

CHAPTER 1

INTRODUCTION

The credibility of recruitment decisions critically hinges on the ability to verify candidates' academic and professional qualifications. Yet centralized credential verification systems where issuing institutions monopolize identity validation fail to provide the resilience, transparency, and scalability demanded by modern hiring (Ziyi Li et al., 2022). These vulnerabilities are particularly acute in cross-border recruitment, where delays and verification inconsistencies compromise fair hiring practices. A 2023 ResumeLab survey of 1,900 U.S. job-seekers revealed that 70% of job-seekers admitted falsifying their qualifications, and 64% of firms reported breaches linked to credential misuse, exposing a systemic trust deficit that undermines recruitment integrity (ResumeLab, 2023).

Verifiable credentials are fundamental to recruitment, serving as critical proof of applicants' academic and professional claims (Pathak et al., 2022). Yet today's centrally managed verification workflow introduces bottlenecks, drive up administrative costs, and erode trust especially when credentials must be validated across borders (Reza et al., 2021). These inefficiencies stem largely from fragmented record-keeping practices and the lack of standardized, interoperable verification protocols.

While blockchain technologies offer tamper-evident infrastructure for credentialing (Khanna et al., 2023), previous studies have introduced decentralized models for credential verification and issuance, but two gaps persist. First, revocation authority remains centralized with issuers (Reddy & Kushwaha, 2023). Second, credentials lack cross-platform portability because validation still depends on trusted intermediaries (Celador Angón, 2024). Earlier credential models based on transferable digital models based on transferable digital tokens, such as NFTs, inherently compromised identity assurance due to their tradability (Aung & Thein, 2024). For recruitment, where credentials must be permanently and exclusively associated with the individual, such tradability introduces unacceptable risks

(Sulaiman et al., 2022). SBTs address this gap by creating non-transferable, identity-bound credentials, enabling truly user-owned verification models (Tumati et al., 2024). The approach enhances trust in candidate qualifications, which is critical for maintaining recruitment credibility, while reducing reliance on third-party validation.

To address these gaps, our core contribution is a decentralized credential model that ensures authenticity, portability, and time-based auto-revocation. The model is designed for the Ethereum network and aligns with the emerging account-bound semantics defined in draft EIP-4973 (often referred to as Soulbound Tokens) as identity-bound, non-transferable digital tokens to deliver secure, user-held, and verifiable digital credentials (Tim Daubenschütz, 2022). By mapping this draft specification to a credentialing workflow and providing detailed pseudocode, the study offers early design insights to the standards community, while keeping the architecture modular enough to accommodate future amendments.

Trusted issuers such as universities, employers, and certification providers issue credentials that are cryptographically anchored to the recipient’s digital wallet. The model supports selective disclosure through structured metadata, with verification data stored on-chain and sensitive information preserved off-chain to ensure privacy and scalability. While the credential format adopts the W3C Verifiable Credentials (VC) standard for interoperability (Herbke et al., 2024). We present a use-case diagram, a process flow for issuance, verification, and revocation, as well as explicit smart-contract pseudocode logic that autonomously executes these operations and ensures an immutable audit trail.

The remainder of this paper is structured as follows: Section II reviews related literature on credential verification and blockchain-based identity. Section III details our methodology and proposed framework. Section IV presents results and discussion, and Section V concludes with directions for future research.