The Value of Blockchain-Verified Micro-Credentials in Hiring Decisions

Research Paper

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Abstract. As micro-credentials and blockchain verification gain attention in education and hiring, their impact on employer perceptions remains unclear. This study investigates how blockchain verification and credential-issuing institutions influence perceived trustworthiness, expertise, and salary expectations. Using a between-group experimental design, 200 participants evaluated a job applicant based on one of four credential types: university-issued with/without blockchain verification or learning academy-issued with/without blockchain verification. Findings revealed no significant differences in trust or expertise ratings based on credential type or verification method. However, blockchain-verified applicants received lower minimum salary offers, suggesting verification may reduce hiring risk but not increase perceived value. The study highlights a possible shift from credential prestige toward a competency-based hiring approach.

Keywords: micro-credentials, blockchain, trust, verification, employer decision-making.

1 Introduction

Traditional academic credentialing systems face well-documented challenges that hinder their effectiveness in a fast-changing educational and employment landscape. In particular, verification of academic credentials is often slow, costly, and prone to fraud. Verifying a degree or certificate typically requires manual checks by issuing institutions or third-party agencies, a process that is labor-intensive and time-consuming (OECD, 2024). The reliance on paper transcripts introduces opportunities for credential fraud and misrepresentation, undermining trust in the credentials themselves (Resei et al., 2019). Micro-credentials (MCs), which include digital badges, certificates, and other attestations of specific skills or short learning experiences, have emerged as a potential solution to augment or “unbundle” traditional degrees (Resei et al., 2019). However, ensuring trust in MCs presents its own set of problems. Unlike degrees granted by accredited universities, many MCs are offered by a wide array of non-academic providers with varying quality controls (Fischer et al., 2022; McGreal, 2023).

In practice, this means that a digital badge or online course certificate may not carry clear weight or recognition, as its rigor and authenticity might be uncertain. Indeed, studies have noted that when MCs are offered outside traditional higher education frameworks, their credibility and transferability remain unclear, leaving recognition largely to the discretion of employers (Golden, Gillian & Kato, Shizuka & Weko, Thomas, 2021; Orr et al., 2020; Steel et al., 2022). Research suggests that many employers may not yet be fully aware of MCs or understand their relevance for hiring decisions, which further complicates their adoption and perceived value in the labor market (Kato et al., 2020). This goes in line with the recent research that highlights technical, institutional, and regulatory obstacles to the broader adoption of blockchain in education, which may in turn affect how blockchain-based MCs are perceived by employers (Alsobhi et al., 2023). These insights resonate with observations from my involvement in a European-level initiative focused on developing an inter-university MCs platform. In this context, challenges have emerged not only around the technical implementation and institutional acceptance of blockchain but also regarding the broader understanding of the purpose and value of such credentialing innovations.

The problem of MCs perception is deepened by the fact that degrees from established universities carry inherent credibility, whereas credentials from non-academic educational institutions and learning platforms such as Coursera, Udemy, or similar may face skepticism (Knowledge Innovation Centre, 2022; Limone et al., 2022). The rise of MCs from a wide array of providers complicates how stakeholders assess credibility. In this context, blockchain verification may serve as a potential mechanism for increasing the perceived trustworthiness of credentials issued by non-university institutions. To address the challenges and unknowns outlined above, this study focuses on the following research question: *How does blockchain verification influence the perceived trustworthiness and expertise associated with digital credentials?*

2 Theoretical Background

2.1 Blockchain Verification and Perceived Trustworthiness of MCs

From a source credibility perspective, blockchain verification introduces a strong cue of honesty and integrity, aligning with Hovland et al.'s (1954) and Ohanian's (1990) conceptualization of trustworthiness. According to Ohanian (1990), trustworthiness is a fundamental component of perceived credibility, influencing the persuasiveness of a source. When applied to credentials, blockchain verification can serve as a reputation-enhancing mechanism, ensuring that evaluators perceive the issuing institution or credentialing entity as reliable and transparent.

