralized nature of existing platforms, such as Facebook, Google, and Instagram, has raised pressing concerns regarding data privacy, ownership, and the exploitation of user-generated content. Notably, incidents of data breaches and the commercial use of personal information without adequate compensation to users have highlighted the vulnerabilities and ethical issues inherent in such centralized systems.

These challenges have sparked a critical discourse on the concept of 'data as labor,' urging a reevaluation of content ownership and value distribution in the digital realm (Posner and Weyl, 2019). As disillusionment with traditional platforms grows, there is an increasing demand for alternative solutions that prioritize user rights and data privacy.

Enter blockchain technology, characterized by its foundational principles of decentralization, transparency, and immutability. Blockchain offers a promising solution to the aforementioned issues by shifting control from centralized authorities to the users themselves, thereby enhancing trust, security, and equity in the digital ecosystem (Murray et al., 2022). Specifically, blockchain-based social media platforms propose a new paradigm for content creation and dissemination, where users retain ownership of their data and could potentially receive fair remuneration for their contributions (Tan and Saraniemi, 2023).

This study aims to explore the factors influencing the adoption of blockchain-based social media platforms through a revised Technology Acceptance Model (TAM). By examining how blockchain technology addresses the critical flaws of traditional social media platforms, this research seeks to provide valuable

insights into the transformative potential of blockchain in reshaping the social media landscape, with a particular focus on enhancing user adoption.

Literature Review

Blockchain-Based Social Media Platforms

Blockchain is widely recognized as a trust-enhancing network with applications extending beyond cryptocurrencies to sectors like news, advertising, and digital rights management. This study focuses on blockchain-based social media, a field ripe with innovation but limited in scholarly research. Among the various platforms, Steemit stands out as a prominent example, similar to a blogging site, with a user base of 3.62 million. The research primarily addresses Steemit's operational and reward mechanisms, and analyzes the advantages and disadvantages of using blockchain to construct social media platforms (e.g., Liu et al., 2022). On Steemit, users earn rewards by posting high-quality content and engaging through comments. The virtual currency gained can be redistributed to support various content creators (Ba et al., 2022). Although many blockchain social platforms mirror Steemit's approach in rewarding users with virtual currency, their management details vary.

As blockchain technology matures, it increasingly offers a robust framework for managing social media content through its core characteristics of decentralization, trustlessness, transparency, traceability, and privacy. Each of these traits contributes to the unique strengths of blockchain in handling data securely and transparently, making it an ideal technology for media content management as highlighted by Liu & Ye (2021).

Decentralization

Blockchain was originally developed to bypass third-party intermediaries in financial transactions, addressing trust issues through a decentralized network. This technology enables secure and complete transfers without central oversight, using cryptographic methods across a distributed array of nodes. According to Nakamoto (2008), blockchain's decentralized nature enhances trust through transparency and immutability of transactions. Buterin (2017) identifies three decentralization facets: architectural (no single point of failure), political (no centralized control), and logical (consistent consensus). Consensus protocols like Bitcoin's proof of work, despite high energy costs, ensure logical consistency and security, while more energy-efficient protocols like proof of stake have since emerged (Guidi, 2020). Yaga et al. (2019) emphasize that these protocols secure the network and enhance trust by making transaction history tamper-evident. Zheng et al. (2017) note that decentralization reduces reliance on central authorities, mitigating trust risks and fostering a secure, trustless environment.

Trustlessness

Blockchain's design principle centers on eliminating the need for third-party intermediaries in transactions, thereby creating a 'trustless' environment where the reliability of transactions does not rely on personal trust but on the technology itself (Malherbe et al., 2019). This trustlessness stems from the immutability of blockchain, where all transaction records are permanent and verifiable (Liu, Zhang et al., 2021). Enforced by consensus mechanisms often implemented via smart contracts, this system provides a normative force that prevents breaches more effectively than traditional legal statutes. According to Tan and Saraniemi (2022), users with over three years of blockchain experience place greater trust in mathematics and cryptography than in third-party intermediaries.

