INTERNATIONAL JOURNAL OF ECONOMICS AND FINANCE STUDIES
Vol: 18 **No:** 03 **Year:** 2026 **ISSN:** 1309-8055 (Online) (**pp.** 94-112) **Doi:** 10.34109/ijefs.2026180305
Received: 15.05.2026 | **Accepted:** 20.07.2026 | **Published Online:** 30.09.2026

-RESEARCH ARTICLE-

BLOCKCHAIN APPLICATIONS AS A TOOL TO REDUCE FINANCIAL CORRUPTION IN BUDGET PREPARATION AND IMPLEMENTATION PROCESSES

Abdulwahab Razzaq Alwan Al-Yasar

Department of Accounting, College of Administration, University of Babylon, Iraq
ORCID: https://orcid.org/0009-0009-6389-1780
Email: abdulwahabr74@gmail.com

Dukhkhani Adil Basheer Dhahir

College of Administration and Economics, Wasit University, Iraq
ORCID: https://orcid.org/0009-0001-9171-1873
Email: adelbasheer@uowasit.edu.iq

Hussein Ali Hisab

General Directorate of Education in Al-Muthanna Governorate
ORCID: https://orcid.org/0009-0003-8264-1847
Email: Hussein.Ali2106p@coadec.uobaghdad.edu.iq

─Abstract─

This research seeks to examine the contribution of blockchain technology applications to mitigating financial corruption in the formulation and execution of government budgets, with particular emphasis on how the inherent characteristics of this technology strengthen financial transparency and enhance the effectiveness of monitoring public expenditure. The study employs a descriptive-analytical methodology through an extensive review of the scholarly literature concerning blockchain applications in public financial management and anti-corruption initiatives. In addition, it evaluates a number of international cases in which this technology has been integrated into public budget administration. The study further develops a conceptual hypothetical framework that explains the relationship between blockchain applications as the independent variable

Citation (APA): AL-yasar, A. R. A., Dhahir, D. A. B., Hisab, H. A. (2026). Blockchain Applications as a Tool to Reduce Financial Corruption in Budget Preparation and Implementation Processes. *International Journal of Economics and Finance Studies*, 18(03), 94-112. doi: 10.34109/ijefs.2026180305

Vol: 18 **No:** 03 **Year:** 2026 **ISSN:** 1309-8055 (Online) (**pp.** 94-112) **Doi:** 10.34109/ijefs.2026180305

and the reduction of financial corruption in budget preparation and execution as the dependent variable. Evidence from prior studies suggests that the integration of blockchain technologies into government financial systems significantly improves transparency and accountability, minimises opportunities for manipulation of financial records, and thereby enhances the efficiency of managing public resources. This study offers a contemporary analytical perspective on the significance of advanced digital technologies in addressing financial corruption. It also provides practical guidance for policymakers regarding the development of digital infrastructure within public institutions, alongside the formulation of supportive policies and legislative frameworks for the adoption of blockchain-based systems in government budgeting processes to strengthen financial integrity and reduce both administrative and financial corruption.

Keywords: Blockchain, Financial Corruption, Public Budget, Financial Transparency, Digital Governance.

INTRODUCTION

Public financial management has undergone substantial transformation in recent years, largely driven by rapid progress in digital information systems. Governments have increasingly turned to contemporary technologies to improve the efficiency of financial resource administration and to attain greater standards of transparency and accountability in the stewardship of public funds. Among the most critical challenges confronting nations in budget administration is financial corruption, as weak financial oversight mechanisms and ineffective accounting information systems often create conditions conducive to manipulation and the misallocation of public resources, thereby adversely affecting economic development and fiscal stability (Khan et al., 2021).

Within this framework, blockchain technology has emerged as a significant digital innovation with the potential to modernise public financial management systems and reinforce transparency in governmental financial operations. This technology is built upon a distributed digital ledger structure in which financial transactions are recorded through an interconnected chain of cryptographic blocks, making unauthorised alteration or data manipulation extremely difficult without the approval of all participating entities in the network (Angelis & Ribeiro da Silva, 2019). Blockchain technology offers a robust degree of transparency and reliability in the documentation of financial records, as all relevant stakeholders can access, verify, and authenticate the information stored within the system at any point in time.

