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Application of Smart Contracts in Engineering Audit Data Verification: Systematic Review and Future Research Directions

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Abstract: The difficulties in engineering audit data verification lie in the evidence gap among on-site facts, contract rules, measurement and payment, and responsibility attribution. Blockchain and smart contracts provide new governance interfaces for this gap, but existing research is scattered in adjacent fields such as construction contract management and Audit 4.0, and has not yet formed a comprehensive explanation for engineering audit. Based on the PRISMA approach, this paper searches and screens relevant literature, combines the evidence mapping method, and reconstructs the knowledge structure of this field around "input of facts - translation of rules - execution of contracts - anchoring of evidence - audit feedback". The study shows that the role of smart contracts in engineering audit is not to replace audit judgments, but to embed verifiable items in the project process, converting engineering quantities into traceable audit events. The literature also reveals that the real bottleneck does not lie in the chain-based evidence storage, but in whether the facts can be trusted to enter the contract, whether the contract rules can accommodate the engineering context, and whether the contract execution results can be recognized by the system. Based on this, this paper proposes a hierarchical mechanism framework and future research agenda for engineering audit data verification, emphasizing trusted oracles, BIM-IoT-chain integration, and privacy protection verification as the main lines of subsequent research.

Keywords: Smart Contracts; Engineering Audit; Blockchain; BIM; Oracle

I. Introduction

The engineering audit does not deal with isolated accounts, but rather with an evidence network composed of engineering quantities, progress, quality, changes, vouchers, materials, payments and settlements. Traditional verification relies on post-event documents, manual sampling, cross-departmental inquiries and supplementary explanations from project participants, often starting to reconstruct the evidence chain

only after the event has occurred. This often leads to problems such as data lag, version drift, fragmented documents and ambiguous responsibility boundaries. The construction project has a long duration, involves multiple participants, and has complex contract levels. The on-site situation keeps changing. Data verification has gone beyond the scope of technical verification and encompasses the recording of project facts, triggering of contract terms, presentation of payment conditions, and determination of responsible entities. Existing reviews of construction contract management have shown that blockchain and smart contracts can improve contract transparency, payment execution, dispute prevention and performance tracking [1-2]; however, these studies mostly focus on project management efficiency and have not placed "how auditable evidence is generated" at the center.

The literature on audit information systems provides another explanatory path. Blockchain accounting and assurance research considers a real-time, transparent and verifiable data environment as an important condition for the digitalization of auditing, while smart contract research further discusses the rule-based, automated and near-real-time execution of auditing procedures [3-4]. The uniqueness of engineering audit lies in its being a composite fact composed of on-site conditions, contract terms, engineering measurement, quality acceptance, material circulation and payment nodes. BIM, IoT, ERP, scanning modeling, digital signatures and supply chain traceability systems can convert these facts into structured data, while trusted oracles determine whether these data can enter the contract in a traceable manner. The research on smart construction objects as blockchain oracles, as well as the review of oracle credibility, actually have touched upon the most sensitive interface of engineering audit: before real facts enter the code rules, they must first obtain proof of source, time point, subject and integrity [5-6].

This paper raises four questions. How do existing studies define the functional boundary of smart contracts in the data verification of engineering audit? Which construction project data objects are most suitable for contract-based verification? How to connect the immutability of the chain, the authenticity of the off-chain, the automatic execution of the contract and the professional judgment of auditing? What gaps are left in evidence strength, scenario verification and governance mechanisms in existing research? The contribution of this paper lies in once again proving that blockchain is "useful", and incorporating smart contracts into the discussion of the evidence infrastructure of engineering audit, revealing its institutional meaning in fact admission,

rule execution, responsibility tracking and auditing feedback.

II. Review Methodology

This article adopts a combined approach of systematic review and evidence mapping. The PRISMA 2020 guidelines and the earlier PRISMA statement provide procedural constraints for the search, screening, and inclusion processes [7-8]; evidence mapping is used to handle the scattered state of this field across construction management, information systems, supply chain governance, and auditing techniques. During coding, this article inquires about the specific location of each study within the engineering audit evidence chain. Table 1 summarizes the search strategy and screening criteria.

Table 1. Search Strategy and Screening Criteria

Item	Specification	Rationale
Databases	WoS, Scopus, IEEE Xplore, ScienceDirect, SpringerLink, ASCE Library, Taylor & Francis, Crossref/OpenAlex	Cover construction management, information systems, auditing, and blockchain engineering
Core keywords	smart contract; blockchain; construction audit; engineering audit; data verification; BIM; IoT; oracle; continuous auditing	Capture both construction-side and audit-side literature
Inclusion	Peer-reviewed journal papers, high-quality conference papers, systematic reviews, conceptual frameworks, prototype or case studies	Ensure theoretical and technical relevance
Exclusion	Pure cryptocurrency papers, non-technical commentaries, papers without audit/data verification relevance, duplicate preprints	Avoid thematic dilution
Coding dimensions	Domain, data source, contract function, verification mechanism, evidence type, validation method, limitation	Enable evidence mapping and synthesis

The verification of engineering audit data has not yet formed a stable set of key terms. The related research is divided into two parts: one focuses on the digital governance of construction projects, another on blockchain audit guarantees, and a third part delves into supply chain, BIM and smart contract security research. Based on this, this paper adopts a cross-search strategy and follows the process shown in Figure 1 to screen the literature.

