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Understanding Malaysian Graduates' Intention to Use Blockchain-based Self-Sovereign Identity (SSI): A Conceptual Framework Integrating Utilitarian and Psychological Determinants

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Abstract

The rapid expansion of digital services has intensified concerns regarding identity security, privacy protection, and individual control over personal data, exposing limitations in conventional centralised identity systems. Blockchain-based Self-Sovereign Identity (SSI) offers a transformative alternative by enabling individuals to securely manage and selectively disclose their digital credentials without reliance on central authorities; yet its adoption remains limited, particularly in developing countries. This study proposes a parsimonious framework to explain Malaysian graduates' behavioural intention to adopt Blockchain-based SSI by integrating utilitarian and psychological determinants. Grounded in UTAUT2, Trust Theory, Privacy Calculus, Protection Motivation Theory, and Self-Determination Theory, the model focuses on five key drivers: performance expectancy, effort expectancy, trust, perceived privacy risk, and perceived autonomy. By addressing the lack of context-specific and theoretically integrated models, the study offers a clearer understanding of adoption behaviour in decentralised identity systems. By clarifying the relative influence of functional benefits and psychological perceptions in decentralised identity adoption, the framework advances understanding of user acceptance in emerging digital ecosystems and provides actionable insights for policymakers and technology developers seeking to strengthen trusted, user-centric digital identity infrastructures.

Keywords: Blockchain-Based Self-Sovereign Identity, Behavioural Intention, Technology Adoption, Psychological Factors, Utilitarian Factors

Introduction

The acceleration of digital transformation across public and private sectors has fundamentally altered how identity is created, verified, and managed. Digital identity now functions as a critical socio-technical infrastructure enabling engagement in education, employment, financial services, healthcare, and government platforms (Stockburger et al., 2021). Recent

global estimates indicate that digital identity systems are becoming a foundational layer of digital economies, contributing significantly to service accessibility, financial inclusion, and cross-border digital transactions (World Bank, 2024; Boston Consulting Group, 2024). In Malaysia, initiatives such as MyDIGITAL underscore the strategic importance of secure and trusted digital identity ecosystems (Bernama, 2025). However, prevailing identity systems remain predominantly centralised, placing control of personal data in the hands of platform operators, thereby exposing individuals to data breaches, unauthorised surveillance, and privacy violations (Santos-Cabaleiro et al., 2023).

Blockchain-based Self-Sovereign Identity (SSI) has emerged as a transformative alternative that reconfigures identity governance by shifting ownership and control to individuals (Santos-Cabaleiro et al., 2023). Rather than relying on central authorities, Blockchain-based SSI enables users to create decentralised identifiers, manage verifiable credentials, and selectively disclose identity attributes based on contextual needs (Allen, 2016). Contemporary studies further highlight that SSI enhances transparency, reduces reliance on intermediaries, and strengthens trust through cryptographic verification mechanisms, making it a promising solution for next-generation identity ecosystems (Yan et al., 2024; Laatikainen et al., 2025). This decentralisation aligns with global regulatory principles emphasising data minimisation, consent, and individual autonomy (Ghadge, 2024). Nevertheless, despite strong theoretical and policy support, actual adoption of SSI remains limited, particularly in developing economies (Raman et al., 2024).

Within the ASEAN region, digital identity has been identified as a strategic enabler of regional digital integration, with projections suggesting substantial economic contributions through improved service delivery and digital trust (Boston Consulting Group, 2024). However, a persistent gap exists between policy ambition and user adoption, as evidenced by low awareness and limited uptake of digital identity initiatives in Malaysia (Zulkifli et al., 2024). Recent empirical findings indicate that trust deficits, privacy concerns, and limited user understanding remain key barriers to adoption of decentralised identity technologies in emerging markets (Lockl et al., 2023; Laatikainen et al., 2025). This suggests that technological readiness alone is insufficient to ensure widespread adoption.