Such a feature significantly reduces opportunities for financial misconduct and strengthens the effectiveness of governmental financial oversight. Its integration into the preparation and execution of government budgets can further reinforce financial governance frameworks by establishing a transparent and fully traceable financial database. This, in turn, enables supervisory authorities to monitor the movement of

Vol: 18 **No:** 03 **Year:** 2026 **ISSN:** 1309-8055 (Online) (**pp.** 94-112) **Doi:** 10.34109/ijefs.2026180305

public funds more effectively and to ensure that expenditures remain aligned with the objectives specified in the approved budget (Casino et al., 2019). Recent scholarly evidence further indicates that blockchain applications can make a meaningful contribution to anti-corruption efforts through the enhancement of financial transparency and the reinforcement of public accountability mechanisms. For instance, a study by Lumineau et al. (2021) demonstrated that the incorporation of blockchain technology into public financial administration can reduce the likelihood of financial data manipulation while simultaneously strengthening trust in government financial systems.

Notwithstanding its considerable potential to improve public financial management, the adoption of blockchain technology in government budgeting processes remains limited across many developing countries. This gap underscores the need for additional empirical and conceptual research aimed at examining the extent to which this technology can assist in mitigating financial corruption during both the preparation and implementation phases of government budgets.

Study Motivation and Theoretical Framing

The administration of public budgets has long been constrained by the persistent problem of financial corruption, which weakens operational efficiency, diminishes accountability, and obstructs the attainment of sustainable economic development objectives. This challenge is particularly pronounced in developing countries, where deficiencies in financial control mechanisms, ineffective accounting procedures, and insufficient transparency frequently create avenues for financial statement manipulation, embezzlement, and the improper allocation of public resources (Kochanova et al., 2020; Khan et al., 2021). Such conditions not only impede economic progress but also undermine citizens' confidence in governmental institutions, thereby highlighting the pressing need for innovative mechanisms to strengthen financial governance.

In response to these challenges, blockchain technology has gained increasing attention as a viable digital solution owing to its decentralised, immutable, and transparent ledger architecture for recording financial transactions (Angelis & Ribeiro da Silva, 2019). Its core attributes, including transparency, decentralisation, data security, and transaction traceability, enable financial activities to be documented with greater accuracy and monitored in real time. These features substantially limit opportunities for data manipulation and reinforce the integrity of government budgeting systems (Casino et al., 2019; Pineda et al., 2024). From a theoretical perspective, this study is grounded in public financial management (PFM) theory and digital governance theory. PFM theory focuses on the systematic planning, supervision, and control of public resources to ensure that government expenditures are managed with transparency and accountability. In parallel, digital governance theory emphasises the transformative role

Vol: 18 **No:** 03 **Year:** 2026 **ISSN:** 1309-8055 (Online) (**pp.** 94-112) **Doi:** 10.34109/ijefs.2026180305

of advanced information technologies in improving governmental processes, facilitating broader access to financial information, and strengthening both citizen participation and institutional accountability (Tan et al., 2022).

By synthesising these theoretical foundations, the study positions blockchain technology as an independent variable with the capacity to influence the incidence of financial corruption during the preparation and implementation of government budgets. This conceptual framework proposes that blockchain applications can mitigate corruption through enhanced digital transparency, stronger protection of financial records, decentralised financial oversight, and precise traceability of transactions. Collectively, these mechanisms contribute to improved financial governance within the public sector, reinforce supervisory controls, and enhance both the efficiency and integrity of government budget administration. Accordingly, this research is driven by the need to empirically investigate how blockchain technology can be utilised to minimise financial corruption in government budgeting processes, while offering both theoretical insight and practical guidance for policymakers aiming to adopt advanced digital solutions that promote transparency, accountability, and efficiency in PFM.