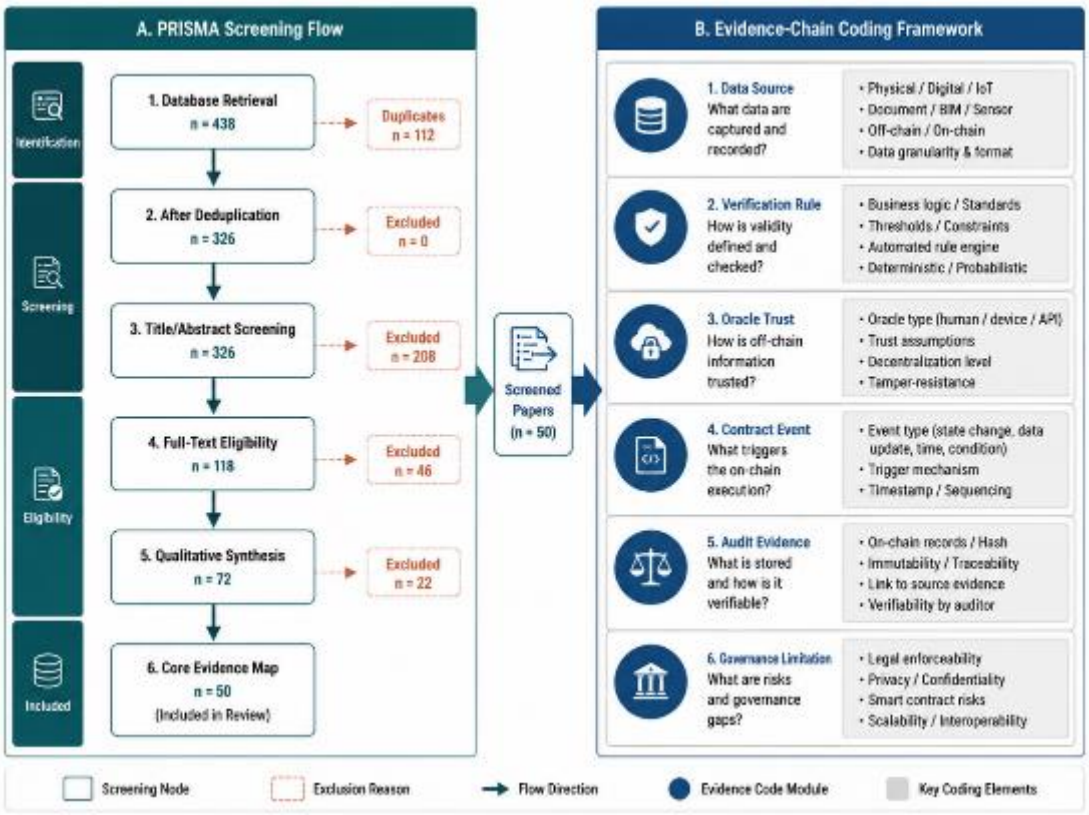

Figure 1. PRISMA-Based Literature Screening Process

The included literature was then re-coded according to the coding framework in Table 2, and transformed into comparable evidence chain units.

Table 2. Coding Framework for the Systematic Review

Code	Coding dimension	Typical values	Audit relevance
C1	Application domain	Contract, payment, BIM provenance, supply chain, ESG assurance, public audit	Defines where verification occurs
C2	Data source	BIM, scan-to-BIM, IoT, ERP, contract documents, sensor data, disclosure data	Determines off-chain evidence quality
C3	Contract function	Trigger, escrow, penalty, access control, provenance logging, exception warning	Translates audit rules into executable logic
C4	Verification mechanism	Hashing, timestamping, oracle attestation, multi-source matching, smart contract event logs	Connects project facts with audit evidence
C5	Validation type	Conceptual model, prototype, simulation, case study, systematic review, empirical study	Indicates evidence maturity
C6	Limitation	Oracle risk, privacy, scalability, rule rigidity, legal enforceability, interoperability	Identifies future research agenda

III. Descriptive Mapping of the Literature

Figure 2 shows the annual distribution of the included literature. The research conducted from 2016 to 2019 was mainly based on blockchain; from 2020 to 2022, BIM data traceability and smart contract security became more concentrated topics; after 2023, Scan-to-BIM payment automation, digital construction supply chain, and Audit 4.0 assurance began to converge. This trajectory indicates that the verification of engineering audit data is not an issue introduced by a single technology, but a new problem domain formed at the intersection of project digitization, supply chain traceability, blockchain records, and continuous auditing.