From a behavioural perspective, adoption of digital identity systems is not purely a technical decision but a socio-psychological process influenced by perceived benefits, ease of use, trust, risk, and autonomy (Yehelmi et al., 2024; Kamaruzaman et al., 2023). Malaysian graduates represent a critical yet underexplored population in this regard. As digital natives transitioning into professional life, they regularly interact with credential verification systems for education, employment, and financial services (Idsardi et al., 2023; Raman et al., 2024). Yet empirical evidence suggests that technological familiarity does not automatically translate into adoption of decentralised identity solutions. Recent studies further indicate that younger, digitally literate users may exhibit scepticism towards emerging technologies when concerns over data privacy, control, and trust are not adequately addressed (Kenesei et al., 2025; Salih et al., 2025).

Despite growing scholarly attention to blockchain and digital identity, existing literature remains fragmented and skewed toward technical, organisational, or Western-centric contexts, with limited focus on individual-level behavioural intention in emerging economies

such as Malaysia (Yan et al., 2024; Chan et al., 2025). Furthermore, prior technology adoption studies tend to emphasise utilitarian determinants (e.g., performance and effort expectancy) while under-examining psychological factors that are particularly critical in decentralised environments characterised by uncertainty and user-controlled data governance (Hünseler & Pöll, 2023; Lockl et al., 2023). This creates a theoretical gap in understanding how functional and psychological factors jointly influence adoption decisions in SSI contexts.

Accordingly, the present study is justified on both empirical and theoretical grounds. Empirically, it addresses the lack of context-specific research on Blockchain-based SSI adoption among Malaysian graduates. Theoretically, it responds to calls for more integrative and parsimonious models that capture the interplay between utilitarian and psychological determinants in emerging technology adoption. By focusing on a streamlined set of core variables and adopting a comparative lens, this study seeks to provide clearer explanatory insight into the key drivers of decentralised identity adoption in emerging digital ecosystems.

Overview of the Literature

Blockchain-based Self-Sovereign Identity

Self-Sovereign Identity (SSI) represents a decentralised identity paradigm in which individuals possess direct ownership and control over their digital identities (Giannpoulou, 2023). Unlike traditional identity management systems that rely on centralised databases and intermediaries, SSI leverages cryptographic techniques and distributed ledger technologies to enable secure, verifiable, and user-controlled identity interactions (Hubschke et al., 2025). Blockchain plays a supporting role by acting as a tamper-resistant registry for decentralised identifiers and public keys rather than storing personal data directly.

The literature identifies several core principles of SSI, including user control, consent, portability, interoperability, and minimal disclosure (Allen, 2016). These principles respond directly to weaknesses in conventional identity systems, such as data silos, identity fraud, and lack of transparency. Empirical and conceptual studies suggest that SSI has potential applications across education, employment verification, healthcare, financial services, and cross-border transactions.

Recent studies further highlight that SSI is increasingly positioned as a foundational component of next-generation digital infrastructure, enabling trusted data exchange and reducing dependency on centralised authorities (Yan et al., 2024; Laatikainen et al., 2025). In particular, blockchain-enabled identity solutions are viewed as critical enablers of secure digital ecosystems, where trust is established through cryptographic verification rather than institutional intermediaries (Broshka & Jahankhani, 2024).

Despite these advantages, SSI adoption faces substantial barriers. Prior studies highlight challenges related to system complexity, limited usability, lack of standardisation, governance ambiguity, and low public awareness (Yamin et al., 2023; Chan et al., 2025). More recent evidence also suggests that user-level concerns; particularly those related to trust, perceived risk, and lack of understanding, remain key inhibitors of SSI adoption (Lockl et al., 2023; Laatikainen et al., 2025). Importantly, most existing research concentrates on technical architecture or institutional pilots, offering limited insight into individual-level behavioural intention, particularly in non-Western contexts.

Digital Identity, SSI and Blockchain in ASEAN and Malaysia

The ASEAN region has increasingly recognised digital identity as a foundation of digital economic integration (Boston Consulting Group, 2024). Regional frameworks emphasise interoperability, inclusivity, and trust to support cross-border digital services. Countries such as Singapore and Malaysia have implemented national digital identity systems, while others remain in exploratory stages (The Malaysian Reserve, 2025).

Recent policy and industry reports indicate that digital identity is expected to play a pivotal role in enabling ASEAN's digital economy, with significant potential to enhance financial inclusion, service delivery efficiency, and cross-border trade (Boston Consulting Group, 2024). However, a notable disparity persists between policy ambition and actual user adoption across the region, particularly in developing economies where awareness and trust remain limited (Zulkifli et al., 2024).

