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Blockchain-Based Land Registry System Based E-Commerce Reputation

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ABSTRACT: Security and effectiveness have become important part in the today's business world. Most of the world's population is diverging into e-commerce for its easy and effective services; however, security is the major concern which prevents the development of growing business. The solution is blockchain security which can enhance the credibility of the e-commerce services. This paper distinguishes about the challenges of the traditional process of ecommerce and how blockchain has conquered the traditional e-market using various blockchain-based platforms, variation of payment with crypto currency over traditional web payments. It demonstrates the business process carrying secured transactions with the decentralized marketplace. There are various e-commerce industries implementing blockchain-based platform for their improvement in online businesses. The study convinces the secure business transactions in a decentralized marketplace.

KEYWORDS: Cryptocurrency, marketplace, e-commerce, decentralized, smart contract

I. INTRODUCTION

E-commerce is an electronic business where selling and buying transactions are performing over the internet. It has takeover various commerce industries via trading goods and services among different organizations. E-commerce uses secure websites for their web payments and financial transactions. However, cryptocurrency has brought revolution in commercial and financial transactions. Blockchain is the technology where transactions are made through decentralized currency with no central intermediaries like bank and authority. The most promising factor is the tracking system and the process of publicly available immutable transaction record. Blockchain technology is a distributed ledger for various economic and financial transactions that performs series of calculations and makes a secure way for e-commerce.

The land registry is an important economic pillar for any country in nation-building. Blockchain technology can improve the security and transparency in the land registry by recording land-related details on the blockchain. Blockchain technology also hastens property identification and enhances trust and accuracy in transactions by enabling digital monitoring by stakeholders. Through an increasingly digital world, robust, useful, and flexible digital identity management systems are critical to electronically identifying and authenticating ourselves and to know who we communicate. As per McKinsey, "Good Digital ID" contains a high level of digital channel protection, verification, and authenticated identity, specially created with the user consent. In 2005, Cameron wrote "The Law of Identity as an Identity and Access Architect" at Microsoft Corporation. This law consists of 7 principles that translate several guidelines on managing and disclosing a user's identity and identifying various entities with different types of identification. These principles describe digital identity systems' success and failure. So digital identity solutions are needed to facilitate the users of the land registry system to initiate a transaction. However, many researchers working in the field of applying digital identity solutions for blockchain-based land registry systems confirmed the issue of noncompliance with digital identity principles given by Cameron. So while developing an identity solution for a blockchain-based land registry system, these issues need attention.