Transparency and Traceability

In blockchain, transparency ensures that at the time of a transaction, data is shared and maintained by all parties involved on a distributed network ledger, which updates continuously to synchronize the latest data (Guidi, 2020). This distributed ledger makes all transaction data publicly accessible, allowing any viewer to easily trace the source, process, and any amendments made to the information. Such visibility not only enhances the credibility and value of the data but also establishes a high degree of trust in the blockchain by enabling public oversight of all data and transactions (Salman et al., 2019). This level of transparency

and traceability, where every participant in the transaction can verify the integrity of the data, fosters a secure environment where the data's origin and history are clear and indisputable.

High Privacy

Blockchain utilizes asymmetric encryption for secure message transmission, where public keys are disclosed, but private keys remain confidential. This ensures that while transaction data is public, the identities of the transacting parties remain private, enhancing security and privacy (Khalilov & Levi, 2018). Similar to the pseudonymity in Bitcoin, users are identified by their public keys, not their personal information, ensuring anonymity (Zheng et al., 2017). This mechanism is crucial for maintaining user trust in decentralized systems (Kenway, 2019).

Technology Acceptance Model

The Technology Acceptance Model (TAM), established by Davis (1986) based on the Theory of Reasoned Action and the Theory of Planned Behavior, explains why individuals adopt or resist new technologies. Central to TAM are two main concepts: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU), which directly influence users' Intentions to Use and subsequent Usage Behavior. Over time, revisions of TAM have shifted focus from attitudinal mediators to a direct correlation between these perceptions and usage intentions.

The application of TAM peaked in the early 2000s with the rise of e-commerce, adapting over time to different sectors. Notably, external factors like image and job relevance can sway PU, while PEOU is generally influenced by system-specific characteristics rather than external conditions (Marangunić & Granić, 2015). Studies have shown that while external factors such as organizational support and training can affect PU, PEOU is primarily determined by the design and interface of the system itself (Venkatesh & Davis, 2000). For example, Venkatesh (2000) found that perceived ease of use is significantly shaped by system usability and user interface design, which are intrinsic to the technology rather than influenced by external factors.

In the context of blockchain, Liu and Ye (2021) applied TAM to a crowdfunding platform, identifying Trust and Information Quality as crucial to adoption intentions. These elements, along with transparency, traceability, and incentives, are key to understanding user engagement with blockchain platforms, guiding future inquiries into this emerging technology's acceptance.

In contrast, this study extends the application of the TAM model specifically to blockchain-based social media platforms. Given that current blockchain social media platforms generally do not match the usability of Web 2.0 platforms, we deliberately omitted PEOU from our model. Instead, we focus on Trust, Privacy Protection, and Decentralization, which are critical in the social media context where user data security and autonomy are paramount.

We integrate Social Capital Theory (SCT) to better understand how these blockchain-specific features enhance user engagement. SCT emphasizes the importance of trust, norms, and reciprocity within social networks, which are crucial for fostering cooperation and information exchange. Transparency and decentralization in blockchain platforms help build trust and accountability, essential components of social capital. Privacy protection increases user confidence, further enhancing trust and cooperation.

By focusing on these distinct aspects, our research provides new insights into the adoption of blockchain technology in social media environments. This approach underscores the importance of adapting the TAM model to fit the specific characteristics of varied blockchain-enabled platforms, highlighting how these platforms can foster social capital and drive user adoption.

Hypothesis Development

This study examines the adoption of blockchain-based social media in Taiwan, focusing on the platform Potato Media, which has demonstrated significant growth with over 150,000 users and 5.3 million weekly visits as of December 2022. Despite its growth, the platform's user base is still modest compared to conventional social media.

The literature review reveals that perceived usefulness may be influenced by factors such as knowledge level, trust, financial incentives, privacy, and security, while simultaneously being affected by social influences. Davis (1986) noted that perceived usefulness is a critical element affecting user intent. Subsequent literature further emphasized the substantial impact of perceived usefulness on attitudes toward adopting blockchain platforms (Nuryyev et al., 2020). Consequently, this research proposes the following hypothesis:

H1: Perceived usefulness positively affects people's attitudes towards adopting blockchain social media platforms.