Malaysia's MyDIGITAL Blueprint positions digital identity as a foundational enabler of the digital economy, targeting seamless service delivery and secure online transactions (Liang, 2025). Nevertheless, adoption rates remain below policy expectations (Zulkifli et al., 2024). Studies indicate that public awareness of decentralised identity concepts is limited, and trust in digital identity systems is uneven. Emerging evidence suggests that psychological concerns; particularly related to data privacy, control, and institutional trust, are significant barriers to adoption, even among digitally literate populations (Kenesei et al., 2025; Salih et al., 2025). This suggests that policy readiness does not necessarily translate into behavioural readiness. Within higher education, blockchain-based identity and credentialing systems have attracted attention for their potential to reduce credential fraud and improve verification efficiency. However, research in the Malaysian context remains sparse, particularly with respect to graduates' behavioural intention (Koo et al., 2025). Furthermore, existing studies tend to emphasise technological feasibility rather than user acceptance, highlighting a critical gap in understanding how individuals perceive and adopt decentralised identity systems in real-world contexts. This gap underscores the need for theory-driven studies that consider both functional and psychological adoption drivers.

Behavioural Intention and Technology Adoption

Behavioural intention is a central construct in information systems research and is widely accepted as a strong predictor of actual usage behaviour (Kelly et al., 2023). Technology adoption models such as TAM, UTAUT, and UTAUT2 have demonstrated robust explanatory power across organisational and consumer contexts (Jiang et al., 2023). However, decentralised technologies such as Blockchain-based SSI introduce novel dynamics, including heightened responsibility for users, reliance on cryptographic trust, and increased salience of privacy concerns.

Recent studies argue that traditional technology adoption models may be insufficient to fully capture user behaviour in decentralised environments, as they primarily emphasise utilitarian evaluations while under-representing psychological and socio-cognitive factors (Hünseler & Pöll, 2023; Lockl et al., 2023). In particular, trust and perceived risk have been identified as critical determinants in contexts involving uncertainty, lack of central authority, and user-managed data (Kenesei et al., 2025; Salih et al., 2025).

Consequently, scholars have called for the integration of complementary theoretical perspectives, including Trust Theory, Privacy Calculus, Protection Motivation Theory, and Self-Determination Theory, to better explain behavioural intention in emerging digital systems (Yuen et al., 2023; Salih et al., 2025). These perspectives collectively emphasise that adoption decisions are shaped not only by perceived usefulness and ease of use, but also by psychological perceptions of control, risk, and trust.

Despite these advances, limited research has systematically integrated utilitarian and psychological determinants into a unified and parsimonious framework, particularly in the context of Blockchain-based SSI and within emerging economies such as Malaysia. This study responds to this gap by proposing an integrated conceptual framework that captures both dimensions in explaining behavioural intentions.

Emphasis and Significance of the Study

This study is timely and significant for several reasons. First, it addresses an emerging digital infrastructure technology with substantial implications for governance, business, and society. Blockchain-based SSI challenges conventional identity paradigms by redefining how trust, authority, and control are distributed (Kenesei et al., 2025). Understanding behavioural intention at this early stage is critical for ensuring inclusive and sustainable adoption.

Second, the focus on Malaysian graduates responds directly to a strategically important demographic that bridges education and labour markets. Their adoption behaviour has implications for workforce readiness, human resource practices, and national digital competitiveness (Yuliani et al., 2024). Third, the comparative emphasis on utilitarian versus psychological determinants contributes conceptual clarity to technology adoption research (Benchis et al., 2025). Rather than expanding models indiscriminately, this study deliberately contrasts two theoretically coherent determinant groups. This approach enables more precise insights into whether adoption of SSI is driven primarily by functional efficiency or by deeper psychological considerations such as trust, risk, and autonomy.

Practically, the study offers guidance for policymakers, system designers, and higher-education institutions in shaping digital identity strategies that resonate with user expectations (Shahid et al., 2024). Theoretically, it advances interdisciplinary integration by bridging information systems, behavioural science, and digital governance literatures.