The extent to which blockchain verification enhances the trustworthiness of digital credentials is highly dependent on contextual factors, including the issuing institution, the type of credential, and the familiarity of evaluators (1954) with blockchain technology. For instance, McGreal (2023) emphasized the transformative potential of blockchain-backed credentials, suggesting that the combination of blockchain and digital badges could significantly enhance verification and trust in credentialing systems, highlighting the potential of blockchain to increase trust in digital qualifications. This phenomenon aligns with the halo effect, where positive attributes of one object (e.g., the credibility of a blockchain-backed credential) transfer to an associated entity (e.g., the applicant holding it) (Thorndike, 1920). Similar effects have been observed in branding and hiring psychology, where external validation (e.g., institutional reputation, third-party endorsements) enhances perceived expertise and reliability, even when the validation is not directly tied to personal qualifications (Ohanian, 1990).

In the context of hiring decisions, credentialing cues may significantly influence how applicants are evaluated. Employers often rely on heuristics (i.e., mental shortcuts) when assessing candidates, especially in cases where they are unfamiliar with the issuing institution (Tskhay & Rule, 2013). Blockchain verification may act as one such heuristic, providing an external, trusted validation layer that enhances confidence in both the credential and its holder. While other verification systems (e.g., institutional portals, eSeals) also aim to establish authenticity, they are often less visible or familiar to external evaluators. Blockchain, by contrast, can function as a distinct trust signal, especially when explicitly stated, by conveying technological robustness and immutability (Choi et al., 2019; Funk et al., 2018; Ramos & Queiroz, 2022). Research on trust in blockchain-based systems further supports this idea, showing that users tend to attribute greater credibility to blockchain-verified data, even when they do not fully understand the underlying technology (Kishore et al., 2021; Lemoine & Richardson, 2015). Consequently, I hypothesize:

(H1) *Blockchain verification influences the perception of MCs, leading assessors to perceive the applicant as more trustworthy.*

2.2 University Credentials and Perceived Expertise

The extent to which blockchain verification enhances trust in digital credentials is shaped by multiple contextual factors, including the issuing institution, its status, and recognizability (Kishore et al., 2021). While trustworthiness concerns the authenticity and reliability of a credential, the expertise dimension of source credibility focuses on the authority and reputational standing of the credential issuer. The credibility of a credential is significantly influenced by perceptions of expertise, as a well-established institution is often assumed to provide rigorous, high-quality education that equips learners with substantial domain knowledge. This assumption aligns with Ohanian's (1990) source credibility model, which identifies expertise as a key factor in persuasion and credibility.

Higher Education Institutions (HEI) have historically built trust and prestige over time, leading to the widespread belief that their certifications inherently indicate a higher level of competence (Lushi, 2018; Smolenski, 2021). Unlike alternative credential providers, universities are usually subject to state accreditation requirements, which mandate compliance with high academic standards. Consequently, university credentials are typically associated with greater trust in both the institution and its graduates, reinforcing perceptions of reliability and expertise. However, newly established or unrecognized institutions may not necessarily command the same level of trust. Research on MCs supports this perspective, as OECD (2021) studies indicate that employers often exhibit skepticism toward alternative credentials, largely due to uncertainty regarding their content, assessment rigor, and overall quality standards. This suggests that while institutional reputation plays a crucial role, the perceived reliability of credentials remains contingent on broader regulatory and industry standards. Thus, I hypothesize:

(H2) Credentials issued by highly regarded universities carry greater weight and, thus, positively influence the perception of the applicant's expertise compared to unrecognized institutions.

2.3 Added Value of Blockchain for Trust in Credentials

While universities are traditionally regarded as highly credible institutions, enjoying strong reputational capital and a well-established system of verification (e.g., transcripts, official records) (Erdil et al., 2018), the addition of blockchain-based authentication may not necessarily enhance their perceived trustworthiness. In some cases, it could even raise questions among employers: if a university is already well-recognized, why would additional verification be necessary? Employers might interpret blockchain verification as a response to potential fraud risks or concerns about the integrity of the university's credentials rather than as a purely trust-enhancing mechanism (Wheelahan & Moodie, 2022). This suggests that for universities, blockchain may have limited or even unintended effects on employer perception, particularly when institutional reputation already functions as a strong credibility signal (Ohanian, 1990).