Many studies have also shown that social influence is a crucial factor affecting user attitudes (Hsu and Lu, 2004; Malhotra and Galletta, 1999; Chaouali, Yahia, and Souiden, 2016). People's opinions and perspectives often change due to their friends' influence. If family and friends use blockchain social media, people are more likely to try these platforms. The confidence in technology and systems shared by the public can affect work performance and attitudes towards life (Venkatesh and Davis, 2000). Thus, we hypothesize:

H2: Social influence positively affects usage attitude.

Blockchain technology promises to eliminate the need for verification and guarantees from third-party platforms (Liu and Ye, 2021). As The Economist suggested, blockchain enables operations among distrustful parties without additional neutral institutions. Shin (2020) indicated that trust is a primary reason for users adopting new technologies. Adequate trust enhances the willingness to use products or technologies (Gefen, Straub, and Boudreau, 2000). Thus, establishing trust will likely contribute to user adoption of blockchain social media platforms. From this literature, we hypothesize:

H3: Trust positively affects perceived usefulness.

Financial incentives have been identified as one of the reasons people participate in blockchain communities. The blockchain records individual data or attention and assigns value to them (Burtch et al., 2018; Lu, Ou, and Angelopoulos, 2018). Financial rewards can also serve as a tool to stimulate user expectations, encouraging users to seek the most beneficial avenues, thereby enhancing participation in online platforms (Kuang et al., 2019). Literature indicates that platforms offering financial rewards have higher user participation than those that do not (Roberts, Hann, and Slaughter, 2006). Hence, we hypothesize:

H4: Financial incentives positively affect perceived usefulness.

In the transportation and logistics industry, tracking information about goods was only possible through information presented by suppliers in the system (Foerstl, Schleper, and Henke, 2017). However, with the application of blockchain, every stage from the shipper to shipping companies, port customs, etc., can be thoroughly tracked and monitored, offering more accurate timing for receiving and delivering goods (Dobrovnik et al., 2018). Hence, we suggest:

H5: Privacy and protection positively influence perceived usefulness.

Knowledge is defined as facts and information acquired through experience and education (Rahman, Asrarhaghighi, and Rahman, 2015). It includes the expertise and skills needed to use specific technologies (Chengyue et al., 2021). Studies show a positive relationship between knowledge and behavior, notably in blockchain technology, where knowledge correlates with its perceived usefulness (Manika, Gregory-Smith, Papagiannidis, 2018; Knauer and Mann, 2019).

To attract users, many blockchain social media platforms mimic the interfaces of traditional platforms to reduce barriers to adoption. The similarity in interfaces ensures that users find blockchain platforms as easy to use as traditional ones. However, the key to sustained use is users' understanding of blockchain's benefits, such as data ownership and decentralized governance. Research indicates that while initial attraction may be due to reward mechanisms, long-term engagement is driven by the appreciation of blockchain's advantages, including escaping restrictive content policies and valuing social influence (Gruzd et al., 2023). Therefore, the study proposes:

H6: Subjective knowledge positively affects perceived usefulness.

Research Method

This study utilizes the Partial Least Squares (PLS) method, well-regarded in business research for its aptitude with small sample sizes, capability to process non-normal data, and facility in evaluating complex models with multiple predictors. Our aim is to validate hypotheses by examining t-values and performing path analysis to discern the strength of relationships within the model. We employ SmartPLS software for comprehensive analysis. Given the constrained sample size, we apply bootstrap resampling, conducting 5000 iterations to ensure precise parameter estimation and bolster the robustness of our findings.

Data Collection and Sampling

The study utilized a convenience sampling technique to collect data from users actively participating in blockchain-related forums and social media platforms. A structured questionnaire was developed and disseminated online to gather responses. The questionnaire link was shared across various platforms where potential respondents were likely to be active, ensuring a diverse sample reflective of the blockchain social media user base.

Measurement Instruments

Adoption Attitude

Following Davis (1989, 1986), this study measures users' attitudes towards blockchain technology, reflecting their positive or negative sentiments. We adapt Kamble, Gunasekaran, and Arha (2019) and Lai, Huang, and Yang (2015) scales, modifying 'information systems' to 'blockchain community'. The measure uses an eight-item Likert scale ranging from "strongly disagree" to "strongly agree".