Scope and Significance of the Study

The scope of this study is deliberately bounded. It addresses the preparation and implementation phases of the government budget cycle rather than the full spectrum of public financial management, and it treats blockchain as a set of measurable properties rather than as a single undifferentiated technology. Geographically it is confined to Iraqi institutions holding direct responsibility for the administration of public funds. Methodologically it examines the perceptions of officials working within those institutions, which establishes informed professional assessment rather than externally verified outcomes; the study therefore measures the anticipated contribution of blockchain rather than the realised effect of a completed deployment.

The significance of the study is threefold. Theoretically, it disaggregates blockchain into four constituent properties and estimates the contribution of each, whereas the prevailing literature treats adoption as a unitary construct and cannot therefore say which property carries the effect. This distinction is consequential because the four properties differ sharply in the institutional change each requires: publishing an immutable record demands no reallocation of fiscal authority, whereas distributing validation across independent nodes does. Empirically, the study supplies evidence from Iraq, a setting almost absent from a literature concentrated in advanced economies, and one in which the combination of substantial public expenditure, documented corruption risk and limited digital infrastructure makes the question of sequencing especially acute. Practically, the resulting

Vol: 18 **No:** 03 **Year:** 2026 **ISSN:** 1309-8055 (Online) (**pp.** 94-112) **Doi:** 10.34109/ijefs.2026180305

ordering of dimensions yields a reform agenda that identifies which capability to build first rather than recommending adoption in general terms.

Research Objectives:

The study is guided by four objectives, which correspond directly to the results reported in Section 4.

- To establish the reliability of a multidimensional instrument measuring blockchain applications and the reduction of financial corruption in a public financial management setting.
- To determine the prevailing level of each construct among officials responsible for budget administration.
- To estimate the joint effect of the four blockchain dimensions on the reduction of financial corruption and to quantify the proportion of variance explained.
- To compare the relative magnitude of the four dimensions and to derive from that comparison a sequenced agenda for implementation.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Blockchain technology is a distributed ledger in which transactions are grouped into cryptographically linked blocks, replicated across participating nodes and validated by consensus rather than by a single central authority. Because each block carries a hash of its predecessor, retrospective alteration of a record requires simultaneous modification of every subsequent block on most nodes, which is computationally impractical in a well-distributed network. Casino et al. (2019), reviewing the applied literature systematically, classify government administration among the domains in which these properties are most consequential, precisely because public financial records are both high-value and historically vulnerable to retrospective adjustment. Pineda et al. (2024) extend this classification to the architectures now available, distinguishing permissioned from permissionless designs and noting that public-sector deployments almost invariably adopt the former in order to retain regulatory control over participation.

The accounting literature has moved from speculation about blockchain toward structured assessment of its effects. Lombardi et al. (2022) review the field and conclude that the technology bears most directly on accountability rather than on recording efficiency alone, since an immutable ledger changes who is able to verify a claim rather than merely how quickly it is recorded. Garanina et al. (2022), analysing 153 papers drawn from ranked journal lists, document a corresponding shift from conceptual argument toward empirical testing, while observing that evidence from public rather than corporate settings remains

Vol: 18 **No:** 03 **Year:** 2026 **ISSN:** 1309-8055 (Online) (**pp.** 94-112) **Doi:** 10.34109/ijefs.2026180305

comparatively thin. Marrone and Hazelton (2019) frame the wider disruption, arguing that emerging technologies reconfigure what accountability means rather than simply how it is discharged, a distinction that matters for budgeting because public accountability is owed to citizens rather than to shareholders.

Work specifically on audit reinforces this reading. Bonsón and Bednárová (2019) argue that distributed ledgers permit a transition from periodic sampling to continuous assurance, because every transaction is timestamped and available for verification at the moment it occurs. Han et al. (2023) examine the intersection of blockchain and artificial intelligence in audit practice and find that the combination makes anomaly detection feasible at population rather than sample level. Fang et al. (2023) provide direct empirical support, reporting that blockchain adoption improves accounting information quality, and Rawashdeh (2025) finds that smart contracts narrow the trust gap in financial reporting by removing discretion from the execution of contractual terms.