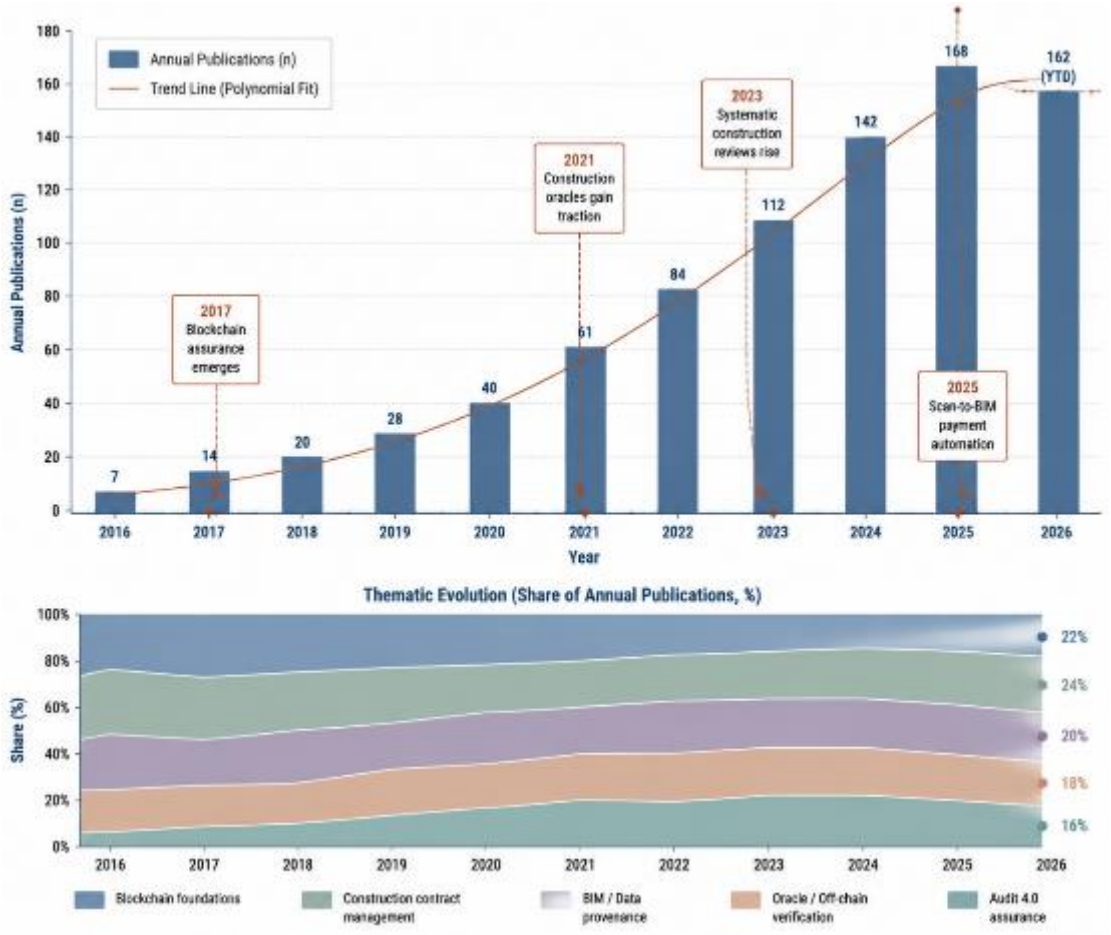

Figure 2. Annual Publication Trend in the Reviewed Corpus

Table 3 further provides the quantity, focus, and maturity of different research categories. Beyond the annual trends, Table 3 further summarizes the included literature from three dimensions: research categories, representative focuses, and maturity.

Table 3. Descriptive Statistics of the Reviewed Literature

Category	Number	Representative focus	Observed maturity
Construction	14	Contract transparency, dispute	High conceptual

blockchain and contract management		prevention, payment execution	maturity; medium empirical maturity
BIM and project data provenance	9	BIM-chain integration, data versioning, design information responsibility	Medium to high
Smart contract foundations and security	8	Architecture, vulnerability, platform comparison, automation boundary	High technical maturity
Oracle and off-chain verification	5	Trusted data feeds, privacy-preserving proof, smart construction objects	Emergent but pivotal
Supply-chain traceability	7	Material provenance, custody transfer, transparency, quality responsibility	Medium to high
Audit 4.0 and assurance	7	Continuous audit, smart audit procedure, ESG assurance, accounting information systems	High theoretical relevance

As can be seen from Table 3, the construction project literature and the audit literature do not simply overlap; instead, they progress at both ends of the evidence chain. The former contributes resources from the factual side, while BIM, scanning modeling, IoT, material circulation and contract status constitute data objects that are collectible, anchored and comparable; the latter contributes resources from the standard side, and continuous auditing, automated assurance and intelligent auditing procedures stipulate which data can be interpreted as evidence. Figure 3 juxtaposes these two routes, and its significance lies in demonstrating that the research focus is shifting from "documenting project transactions" to "generating auditable facts".