Perceived Usefulness

Based on Davis (1985), this concept is the belief that adopting new technology improves job performance. We replace 'system' with 'blockchain technology' in Davis's (1989) scale for relevance, using an eight-item Likert scale for evaluation.

Social Influence

Defined by Chaouali et al. (2016), social influence encompasses the impact of others' norms, values, and behaviors on an individual's perceptions and actions. This study adapts this to blockchain, measured by an eight-item Likert scale.

Trust

Following Liu and Ye (2021), trust refers to the perceived security, fairness, and transparency of blockchain technology. Scales from Albayati, Kim, and Rho (2020) are tailored to blockchain context, utilizing an eight-item Likert scale.

Financial Incentives

As outlined by Kuang et al. (2019), this pertains to rewards driving personal gain. This study creates a new scale specific to blockchain community incentives, employing an eight-item Likert scale for assessment.

Privacy Protection

Adhering to Jain et al. (2018), this term refers to the blockchain's ability to ensure data integrity and transparency. Adapted from Venkatesh and Davis (2000) and Tapscott and Tapscott (2016), this is measured with an four-item Likert scale tailored for blockchain.

Subjective Knowledge

Following Kern (2018), this encompasses knowledge acquired through experience and education impacting technology use. This study adapts Kern's scales for clarity on blockchain involvement, using an eight-item Likert scale for measurement.

Results and Discussion

Results

This study targeted blockchain social media users, employing convenience sampling through questionnaires distributed on blockchain-related forums and social platforms. Out of 742 collected responses, 480 were deemed valid after excluding 263 for failing the screener questions. The sample comprised 36.1% male (174 individuals) and 63.9% female (306 individuals) respondents.

Initially, the reliability of the scales was assessed, revealing all Cronbach's alpha values to be above 0.7, with the lowest being social influence at 0.744. Composite Reliability (CR) values exceeded 0.8, indicating high reliability of the scales used in this study. Additionally, all Average Variance Extracted (AVE) values were above 0.5, with the exception of social influence and privacy and protection, which were 0.656 and 0.691, respectively, suggesting good convergent validity. Furthermore, the square of each construct's AVE was greater than the inter-construct correlation coefficients, confirming discriminant validity.

Table 1. Table 1: Reliability, Correlations, and Validity of Study Constructs

Construct	CR	(a)	(b)	(c)	(d)	(e)	(f)	(g)
Subjective Knowledge (a)	0.923	**0.84**						
Adoption Attitude (b)	0.958	0.556	**0.94**					
Trust (c)	0.916	0.481	0.693	**0.86**				
Perceived Usefulness (d)	0.935	0.473	0.809	0.721	**0.91**			
Social Influence (e)	0.851	0.654	0.6	0.564	0.521	**0.81**		
Financial Rewards (f)	0.889	0.289	0.54	0.607	0.59	0.425	**0.85**	
Privacy and Protection (g)	0.889	0.391	0.698	0.693	0.738	0.445	0.605	**0.83**

Note: Bold values represent the square root of the Average Variance Extracted (AVE).

This study conducted path analysis using the Partial Least Squares (PLS) method and found significant results impacting the adoption of blockchain-based social media platforms. Notably, perceived usefulness significantly influences attitudes towards adopting blockchain social media (path coefficient = 0.681, $t = 21.682$, $p < 0.001$), validating Hypothesis H1. This suggests that the perceived utility of blockchain platforms is a critical determinant of user adoption intentions.

Social influence also had a significant impact on usage attitude (path coefficient = 0.246, $t = 7.002$, $p < 0.001$), supporting Hypothesis H2. This outcome aligns with the nature of social media as platforms rooted in communal participation, highlighting the profound effect of peer influence on user behavior.