Evidence on realised effects is nevertheless more qualified than the conceptual literature implies. Pascual Pedreño et al. (2021) observe that application to accounting remains uneven across jurisdictions, and Prewett et al. (2020) identify cost, scalability limitations and regulatory uncertainty as barriers that have persisted despite a decade of experimentation. Alkhwaldi et al. (2024), applying an extended acceptance model, demonstrate that professional adoption is governed by facilitating conditions and perceived usefulness rather than by technical merit alone. The implication is that the properties of the technology establish what is possible, while organisational and regulatory conditions determine what is realised.

The public-sector literature approaches the question from the direction of corruption rather than of technology. Adam and Fazekas (2021), reviewing the state of evidence on emerging technologies and corruption, caution that measured effects are smaller and more conditional than advocacy literature suggests, and that the strongest results come from applications that narrow discretion rather than from those that merely digitise records. Khan et al. (2021), in a systematic review of electronic government and corruption, conclude that digital systems reduce corrupt opportunity principally by increasing the visibility of transactions and by reducing the number of discretionary contact points between officials and citizens. Kochanova et al. (2020) supply quantitative support, showing that e-government systems measurably lower tax compliance costs and raise public procurement competitiveness across a large cross-country sample. Myeong and Jung (2019) situate blockchain within this wider programme of administrative reform, arguing that its contribution is continuous with, rather than distinct from, earlier digitisation.

Vol: 18 **No:** 03 **Year:** 2026 **ISSN:** 1309-8055 (Online) (**pp.** 94-112) **Doi:** 10.34109/ijefs.2026180305

Blockchain-specific governance research identifies the conditions under which these gains materialise. Tan et al. (2022) develop a conceptual framework for public-sector blockchain governance and cluster the decisions that determine whether a deployment succeeds, including infrastructure architecture, interoperability and the allocation of decision rights. Lumineau et al. (2021) argue that blockchain constitutes a distinct organisational form, coordinating collaboration through code rather than through contract or hierarchy, which reframes decentralisation as a governance choice rather than a technical by-product. Procurement has attracted the most concrete experimentation. Weingärtner et al. (2021) prototyped a smart-contract-based public procurement system and demonstrated that automated tender evaluation removes the discretionary step at which manipulation typically occurs, while Dixit et al. (2022) show in a systematic review that the legal relevance of such contracts, rather than their technical feasibility, is the binding constraint on deployment. Kamel et al. (2023) reach a comparable conclusion in construction contracting, and Yu (2024) documents both the opportunities and the risks of blockchain in e-government, noting that public resource trading platforms are the most common application. Anastasiadou et al. (2021) caution that matching technology to governance challenge requires explicit design reasoning rather than assumed fit. Implementation evidence supplies the necessary corrective to technological optimism: Shang and Price (2019), examining the Georgian land-titling project, show that blockchain rebuilt public trust only because it was paired with institutional reform, and Mackey et al. (2020) reach a comparable conclusion in prototyping an antifraud framework for health care.

Evidence from institutional settings comparable to the present study is directly relevant. Majeed and Taha (2024), surveying Iraqi auditors, found that adoption intentions are shaped by organisational readiness and regulatory clarity rather than by familiarity with the technology, which situates the present Iraqi sample within an established empirical base. Al Shanti and Elessa (2023) report that blockchain application in banks improves both accounting information quality and governance effectiveness, while Zhou et al. (2022) demonstrate improved reliability of information disclosure where ledger-based verification replaces self-reported data. Angelis and Ribeiro da Silva (2019) argue that adoption should be evaluated against value drivers rather than against capability, a criterion adopted here in specifying the dimensions of the measurement model.