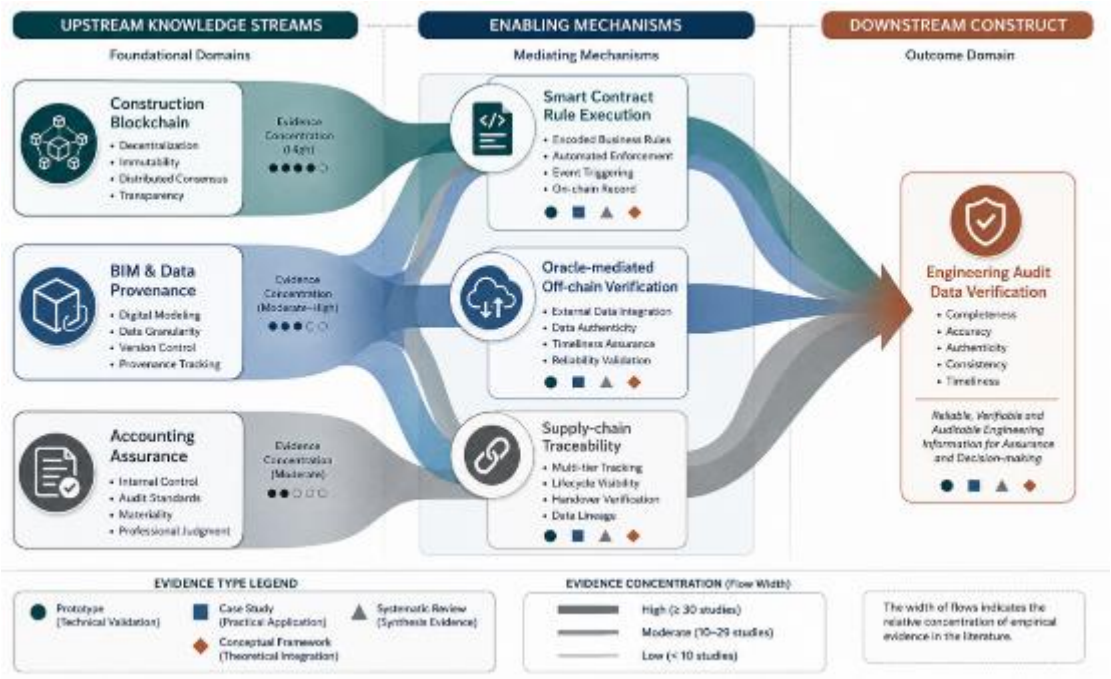

Figure 3. Research Trajectory from Construction Blockchain to Audit Verification

IV. Thematic Synthesis: From Construction Data to Audit Evidence

4.1 Construction Contract Management and Payment Verification

Most studies have generally summarized the functions of blockchain as contract status recording, transparent payment conditions, preservation of dispute evidence, and multi-party collaboration [9-13]. In the context of engineering auditing, these functions need to be re-examined. Linking contract terms to the blockchain is only the beginning. The core focus of auditing is whether the terms can form a verifiable mapping relationship with on-site engineering quantities, acceptance status, payment conditions, and responsible entities.

Based on this, Table 4 summarizes the auditing implications of each research line. BIMcontracts and Scan-to-BIM studies show that BIM component status, on-site scanning results, and contract conditions can jointly trigger engineering payments [14-15]. Their deeper value lies in reconfiguring the basis for payment, enabling payment decisions to be based on traceable and verifiable engineering facts. The engineering quantity is no longer just the declared number in the settlement stage, the progress is no longer just the form signed by the supervisor, and the payment conditions no longer exist independently from the on-site facts. After these three are connected by contract events, the formation time of auditing evidence shifts from before the completion settlement to the construction process. Thus, auditing shifts from confirming existing

evidence to verifying how the evidence is generated, who generates it, and under what rules it is generated.

Table 4. Representative Studies by Research Stream

Stream	Representative studies	Main mechanism	Implication for audit verification
Construction contract	Zhang et al.; Gupta and Jha; Li and Kassem	Blockchain records contractual states and reduces dispute opacity	Turns contract performance into traceable audit events
Payment automation	Sigalov et al.; Elsharkawi et al.	BIM/scan data trigger smart-contract payment	Links quantity/progress verification with payment conditions
BIM provenance	Celik et al.; Elghaish et al.; Liu et al.	Blockchain records BIM object metadata and responsibility	Supports version control and evidence attribution
Oracle verification	Lu et al.; Al Breiki et al.; Park et al.	Off-chain data are attested before entering smart contracts	Addresses the weakest point of on-chain audit logic
Audit 4.0	Dai and Vasarhelyi; Rozario and Thomas; Guo et al.	Smart contracts encode audit procedures and alerts	Moves audit from ex post sampling to near-real-time assurance

4.2 BIM Data Provenance and Responsibility Attribution

The BIM literature presents the second set of evidence. BIM can store information such as project quantities, but it does not automatically generate audit validity. Issues such as model version coverage, modification of component attributes, unclear liability entities, and inconsistency of the model on-site will weaken its evidentiary qualification. The research on BIM data sources supported by blockchain writes metadata, publishing entities, version information, and liability boundaries onto the chain record [16]; the research on digitalized circular construction supply chain further incorporates material, component, and lifecycle information into the continuous tracking chain [17]. These two studies jointly illustrate that the audit value of BIM-chain comes from the responsibility-based data structure, rather than the model visualization itself.

In this sense, BIM-chain undertakes at least three verification tasks. One is to trace the model source of project quantities or change entries, the second is to identify the entities responsible for data submission, confirmation, modification, and use, and the third is to compare the consistency of BIM component data with scanning results, IoT sensing, material entry, and payment applications. The smart building management research has provided several application frameworks [18-20], but most of these frameworks still center on collaborative efficiency. The engineering audit requires that

each data object must answer questions about source, time point, liability, and reusability; data models that cannot answer these questions, even if highly detailed, are difficult to become high-quality audit evidence.