For alternative education providers, such as online platforms and training academies, blockchain verification may serve as a crucial market differentiator. Lacking formal accreditation, historical prestige, and standardized verification, these institutions often issue easily replicable PDF-based certifications, increasing the risk of fraud (Kishore et al., 2021; McGreal, 2023). Blockchain offers a tamper-proof validation mechanism, enhancing credibility and employer confidence. Given the absence of widely recognized validation mechanisms, blockchain verification may play a significant role in increasing employer confidence in the authenticity of such credentials (Beck et al., 2018). Studies on trust in digital systems suggest that when traditional verification structures are weak or absent, technological validation mechanisms gain importance in shaping credibility perceptions (Capece et al., 2020; Funk et al., 2018; Xi et al., 2024). However, for institutions that already enjoy high credibility baselines, adding another trust signal may not produce additional positive effects and could instead introduce uncertainty or skepticism. Conversely, for less established platforms, where trust is not automatically granted, blockchain verification could act as a critical trust-enhancing mechanism, mitigating concerns about credential legitimacy. Based on these considerations, I hypothesize that:

(H3) *Blockchain verification enhances the perceived value of credentials issued by non-university platforms, increasing employer trust in the credential and the applicant, whereas its effect on university-issued credentials is weaker or neutral.*

2.4 Research Model

In my research, I seek to address the proposed research questions and empirically test the formulated hypotheses. To illustrate the hypothesized relationships, I present my research model in Figure 2.

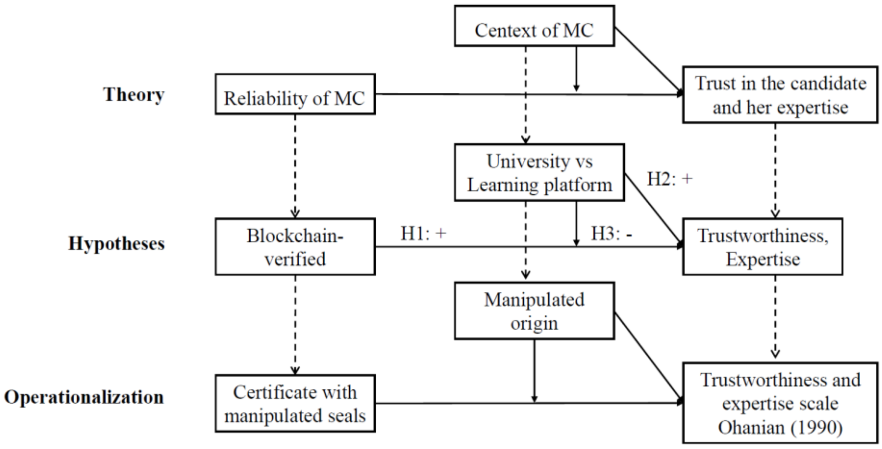

Figure 1. Research Model

3 Methodology

3.1 Research design

To systematically analyze the hypothesized relationships, I structured my study using a randomized between-group experimental design. First, causality can only be confidently established through experimental manipulation, making this design the most suitable for testing the direct effects of blockchain verification and credential sources on employer decision-making. Second, randomization simplifies the analysis by reducing selection biases and balancing unmeasured variables across groups, enhancing the internal validity of the findings.

3.2 Operationalization

Dependent variables: I identified perceived trustworthiness, perceived expertise, and willingness to pay (average, range) as the key dependent variables based on established models of source credibility and hiring criteria. My measurement approach drew from Ohanian's (1990) source credibility scale, which posits expertise, trustworthiness, and attractiveness as core dimensions of credibility. Since participants did not see a photograph of the applicant, the dimension of attractiveness is irrelevant and, thus, omitted. My study investigated how blockchain verification and credential-issuing institutions shape employer perceptions of trustworthiness and expertise. I also included questions on the willingness to pay, measured as the minimum and maximum hourly salary employers would be willing to offer the applicant. Each variable was measured using a 7-point Likert scale, adapted from Ohanian's validated instrument, ranging from "not at all" to "absolutely".