In examining the effects of four variables on perceived usefulness, the results indicate that privacy and protection have the most substantial influence (path coefficient = 0.399, $t = 7.936$, $p < 0.001$), followed by trust (path coefficient = 0.303, $t = 5.429$, $p < 0.001$). While financial incentives, a common promotional tool, showed a significant but smaller impact (path coefficient = 0.125, $t = 2.873$, $p < 0.01$). Furthermore, subjective knowledge significantly affects perceived usefulness (path coefficient = 0.135, $t = 3.783$, $p < 0.001$), suggesting that greater understanding of blockchain leads to a higher appreciation of its utility, confirming Hypothesis H6.

To strengthen the validity of our findings, we conducted a Finite Mixture (FIMIX) segmentation analysis. Key indicators include AIC (Akaike's Information Criterion), demonstrating good model fit, BIC (Bayesian Information Criterion), confirming the model's suitability by balancing fit and complexity, a Normed Entropy Statistic (EN) of 0.710, indicating well-defined segments with minimal overlap, and a Non-Fuzzy

Index (NFI) of 0.740, showing strong consistency within segments and clear separation between them. These results suggest that our model effectively captures underlying heterogeneity within the sample and supports the robustness of our findings.

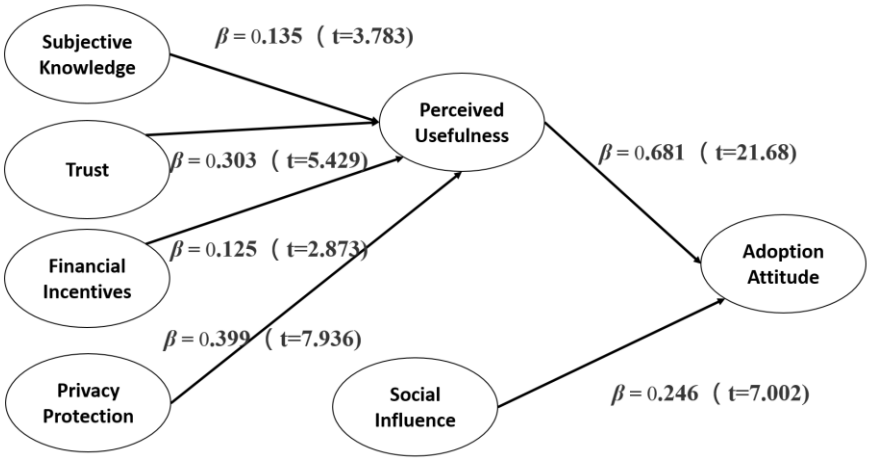


Figure 1: Path Analysis of Modified TAM for Blockchain Social Media Adoption

Contributions

This study makes a significant contribution to the field of technology acceptance by integrating the modified Technology Acceptance Model (TAM) with the unique context of blockchain social media platforms. It systematically investigates how privacy, protection, trust, subjective knowledge, and financial incentives influence perceived usefulness, thereby affecting user adoption. Our findings reveal that privacy protection are the most influential factors, underscoring the essential role of security and transparency in fostering user trust and acceptance. Interestingly, contrary to prevalent marketing tactics, financial incentives play a minor role in shaping perceived usefulness, pointing towards the necessity of focusing on intrinsic platform values rather than external rewards. Additionally, the study underscores the importance of subjective knowledge, indicating that a deeper understanding of blockchain significantly enhances its perceived value. By dissecting these variables, the research offers new insights into the drivers of blockchain platform adoption, highlighting the interplay between user knowledge, security concerns, and the underlying trust infrastructure.

Practitioners should utilize these findings to improve user perceptions of blockchain social media platforms, focusing on enhancing trust, security, and the perceived usefulness of these platforms. It is suggested that developers emphasize the practical benefits of blockchain, foster community engagement, and use peer influence to increase adoption. Educational efforts to boost blockchain understanding can also lead to higher perceived usefulness and a better-informed user base. Moreover, the emphasis on privacy and security as primary adoption factors indicates that platform developers should prioritize these aspects in their design and marketing strategies. Transparent operations and robust security measures are crucial for building user trust and ensuring platform longevity. The study also recommends that learning opportunities be integrated into the platforms to improve user engagement and value perception, moving beyond mere financial incentives towards a holistic approach encompassing education and trust-building. Policymakers are advised to set standards enhancing privacy and protection, contributing to an environment that bolsters user trust and adoption.

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