4.3 Smart Vision, IoT and Off-Chain Data Capture

The third set of evidence comes from intelligent vision and IoT research. The construction 4.0 literature indicates that machine vision, deep learning, sensors, and drones have entered progress monitoring, quality identification, safety management, and operation and maintenance monitoring [21]. These technologies expand the sources of audit facts and also bring data noise, model errors, equipment calibration, sampling frequency, and time synchronization issues into the verification chain. Smart contracts only execute input rules and cannot independently prove the authenticity of the site. The immutability of the chain cannot be equated with the authenticity of the entire chain; the pre-stage of engineering audit is precisely the collection, cleaning, cross-comparison, and liability-proofing of facts collected off-chain.

V. Technical Mechanisms of Smart-Contract-Enabled Verification

The review studies repeatedly discuss automatic execution, transparent rules and decentralized collaboration [22-25]; the security studies remind that re-entry attacks, integer overflows, access control flaws, timestamp dependencies and business logic errors will directly alter the contract results [26-27]. Engineering audits cannot merely treat smart contracts as control tools; they must also include the contract code itself as an object of audit. Once anomaly warnings are triggered by the contract, the contract logic becomes part of the evidence chain; code defects are no longer just risks to information systems, but will transform into audit conclusion risks and responsibility allocation risks.

The basic blockchain review and technical standards regard distributed consensus, non-modifiability, timestamps, transparent records and encrypted verification as the main advantages [28-31]. Engineering audits need to translate these capabilities into specific data objects. This article summarizes the credibility of audit data as follows:

$$TVS_i = \alpha I_i + \beta C_i + \gamma T_i + \delta R_i - \lambda E_i \quad (1)$$

Among them, TVS_i represents the credibility of the i-th type of audit data; I_i, C_i, T_i, R_i and E_i respectively represent data integrity, cross-source consistency, timestamp credibility, responsibility traceability, and abnormality and manipulation risks. This formula integrates scattered technical capabilities into a unified audit

framework. Whether the data can be accepted depends on whether the records are complete, whether the sources can be mutually verified, whether the sequence is reliable, whether the responsibility can be traced, and whether there is an unidentifiable manipulation space.

Figure 4 presents the technical mechanism under this framework. The data layer is responsible for collection, cleaning and cross-source matching; the oracle layer completes trusted transmission and fact verification; the contract layer executes rules and triggers anomalies; the evidence layer solidifies logs, hashes and responsibility relationships; the audit analysis layer converts contract events into professional judgments and governance feedback.

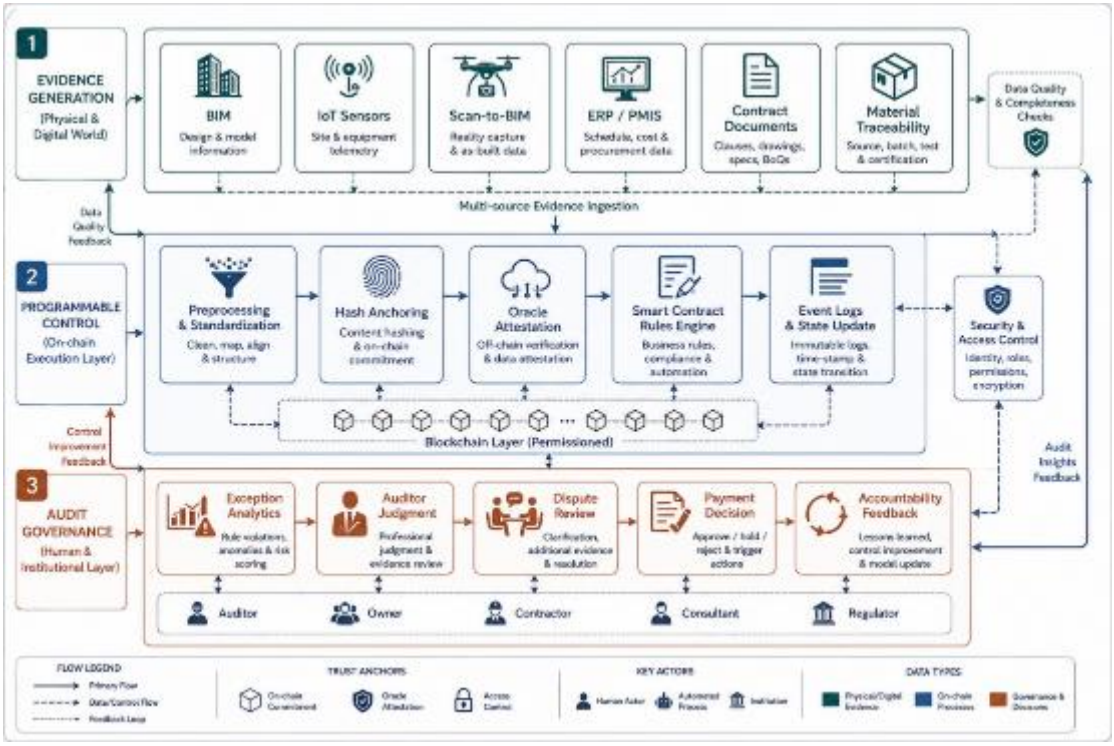

Figure 4. Mechanism Framework of Smart-Contract-Enabled Engineering Audit Verification

Table 5 further narrows down this framework to six types of audit scenarios: quantity of work, progress, changes, materials, payment, and compliance, allowing the discussion of the mechanism to return to actionable audit objects.