To ensure the construct validity of the measurement model, I assessed internal consistency and discriminant validity. Cronbach's alpha values were $\alpha = .940$ for *trust* and $\alpha = .937$ for *expertise*, indicating excellent internal reliability and consistency within each scale (Churchill, 1979). To test discriminant validity, I used the Heterotrait-Monotrait (HTMT) ratio of correlations, a robust criterion for construct separation. The $HTMT_{trust-expertise}$ was .637, well below the conservative threshold of .85 recommended by Kline (2023). These results confirm that the constructs were both internally reliable and empirically distinct.

Independent variables: To operationalize these constructs, I conducted a between-group experimental study. An example of a full credential presentation can be found in Figure 2, illustrating how the credentials appeared in the applicant's profile. The participants were randomly assigned to evaluate one of four credential conditions: (1) University-issued credential with blockchain verification; (2) University-issued credentials without blockchain verification; (3) Learning academy-issued credential with blockchain verification; (4) Learning academy-issued credential without blockchain verification. Figure 3 provides a visual representation of the credential verification stamp variations manipulated in the study.

Figure 2. Example of a full credential.

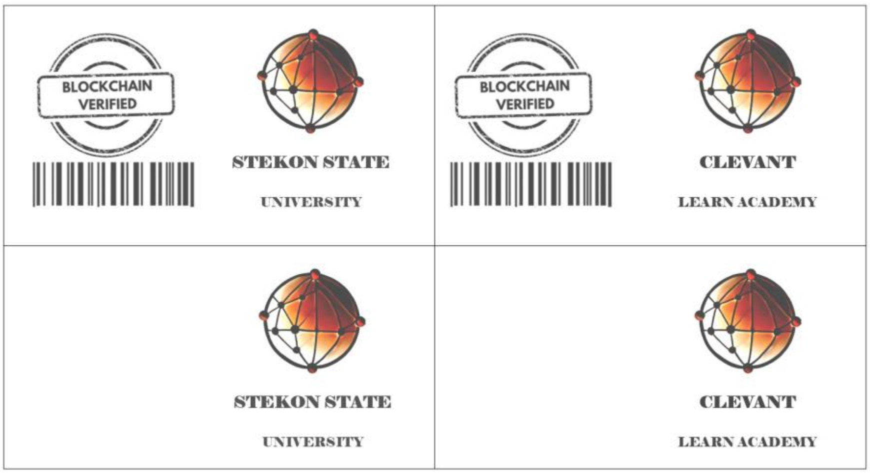

Figure 3. Overview of the manipulated bottom left corner of the certificate.

Control variables: I also collected demographic information, including age, gender, professional experience, and educational degree. Additionally, I included an "assumed gender" variable, asking participants to infer the applicant's gender based on the gender-neutral name "Alex M. Smith". This was made to control for gender-related biases in hiring, as implicit gender stereotypes can shape competence assessments and wage offers (Kraugusteeliana, 2023; Rice & Barth, 2016). Especially in male-dominated fields like IT, equally qualified female candidates are often rated less favorably than their male counterparts (Moss-Racusin et al., 2012; Reuben et al., 2014).

3.3 Pre- and Post-Study Power Analysis

Before data collection, a pre-study power analysis was conducted using G*Power to determine the appropriate sample size for the study (Faul et al., 2007). Given that the research involved comparing four experimental groups, a one-way ANOVA was selected as the appropriate statistical test. The goal of the power analysis was to ensure that the study had a high probability of detecting meaningful differences between groups while minimizing the risk of statistical errors.

To achieve this, the analysis was conducted using a large effect size (f = .40), a significance level of α = .05, and a desired statistical power of .95. These parameters were chosen to ensure a high probability of detecting strong effects while maintaining a 5 % probability of a Type I error (false positive result).

The power analysis results indicated that a minimum of 112 participants (28 per group) were required to achieve sufficient statistical power. The final power calculation confirmed that with this sample size, the study achieved an actual power of .95, indicating that it was well-powered to detect large effects across the experimental conditions.

However, to account for potential dropout rates, missing data, or unexpected variability, as well as to increase statistical power, the final planned sample size was increased to 200 participants (50 per group). This adjustment ensured that the study remained well-powered even in the presence of minor participant attrition.