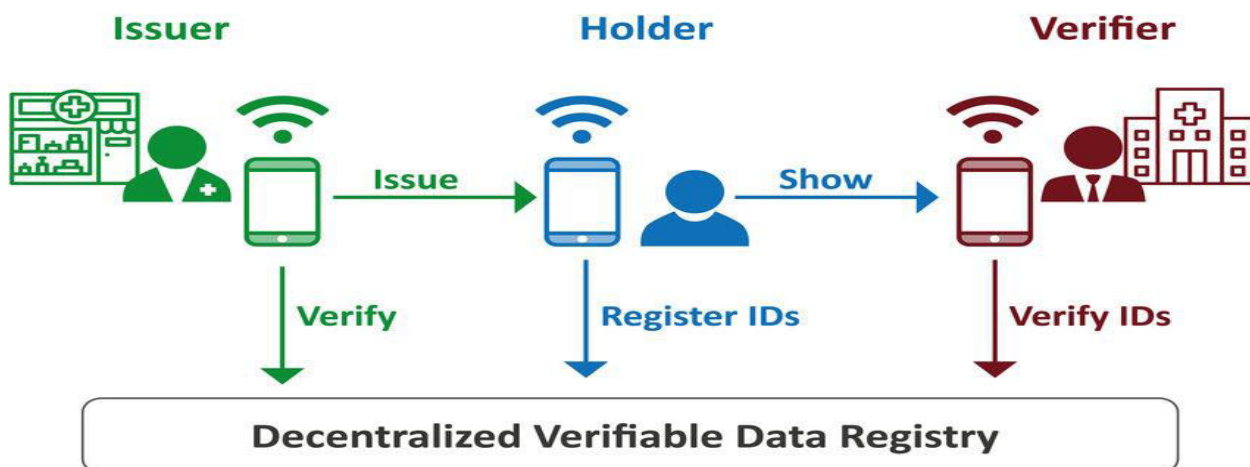


Fig 1: workflow in W3C Verifiable Credential

A digital identity is a collection of credentials and identifiers expressed in an appropriate context, for instance, the name, ID, and other relevant attributes. Digital identity describes the attribute of an entity digitally in providing access to systems and application of identity management process. Traditionally, digital identities are mediums to validate users at the workplace. Existing digital identities are controlled by identity providers, not by the users themselves. Identity providers have complete ownership over an individual’s identity, making it vulnerable to identity misuse. Identity owners often share their credentials for registering or accessing a service with no standard or guidelines on what data they need to share and store on the Internet. In addition, oversharing of data contributes to privacy issues for the identity owner. Since the challenges of current digital identity are severe and damaging, a new concept of digital identity is required. That can offer users complete control over their identities, reduce management costs, increase efficiency, and improve overall online identity.

II. LITERATURE REVIEW

Self-sovereign identity (SSI) is a revolutionary way to address identity. In the early days, centralized organizations controlled digital identities, while in the real world, people stored their issued identity information in a decentralized manner using a physical wallet. SSI’s objective is to connect online identity systems to the actual world and give users control over their identities. In the actual world, after the birth of a child, identity credentials like birth certificates, identification numbers, etc., are provided by the government authorities. The person utilizes these credentials on several occasions to identify themselves or establish a relationship throughout life.

The self-sovereign identity is a well-developed concept in the academic and industry fields. However, there is still no consensus on its exact definition. Generally, the SSI is defined by considering the principles of self-sovereign by de Marneffe and descriptions of identity by. Self-sovereign identity is a digitalized form of personal features, details, and attributes. No entity can breach the right to choose a level of privacy or reputation of identity attribute. While working as an identity and access architect in Microsoft Corporation, Cameron wrote identity laws in 2005. The identity law follows a distributed ledger, which first explains the concept of SSI. Although Cameron was unaware of the advancement of distributed ledgers in the upcoming years, proposing the Microsoft Passport is an unnecessary reliance on a single organization without user control and can lead to identity failures. The necessity of user access, minimal disclosure, and a portable, interoperable structure is required. The first occurrence of sovereign identity happened in 2019.

In 2016, Allen presented ten principles of the self-sovereign identity (SSI) focusing upon identity laws by describing how identity could work, why systems and algorithms need to be transparent, and how is it permanent despite being portable and interoperable. The details required for the concept of self-sovereign identity were proposed by The definition provided by Abraham is congruent with the ten principles provided by Allen. Abraham extends the control concept and adds, “All user identity information will be recorded for further authentication.” It is trade-of-security and privacy, which should be based on the chosen user. SSI is considered as a long-lasting identity possessed and controlled by the individual without any external authority sans the possibility of identity removal. It requires user consent for

interoperability of user identity across several locations and ownership over the identity to provide user autonomy. SSI may prove to be the new normal in the evaluation of identity management.

Similarly, offering alternative credentials like a student ID does not require the university's permission in the actual world. The blockchain uses a distributed ledger technology which allows the creation of identity without a central authority where the ledger acts as a basis of trust. An essential feature of SSI is the backend data storage in off-ledger. Most DID methods use a public or private repository, such as a private database or IPFS (Interplanetary File System), to collect off-ledger information. IPFS generates content-based hashes using particular IPFS data. Wallet files are stored as a backup in the backend off-ledger, making it easy to recover if lost.

Self-sovereign identity systems are based on blockchain technology. The blockchain is an evolving technology that uses cryptocurrency to provide a decentralized, open shared ledger that can be used for electronic voting and land registration. It is evident that cryptocurrency is not the only feasible use case for blockchain. Blockchain technology is well placed due to its technical features in facilitating a notable change in digital identity. The self-sovereign identity is based on the sharing and storing verifiable claims held in off-ledger. The authenticity of these signed data objects is assured by storing a hash of the thing on a blockchain. Once subjects submit a verifiable claim to a relying party, the hash of the claim with available blockchain record can be compared and verified through an integrated signature where the relying party can quickly and precisely ascertain the claim's validity. A blockchain provides a way to revoke or store an auditable record of consent behavior and maintain the security of data objects to assure the integrity of the data object. Blockchain is built on a decentralized public-key infrastructure and provides robust methods that can be used for encryption and authentication, apart from self-sovereign identity. Additionally, blockchain offers several key features that have ample opportunities for identity systems, including immutability, usability, and low transaction cost.