Table 5. Application Scenarios, Data Sources, Verification Rules, and Audit Outputs

Scenario	Primary data source	Smart-contract rule	Audit output
Quantity verification	BIM quantity take-off; scan-to-BIM; field measurement	If approved quantity equals measured threshold, record payable quantity	Quantity exception list; payable base
Progress verification	IoT sensors; site images; schedule	If progress milestone is attested by oracle, trigger progress event	Milestone evidence; delay

	system		warning
Change order verification	Change documents; BIM version logs; approval signatures	If approval chain is complete, bind change to model version	Change legitimacy trace
Material traceability	Supplier records; QR/RFID; logistics data	If custody transfer is validated, update material provenance	Material source and responsibility record
Payment verification	Contract schedule; payment application; completion evidence	If quantity/progress/quality conditions are satisfied, release or flag payment	Payment approval or exception
Compliance verification	Regulatory requirements; inspection records; ESG data	If compliance threshold is breached, generate audit alert	Compliance warning and rectification record

Figure 5 compresses the above process into an evidence chain. After the on-site facts are digitally recorded, hashed summarized, proved by the oracle, and processed by the contract events, they enter the audit evidence set. This process determines how the smart contract connects the facts and the rules in the engineering audit, and also makes the vulnerable links before the facts enter the rules fully visible.

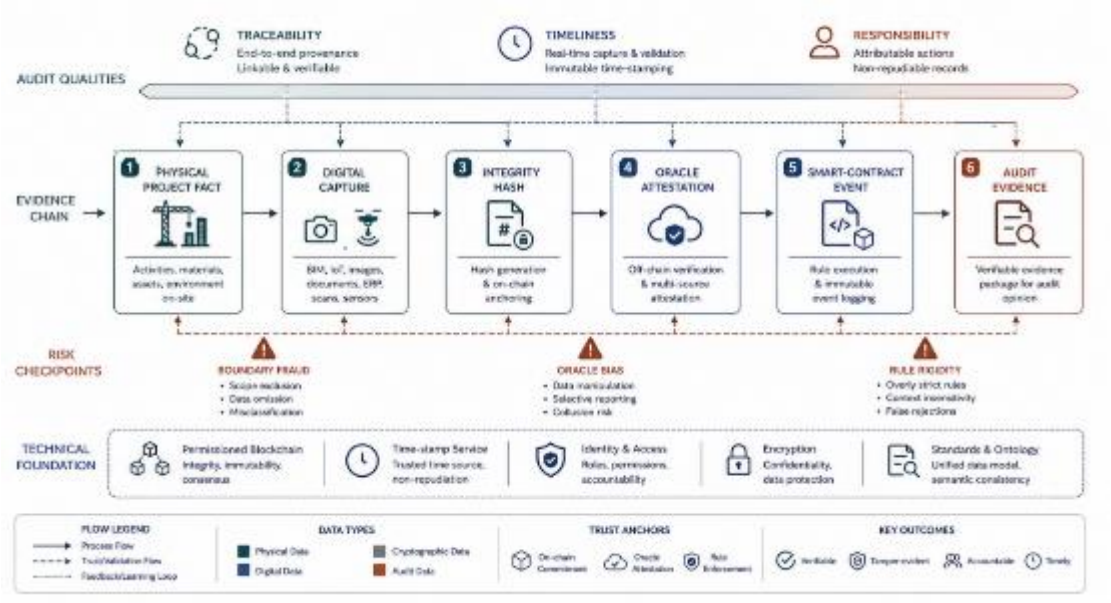

Figure 5. Evidence Chain from Off-Chain Project Facts to On-Chain Audit Records

VI. Evidence Strength and Forest-Like Synthesis

Figure 6 uses a forest plot-style to express the strength of evidence, comparing the evidence density, method maturity, scenario closeness, transferability and transparency of limitations of different research streams.