3.4 Experimental Procedure

I conducted a randomized two-group experiment using Qualtrics® in an online format to investigate perceptions of trust and expertise in different credentialing systems. Participants were recruited via Prolific© and were informed about the estimated duration of the study as well as the anonymity of their responses. To ensure data privacy, participant information was stored in a restricted database within Prolific, which remained inaccessible to researchers.

During the experiment, participants were first presented with an introduction page outlining details such as the anonymity of the survey and its duration. Following this, they were given a scenario: their manager had identified a need to improve communication within the Information Technology team and was therefore looking to hire a candidate with both IT knowledge and proven business communication skills. The manager then asked the participant to assist in the hiring decision.

Participants were subsequently provided with a brief summary of the applicant's key skills extracted from their CV (rather than the full CV, to minimize distractions and information overload), along with an attached credential. Each participant was randomly assigned one of four credential types displayed in the applicant's profile. After reviewing the applicant's CV (same for all treatment groups) and manipulated credentials, participants were asked to evaluate the applicant's trustworthiness and perceived expertise based on the provided information. Subsequently, they were asked about the purpose of the study, and on a separate page, they indicated what they believed the candidate's gender to be.

3.5 Sample

To evaluate my model, I conducted a targeted recruitment of participants via Prolific©, selecting individuals based in the United Kingdom who are professionally engaged in the fields of IT, Information Networking, and Information Security. This specific sample helped increase the external validity as the IT-specific problem of communication in teams (e.g. Bogodistov & Moormann, 2020) was presented to IT specialists. Moreover, IT professionals are more likely to understand the technological implications of blockchain technology. The final dataset included 200 participants (157 male, 43 female), reflecting the gender disparity in the IT sector (Blackburn & Heppler, 2019). The average age was 40.65 years (*SD* = 12.18), with an average of 2.03 years (*SD* = 0.96) of professional experience.

4 Results

I conducted a factorial multivariate analysis of variance (MANOVA) to examine how blockchain verification (present vs. absent) and educational affiliation (university vs. learning academy) affected multiple outcome measures: perceived trust, perceived expertise, and willingness to pay, the latter operationalized through minimum, maximum, and average salary offers, as well as the calculated salary range (maximum minus minimum).

This full-factorial model tested the direct (main) effects of blockchain verification and university affiliation on each dependent variable, as well as their interaction. In this model, I also controlled for both the participant's gender and the anticipated gender of the candidate, in recognition of the well-documented influence of gender bias and gender-based wage disparities in hiring contexts (Blau & Kahn, 2017; Moss-Racusin et al., 2012).

A slightly significant multivariate effect was observed for blockchain verification, *Pillai's Trace* = .002, $F_{2, 192}$ = .171, p = .843, though the effect size was small (partial η^2 = .002), indicating that blockchain verification explained only 0.2% of the variance in the dependent variables. Since the p-value is well above the conventional significance threshold (p > .05), this result suggests that blockchain verification did not have a statistically meaningful impact on the dependent variables in this study. Similarly, the main effect of credential type (university vs. learning academy) did not reach significance, suggesting that university-issued credentials did not automatically enhance perceptions of trustworthiness or expertise compared to learning academy credentials.

Although the gender of the participant did not significantly influence hiring perceptions (*Pillai's Trace* = .004, $F_{2, 192}$ = .372, p = .690, η^2 = .004), an interaction effect was found for anticipated gender, which moderated the impact of blockchain verification and credential type on salary offers. Specifically, *Pillai's Trace* = .030, $F_{2, 192}$ = 2.948, p = .055, with an effect size of η^2 = .030, indicating that 3.0% of the variance in salary offers was influenced by anticipated gender.

Additionally, a series of ANOVAs was conducted to examine the effects of blockchain verification and credential type on the dependent variables. Before that, I ran a Levene's test of homogeneity of variance to show that ANOVA test can be applied. Both for trust ($F_{13, 187}$ = .853, p = .603) and expertise ($F_{13, 187}$ = .736, p = .726) Levene's test was not significant, indicating that the ANOVA is legitimate (Huberty & Petoskey, 2000).