III. METHODS

Self-sovereign identity solutions using a cryptographic signature, pairwise connection, and digital identities provide the user with complete control over his identity information. The user or the groups will be attached to the assets through self-sovereign identity, which improves the functions and scope of the land registry. Moreover, verifying and exchanging identity information will evolve to provide validated credentials and manage the remaining registry components that do not benefit through Self-sovereign identity

Self-sovereign identity-based land registers can also provide more detailed and trusted information about potential borrowers in developing countries. The financial-market specialists at the Inter-American Development Bank, Juan Antonio Ketterer, and Gabriela Andrade, acknowledged that transparent and more accurate asset registers as collateral could mitigate knowledge-related asymmetry constraints and provide financial access. As shown in recent initiatives in the United States of America, the expansion of mobile assets can have a major impact on economic growth for small and medium scale enterprises

To reduce the possibility of fraud in the real estate markets, a high degree of due diligence is required for the identity of the involved parties, leading to inefficiency and more transaction fees. A self-sovereign identity solution will securely associate the owner with its properties and legally bind the digital signature to provide trusted and transparent online working.

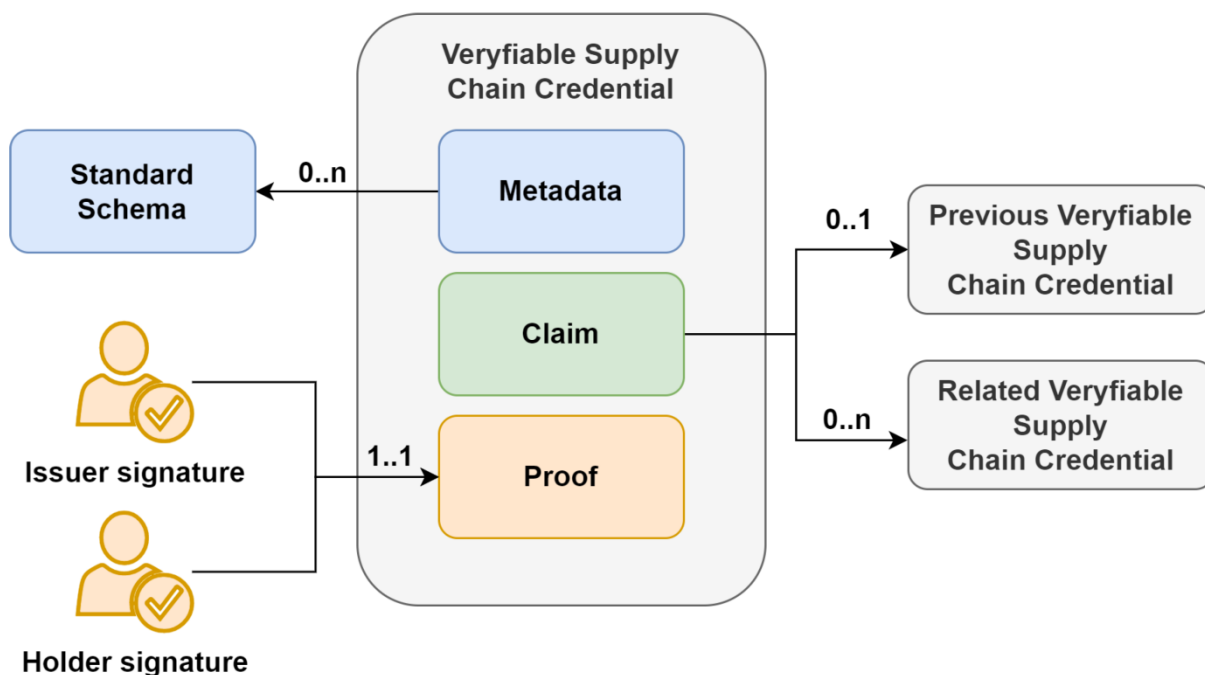


Fig 2: Blockchain-Based Supply chain method

Legal reestablishment of land for refugees and internally displaced persons (IDPs) helps postconflict restoration. However, the restoration process is complicated as many refugees do not have any essential land records or fear consequences. An SSI secures land ownership records and receives verifiable credentials from an NGO to help record a claim in lieu of a proper land registry.

Land ownership is important for preparing for disasters and can improve the restoration process. New programs for disaster preparedness use innovative technologies. Nevertheless, a solution to SSI will give users a safer and more accessible tool to show their land ownership and submit a request for assistance and restoration grants. Decentralized record management will guarantee the preservation of land ownership records. The use of biometrics in SSI allows people to prove their identities and authorized services, even though documents are deleted or lost.