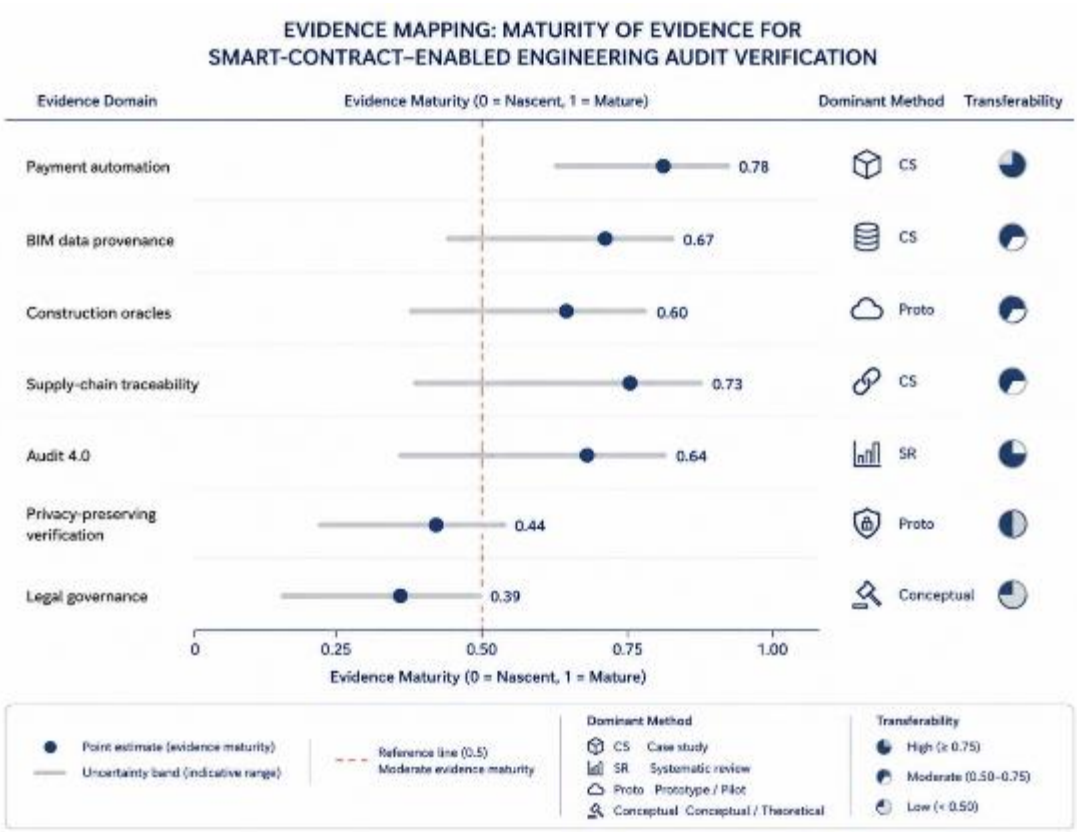

Figure 6. Evidence Strength Plot by Research Stream

Based on Table 6, it can be seen that prototypes, case studies or system overviews have been developed for payment automation, BIM data traceability and supply chain traceability; while the continuous verification framework specific to engineering audits, trusted oracle governance and liability configuration are still relatively weak. The technical side has advanced faster, but the auditing system has absorbed the changes relatively slowly. In other words, existing research can already explain how data is linked to the blockchain and how rules are executed, but it has not fully explained how these on-chain events can be transformed into reliable evidence in auditing opinions, liability determination and dispute resolution.

Table 6. Methodological Characteristics and Evidence Levels

Research stream	Dominant method	Evidence level	Key weakness
Payment automation	Prototype; case implementation; smart contract workflow	Medium-high	Limited cross-project validation
BIM data provenance	Conceptual model; prototype; cost analysis	Medium-high	Model-field consistency not fully resolved
Construction oracles	Conceptual framework; oracle design	Medium	Trust assumptions remain fragile
Supply-chain	Prototype; case study;	Medium-	Boundary fraud and

traceability	systematic review	high	human error remain
Audit 4.0	Conceptual model; prototype; review	Medium	Few construction-specific audit cases
Privacy-preserving verification	Cryptographic model; zk proof; access-control design	Medium-low	High complexity and deployment cost
Legal governance	Conceptual and normative analysis	Low-medium	Limited empirical testing

VII. Audit-Oriented Interpretation of the Literature

Supply chain traceability literature has brought the verification of engineering materials and equipment into a broader governance context. Product traceability studies have shown that event logs, identity authentication, and transaction records can reconstruct the product circulation chain [34-35]. Supply chain research regards transparency, traceability, multi-party collaboration, and digital integration as the main values of blockchain applications [36]. After being incorporated into engineering audits, these mechanisms correspond to material source verification, equipment entry verification, quality responsibility tracking, and abnormal circulation warning.

Table 7 summarizes the relevant technical mechanisms and their auditing functions. Blockchain enhances the visibility of digitized events, but human errors and fraud at the boundaries still exist. Theoretical research and case studies indicate that supply chain blockchains are still constrained by governance, incentive mechanisms for participants, the authenticity of data entry, and cross-organizational collaboration costs [37-40]. When engineering audits incorporate the results of supply chain traceability, they should not only adopt the traceability interface, but also connect material scanning, sensor collection, and logistics records with acceptance responsibilities, sampling mechanisms, and abnormal penalties. Without this layer of institutional connection, the traceability system is prone to remain "visible" but difficult to achieve "accountability".

Table 7. Technical Mechanisms and Audit Functions

Technical mechanism	Operational logic	Audit function	Residual risk
Hash anchoring	Store digest of off-chain data on chain	Detect later alteration of documents or BIM files	Original data may be false before hashing
Timestamping	Attach verifiable time to event record	Reconstruct sequence of progress, change, and payment	Clock synchronization and delayed submission
Oracle attestation	Transmit verified off-chain state to smart	Connect field facts with executable rules	Oracle manipulation and source dependence

	contract		
Smart contract trigger	Execute payment, warning, or logging when conditions are met	Automate rule-based audit controls	Rule rigidity and coding defects
Event log	Record contract execution and participant actions	Support audit trail and accountability	Incomplete off-chain context
Access control	Limit who can submit, approve, or query data	Protect sensitive audit and contract information	Key management and role misconfiguration

The audit literature elevates the aforementioned technical mechanisms to a guarantee logic. The research on blockchain accounting and guarantee proposes a real-time, transparent, and verifiable data environment [3]; the research on smart contract audit procedures writes some audit procedures into the contract execution [4, 41]; the review of blockchain and AI auditing, Audit 4.0 cases, and ESG guarantee research further connect real-time data, automatic control, anomaly warning, and the transformation of the auditing role [42-48]. The engineering auditing introduces smart contracts to re-institutionalize the continuous auditing idea. Evidence is no longer collected only at the end of the audit, and control is no longer remedied only after a problem is identified; instead, it is continuously generated, triggered, anchored, and fed back throughout the project lifecycle.