Theoretical Clarification and Research Gaps

Utilitarian Perspective

The utilitarian perspective conceptualises technology adoption as a rational evaluation of expected performance gains, and effort requirements. UTAUT2 is particularly relevant in consumer and voluntary-use contexts and has been widely applied in studies of mobile services, e-government, and digital platforms (Laatikainen et al., 2025). In the context of SSI, performance expectancy relates to perceived improvements in identity security and verification efficiency, while effort expectancy reflects perceived ease of managing decentralised credentials (Falih et al., 2024; Yan et al., 2024).

However, critics argue that utilitarian models may oversimplify adoption decisions in contexts involving high uncertainty and personal risk (Kenesei et al., 2025). SSI adoption requires users

to assume greater responsibility for identity management, which may not be fully captured by functional benefit assessments alone.

Psychological Perspective

Psychological theories provide complementary explanatory power by addressing intrinsic motivations and perceived risks. Trust Theory explains confidence in system reliability and integrity, which is particularly salient in decentralised environments lacking central authorities (Broshka & Jahankhani, 2024). Privacy Calculus Theory and Protection Motivation Theory explain how individuals evaluate privacy risks relative to perceived benefits (Salih et al., 2025).

Self-Determination Theory highlights autonomy as a fundamental psychological need that can enhance intrinsic motivation when supported by technology (Yuen et al., 2023).
In SSI contexts, autonomy is not merely a feature but a defining principle. Users must actively control and manage identity credentials, making perceived autonomy a critical determinant of acceptance.

Identified Research Gaps

Despite growing interest in SSI, three major gaps persist. First, empirical studies on SSI adoption in Malaysia and ASEAN remain limited. Second, existing research often prioritises utilitarian factors while under-theorising psychological determinants. Third, few studies adopt a comparative analytical approach to assess the relative influence of different determinant categories. This study addresses these gaps by proposing an integrated yet comparative conceptual framework suitable for empirical validation.

Research Framework

This study proposes a parsimonious conceptual framework to explain Malaysian graduates' behavioural intention to adopt Blockchain-based Self-Sovereign Identity (SSI). The dependent variable is behavioural intention to adopt Blockchain-based SSI. The independent variables are organised into two categories: utilitarian determinants and psychological determinants. Utilitarian determinants capture functional and usability-related evaluations, while psychological determinants capture trust-, risk-, and autonomy-related perceptions that are particularly salient in decentralised identity systems. The conceptual relationships and hypothesized linkages among these constructs are visually depicted in the accompanying research framework diagram (Figure 1).