IV. RESULT ANALYSIS

The search strategy is carried out between 2008 and 2021. This systematic review study took the starting point from 2008 when the first actual research in the blockchain was published. The grey literature includes magazines, company whitepapers, and books. To identify different blockchain-based self-sovereign identity solutions, and to be as generic as possible, the search string used to retrieve the articles from databases is (“self-sovereign identity” AND “Blockchain”) OR (“self-sovereign identity” AND “identity management”) OR (“self-sovereign identity” AND “Blockchain” AND “identity management”). Also, semantic search words were identified in the fields of digital identity, and self-sovereign identity and blockchain are also searched in the databases. Moreover, our search string is restricted only to the article’s title, abstract, and subject terms. It was done to exclude irrelevant articles referencing the search words only in the body’s text.

The next step was to search for all related papers. A final search was carried out on 17 November 2020, covering years from 2008 to 2022. The search consists of conferences, journals, workshops, government project reports, working papers, review documents, and book sections. The searched terms are “blockchain”, “land registry”, “Identity model”, and “Law of identity” to check the title, keywords, and abstracts of academic papers. Some research papers use real estate in place of land registry, so we have modified the search strategy and used only the real estate & blockchain keywords.

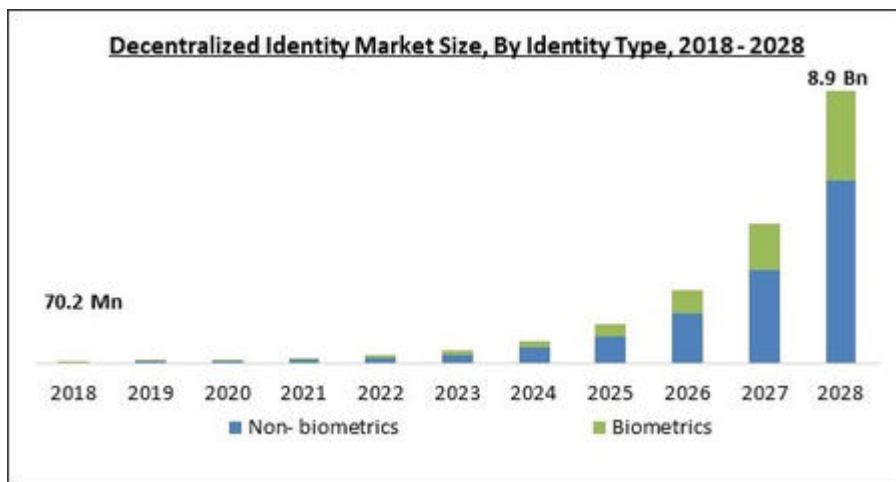


Fig 3: Result analysis

Additionally, the cryptographic key management does not support users since ShoCard stores the identities on the public blockchain, which provides open access and transparency. Users will secure the private key in their personal device, where the service provider uses a public key to verify the ShoCard ID. Organizations may use a software development kit to integrate ShoCard technology with its current application or website. ShoCard supports multiple authentication and verification, such as KYC, encryption, traceable authorizing, and credential certification, besides offering an authentication mechanism using a phone app. The method of authentication involves downloading the application to establish its ShoCard ID. It requires a user to take a snapshot of a legitimate government-issued identity through which ShoCard gathers personal information. The user can then validate the details, create a password, or ask for a biometric scan.

V. CONCLUSION

This paper highlights the limitations of existing identity solutions, advantages of SSI, and its application in the blockchain-based land registry system. This paper uses a systemic literature review (SLR) based on three defined research questions highlighting the role of SSI in solving the issue of noncompliance with identity principles, evaluation criteria for evaluating existing SSI solutions, and suggesting the best possible SSI solution in the case of Blockchain-based Land registry system. This SLR has selected 251 papers based on criteria and 65 articles from grey literature and finally used a total of 43 articles for review. A detailed study of SSI principles and evaluation criteria for existing SSI solutions have been defined. Based on the defined evaluation criteria, an extensive review of the existing SSI solutions has been done. This study highlights the strengths, limitations, and functioning of each SSI solution, and it concludes that none of the existing SSI solutions complies with all the SSI principles. Based on the defined evaluation mechanism, Sovrin is the best possible solution among the existing SSI solutions. It complies with most of the SSI principles but lacks the scale of human integration. It is the best possible SSI solution that can be applied in the case of a Blockchain-based land registry system. As the Sovrin lacks a human integration factor that is essential for ease of use and high adaptability, it provides a scope for further improvement and future research.

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