VIII. Challenges and Governance Pathways

The aforementioned literature collectively points to three types of governance issues. First, the authenticity of off-chain data. On-site measurements, manual inspections, sensor collection, and project management systems are located before the contract, and input distortion will be quickly solidified by the automated mechanism. Second, the credibility of oracles. Oracles are both the entry point for smart contracts to connect with the real world and a high-risk node for attacks, manipulation, and liability transfer [5-6, 32-33]. Third, the engineering context is difficult to be fully standardized. Changes in visa applications, for example, require professional judgment, and simple threshold rules will flatten engineering facts. Table 8 converts these tensions into governance paths and relegates technical issues back to the auditing responsibility and institutional recognition.

Table 8. Challenges, Causes, and Governance Pathways

Challenge	Root cause	Governance pathway	Research

			priority
Off-chain data authenticity	Field facts are captured before entering blockchain	Multi-source validation; random inspection; sensor calibration	High
Oracle trust	Smart contracts cannot directly access external reality	Decentralized oracles; attestation protocols; liability allocation	High
Rule rigidity	Engineering events often require contextual judgment	Hybrid smart contract plus human-in-the-loop review	High
Privacy-transparency tension	Auditability may expose commercial data	Access control; zero-knowledge proof; selective disclosure	Medium-high
Legal enforceability	Code execution and legal responsibility are not identical	Smart legal contract design; dispute resolution interface	Medium-high
Smart contract vulnerability	Code defects and governance errors	Contract audit; formal verification; upgrade governance	High
Interoperability	BIM, ERP, IoT and finance systems use heterogeneous standards	Open data standards; API governance; semantic mapping	Medium

IX. Future Research Agenda

The central issue for future research is no longer whether blockchain can be applied to engineering audits, but rather how to establish an auditable, explainable, and governable data verification infrastructure. Figure 7 presents the research agenda of this paper. A trusted oracle needs to expand from data interfaces to data source authentication, proof of collection process, anomaly detection, binding of responsible entities, and dispute review mechanisms. The integration of BIM, IoT and blockchain should extend from collaborative management to the design of audit evidence, clearly defining the evidence level, verification frequency, traceability fields and usage boundaries of various data. Continuous auditing should run through the entire project life cycle, incorporating bidding and tendering, contract signing, material procurement, construction progress, change endorsements, price settlement and final completion settlement into a unified evidence chain.

Figure 7. Future Research Agenda for Smart-Contract-Enabled Engineering Audit Verification

Human-machine collaboration forms another main research line. Tasks with clear rules can be executed by smart contracts, while auditors focus on handling major anomalies and substantive judgments. For payment data with commercial sensitivity, privacy computing and selective disclosure should also be introduced.

Table 9 summarizes the method paths and theoretical contributions of each research direction. Future research should integrate technical prototypes, auditing norms, responsibility allocation, and real project validation to form a complete research design.

Table 9. Future Research Agenda and Expected Theoretical Contributions

Agenda	Key question	Suggested method	Expected contribution
Trusted engineering	How can field facts be reliably translated into	Prototype plus adversarial	Strengthen the weakest link between

oracles	contract triggers?	testing	reality and code
Audit-oriented BIM-chain design	Which BIM attributes should become audit evidence?	Design science; case study	Reframe BIM as evidence infrastructure
Continuous engineering audit	How can audit procedures be embedded into project lifecycle?	Process mining; longitudinal case	Extend Audit 4.0 to construction projects
Human-in-the-loop smart contracts	When should automated execution stop and professional judgment intervene?	Decision protocol design	Balance automation and discretion
Privacy-preserving verification	How can sensitive contract data be audited without excessive disclosure?	ZKP/MPC experiment	Resolve transparency-privacy tension
Legal-accountability interface	How should code execution, contractual obligation, and audit responsibility be aligned?	Comparative legal analysis	Connect smart contracts with institutional legitimacy

X. Conclusion

This article conducts a systematic review on the application of smart contracts in the verification of engineering audit data, highlighting that the key in this field lies in reconfiguring the generation, solidification, execution and feedback mechanisms of engineering audit evidence. Existing literature has already established important foundations in contract management for construction and Audit 4.0, but these studies have not yet fully converged into a comprehensive framework for engineering audit data verification. The comprehensive results of this article indicate that technical literature provides tools for fact collection and rule execution, while audit literature provides guidelines for evidence interpretation and guarantee logic. There still needs to be an institutional connection based on the project life cycle between the two.

The proposed framework of "data source - off-chain preprocessing - oracle - smart contract - on-chain evidence - audit feedback" in this article indicates that smart contracts can only become an effective infrastructure for the digital transformation of engineering audits under the conditions of reliable off-chain facts, reasonable rule expression, clear responsibility subjects, and the possibility of audit judgment intervention. Future research needs to go beyond technical feasibility verification and enter real engineering projects, real audit processes and real institutional environments, establishing a more robust theoretical and practical connection between trustworthy

oracles, privacy protection, continuous auditing, human-computer collaboration and legal governance.

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