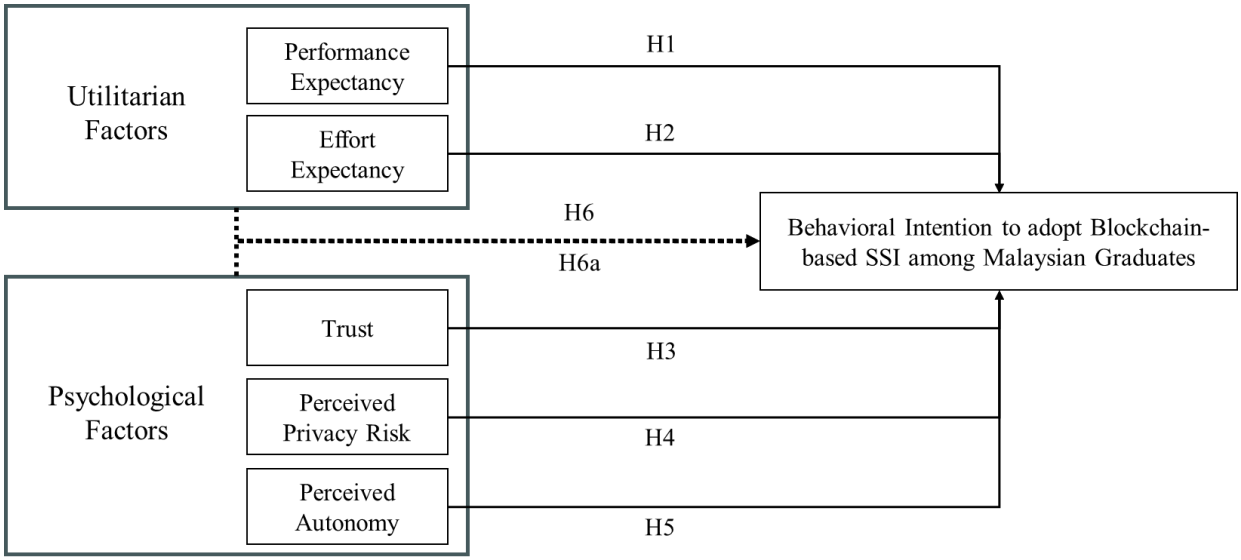

Figure 1: Relationship between utilitarian factors, psychological factors and behavioral intention to adopt blockchain-based SSI among Malaysian graduates

Hypotheses

Based on the proposed conceptual framework, the following hypotheses are developed to examine the relationships between utilitarian and psychological determinants and behavioural intention to adopt Blockchain-based SSI among Malaysian graduates.

H1: Performance expectancy has a positive effect on Malaysian graduates' behavioural intention to adopt Blockchain-based Self-Sovereign Identity.

H2: Effort expectancy has a positive effect on Malaysian graduates' behavioural intention to adopt Blockchain-based Self-Sovereign Identity.

H3: Trust has a positive effect on Malaysian graduates' behavioural intention to adopt Blockchain-based Self-Sovereign Identity.

H4: Perceived privacy risk has a negative effect on Malaysian graduates' behavioural intention to adopt Blockchain-based Self-Sovereign Identity.

H5: Perceived autonomy has a positive effect on Malaysian graduates' behavioural intention to adopt Blockchain-based Self-Sovereign Identity.

Method and Measures

This study adopts a quantitative, cross-sectional research design to empirically test the proposed five-variable conceptual framework. The design is appropriate for examining behavioural intention and aligns with prior social science research published in the International Journal of Academic Research in Business and Social Sciences.

Population and Sample Selection

The population comprises Malaysian graduates enrolled in postgraduate programmes at public and private universities. A judgmental (purposive) sampling approach will be employed to target graduates with basic digital literacy and exposure to technology-enabled systems. Responses with incomplete or missing data on key constructs will be excluded to ensure analytical robustness.

Variables and Measurement

The dependent variable is behavioural intention to adopt Blockchain-based SSI. The independent variables include two utilitarian determinants (performance expectancy and effort expectancy) and three psychological determinants (trust, perceived privacy risk, and perceived autonomy). All constructs will be measured using multiple-item scales adapted from validated prior studies and contextualised to the SSI domain. A five-point Likert scale will be used for all measurements.

Data Analysis Model

Data analysis will be conducted using Partial Least Squares Structural Equation Modelling (PLS-SEM). The structural model can be expressed as follows:

Behavioural Intention (BI) = $\alpha + \beta(PE) + \beta(EE) + \beta(TR) + \beta(PR) + \beta(PA) + \varepsilon$

PLS-SEM is suitable due to its predictive orientation and ability to handle models with multiple latent constructs. The analysis will assess both measurement and structural models to evaluate the proposed hypotheses.

Conclusion

Blockchain-based Self-Sovereign Identity represents a fundamental shift in digital identity governance by empowering individuals with greater control, privacy, and security over their digital identities. This paper has argued that adoption of such decentralised identity systems cannot be explained solely through functional or efficiency-based considerations. Instead, behavioural intention is shaped by a nuanced interaction between utilitarian evaluations and psychological perceptions.

By integrating UTAUT2 with Trust Theory, Privacy Calculus, Protection Motivation Theory, and Self-Determination Theory, this study offers a conceptually rigorous framework that captures the socio-psychological complexity of SSI adoption. The comparative distinction between utilitarian and psychological determinants provides a parsimonious yet powerful lens for understanding adoption behaviour in emerging economies such as Malaysia.

The framework developed in this paper provides a strong foundation for future empirical research and offers practical insights for policymakers, technology developers, and higher education institutions seeking to promote trusted, user-centric digital identity ecosystems. As digital identity becomes increasingly central to economic participation and governance, understanding the human factors underpinning adoption will remain a critical area of inquiry.

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