Perceived trustworthiness did not significantly differ across conditions, $F_{2, 192}$ = .171, p = .843, suggesting that neither blockchain verification nor credential issuer had a strong influence on how employers rated trustworthiness. Similarly, perceived expertise showed no statistically significant main effects, $F_{2, 192}$ = .572, p = .565, though a weak trend suggested that a combination of blockchain verification and a university-issued credential slightly increased expertise rating. In contrast, willingness to pay exhibited some differentiation, particularly in minimum salary offers, which were lower for blockchain-verified applicants than for those without verification, $F_{2, 192}$ = 1.310, p = .272. This finding suggests that credential verifiability may reduce perceived hiring risk, leading employers to offer a more conservative starting wage.

Additionally, anticipated gender played a role in salary expectations, as participants who assumed the applicant was female tended to offer higher salaries than those who assumed the applicant was male, $F_{2, 192}$ = 2.948, p = .055, η^2 = .030. This suggests that gender perception may exert a stronger influence on salary decisions than credential format alone.

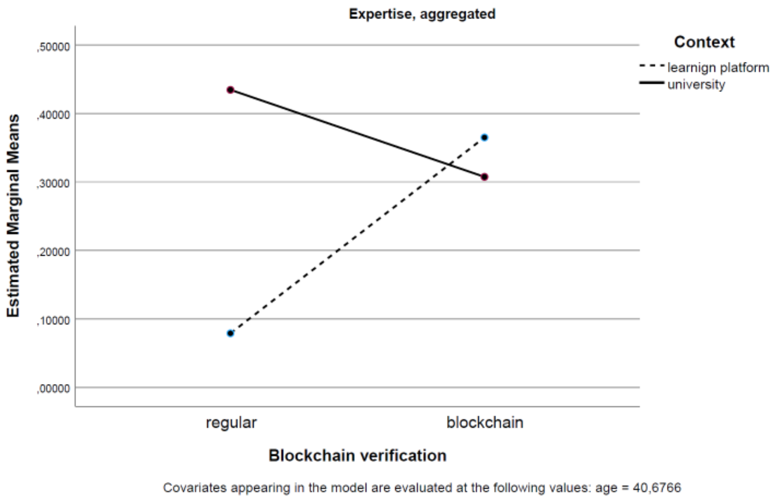

Figure 5. Example of a full credential.

Additionally, a series of ANOVAs was conducted to examine the effects of blockchain verification and credential type on the dependent variables. Perceived trustworthiness did not significantly differ across conditions, $F_{1, 193} = .202, p = .653, \eta^2 = .001$, suggesting that neither blockchain verification nor credential issuer had a strong influence on how employers rated trustworthiness. Similarly, university-issued credentials did not provide a clear advantage over those issued by non-university providers, $F_{1, 193} = .266, p = .607, \eta^2 = .001$. The interaction effect between blockchain verification and credential type was also non-significant, $F_{1, 193} = .055, p = .815, \eta^2 = .000$, suggesting that blockchain verification did not meaningfully alter employer trust perceptions, regardless of the issuing institution. Likewise, perceived expertise did not show significant effects for blockchain verification, $F_{1, 193} = .317, p = .574, \eta^2 = .002$, or university-issued credentials, $F_{1, 193} = 1.141, p = .287, \eta^2 = .006$. However, while the interaction between blockchain verification and credential type was not statistically significant, $F_{1, 193} = 2.141, p = .145, \eta^2 = .011$, the trend suggests that blockchain verification may have a slight positive effect on expertise ratings for non-university credentials. This aligns with the hypothesis that blockchain verification could serve as a trust-enhancing mechanism for alternative credentials, though further research is needed to confirm this effect.

5 Discussion

The findings of this study signal a potential challenge for universities: practitioners surveyed appeared largely indifferent to whether credentials were issued by universities or non-university providers, with no significant differences in perceived expertise or trustworthiness. This aligns with concerns raised by scholars, such as Wheelahan & Moodie (2022), who argue that MCs may pose a genuine threat to the traditional university system. The results suggest that employers are increasingly prioritizing demonstrated skills and competencies over institutional prestige, shifting toward a more flexible, skills-based hiring approach. This tendency is particularly pronounced in fast-evolving sectors such as IT and communications, where targeted MCs, such as certifications in specific software or project management tools, are often perceived as more immediately relevant than traditional degree programs (OECD, 2024; Wheelahan & Moodie, 2022). Their ability to quickly reflect current industry needs gives them a competitive edge in these domains (Fischer et al., 2022; Orr et al., 2020). If this shift persists, universities may face mounting pressure to adapt their credentialing models to better communicate tangible skill outcomes.

My findings suggest that despite growing enthusiasm for blockchain as a tool to enhance credential transparency, blockchain verification did not significantly increase employers' perceptions of an applicant's trustworthiness or expertise. Until employers broadly recognize and value what a blockchain-verified credential represents, such credentials may serve primarily as back-end efficiencies or experimental technology, rather than as strong credibility signals. In essence, cultural adoption lags behind technical capability. However, my results approached significance for an interaction effect (Figure 1), indicating that a more refined research design could reveal stronger patterns.

While trust and expertise perceptions were largely unaffected by credential type, an intriguing outcome emerged regarding salary expectations. Applicants with blockchain-verified credentials were offered lower minimum starting salaries compared to those without blockchain verification. Rather than being an advantage, the blockchain stamp seemed to signal that the applicant's qualifications were easily verifiable and thus lower-risk, paradoxically giving employers the confidence to offer a bit less. Likewise, I observed that university-issued credentials did not lead to higher salary offers than those issued by a non-university learning academy; in fact, in sample, they were associated with slightly lower minimum salary offers.

My exploratory analysis revealed significant hints of gender-based biases in how participants evaluated the applicant. Interestingly, participants who assumed the applicant was female tended to offer higher salaries than those who assumed the applicant was male. Although this difference was not statistically significant and my scenario was hypothetical, it raises questions about gender congruence effects in perceived salary negotiations. One possible interpretation is that evaluators might overcorrect or react differently when they believe a candidate is female, perhaps anticipating salary negotiations or wanting to appear unbiased. This pattern, tentative as it is, aligns with a broad body of research indicating that gender perceptions can influence hiring decisions and salary offers (Moss-Racusin et al., 2012)

While traditional university credentials are certainly not obsolete, their competitive edge is no longer assured. The growing acceptance of alternative credentials, combined with technologies that make all credentials easier to verify, is democratizing the qualification space. This shift presents both opportunities for greater access and personalization in learning but also risks such as credential inflation, increased labor market instability, and the weakening of the broader educational mission (Wheelahan & Moodie, 2022). These findings expand on concerns raised by Resei et al. (2019) and the OECD (2024) about the instability of trust in traditional and non-traditional credentialing systems alike, especially in the absence of shared verification standards.

Higher education stakeholders, policymakers, and employers will need to navigate this evolving landscape thoughtfully. Future research should continue to monitor how employers' preferences change over time and how educational institutions can innovate without compromising their deeper educational purposes. The ultimate question raised is whether I am witnessing the beginning of a paradigm shift in how society defines and trusts "qualification" and expertise, or simply an expansion of the pathways people can take to demonstrate their abilities. My findings suggest the early signs of such a shift, one that will require careful balancing of innovation with the enduring values of education and equity in the workforce.

6 Limitations & Future Research

A key limitation is my sample composition, primarily IS specialists who may lack HR expertise in candidate evaluation. Their decision-making may differ from HR professionals or hiring managers familiar with recruitment heuristics, potentially contributing to the non-significant results. Future research should include HR professionals to examine whether evaluator background influences perceptions of blockchain-verified and non-verified credentials.

Additionally, the operationalization of credential information may have contributed to the weak effects, as the small blockchain verification stamp likely reduced its salience. Participants may have focused more on the certificate's text, diminishing the impact of the manipulated verification factor. Future studies should adopt a text-only approach to isolate the effects of credential type and verification status.

Moreover, the experimental design did not include semi-automated verification mechanisms such as eSeal systems or institutional online verification portals, which are already in use by some universities and learning providers. Future research should consider comparing such established methods with blockchain-based verification to more precisely isolate their relative signaling effects.

If future research replicates these findings, it may further indicate that traditional university credentials are losing their competitive edge. Concerns about MCs undermining universities (Wheelahan & Moodie, 2022) appear valid, as employers showed no significant preference for university-issued credentials over non-university ones. Confirming these trends could signal a structural shift in how employers value higher education versus alternative learning pathways.

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