Read together, this literature establishes three propositions. Blockchain alters the verifiability of financial records rather than merely their storage; the resulting reduction in corrupt opportunity operates through visibility and the removal of discretion; and realisation depends on institutional conditions that are external to the technology. What the literature has not established is which property of the technology carries most of the

Vol: 18 **No:** 03 **Year:** 2026 **ISSN:** 1309-8055 (Online) (**pp.** 94-112) **Doi:** 10.34109/ijefs.2026180305

effect. Studies overwhelmingly treat blockchain adoption as a unitary construct, which prevents any statement about whether transparency, security, decentralisation or traceability is doing the work. That distinction is consequential for policy, because the four properties differ sharply in the institutional change each demands.

The corruption literature supplies the theoretical rationale for expecting these effects. The stakes are substantial: Andersen et al. (2022) show that aid disbursements to highly aid-dependent countries coincide with sharp increases in deposits held in offshore financial centres, providing direct evidence of elite capture at the point of disbursement. Corruption in budgeting is conventionally analysed as an agency problem in which officials hold private information about the allocation and disbursement of funds that principals, whether legislatures, audit institutions or citizens, cannot readily observe. Interventions therefore succeed to the extent that they reduce the information asymmetry on which discretion depends. Khan et al. (2021) find precisely this pattern across the e-government literature, concluding that the mechanism is informational rather than technological. Blockchain can be understood as an unusually complete instance of such an intervention, because it removes not only the opacity of the record but also the possibility of its subsequent revision.

The literature also identifies conditions under which the expected effects fail to materialise. Prewett et al. (2020) note that scalability constraints limit throughput in high-volume settings, which matters for budget execution systems processing large numbers of low-value transactions. Pascual Pedreño et al. (2021) observe that the absence of standardised accounting treatment for ledger-based records impedes integration with existing reporting frameworks. Tan et al. (2022) emphasise that governance decisions taken at the design stage, particularly concerning who may validate and who may read, determine whether a deployment delivers transparency in practice or merely relocates opacity behind a permissioned boundary. These qualifications motivate the present study's focus on which property of the technology respondents judge most consequential, rather than on whether adoption is beneficial in the abstract.

Theoretical Framework

The present study therefore disaggregates blockchain applications into four dimensions drawn from the reviewed literature. Digital transparency denotes the establishment of a permanent, non-alterable record accessible to authorised oversight bodies, which reduces the scope for retrospective adjustment of budget figures. Data security denotes the cryptographic mechanisms that restrict unauthorised alteration and authenticate the origin of each entry. Decentralisation denotes the distribution of validation across nodes, which

Vol: 18 **No:** 03 **Year:** 2026 **ISSN:** 1309-8055 (Online) (**pp.** 94-112) **Doi:** 10.34109/ijefs.2026180305

reduces dependence on any single administrative authority and limits the capacity of an individual actor to control the record. Transaction traceability denotes the systematic recording of each financial movement in a manner that remains auditable from origin to destination, enabling continuous rather than periodic oversight. The dependent construct, reduction of financial corruption, is defined as the perceived decrease in opportunity for manipulation, misallocation and concealment during budget preparation and execution.

Development of Hypotheses

On the basis of the foregoing, the study advances one principal hypothesis and four sub-hypotheses. The principal hypothesis holds that blockchain applications exert a statistically significant positive effect on the reduction of financial corruption in the preparation and implementation of government budgets. The first sub-hypothesis holds that digital transparency delivered through blockchain significantly reduces financial corruption, on the reasoning that visibility of the record raises the probability of detection. The second holds that enhanced data security significantly improves financial control and reduces manipulation, since cryptographic authentication removes the possibility of undetected alteration. The third holds that decentralisation strengthens fiscal accountability by dispersing validation authority and thereby limiting unilateral control over financial records. The fourth holds that transaction traceability significantly decreases financial manipulation by rendering each movement of funds auditable from origin to destination. Taken together, the four sub-hypotheses permit the relative contribution of each property to be estimated rather than assumed.

METHODOLOGY

This study employs a descriptive-analytical research design to investigate the contribution of blockchain applications to mitigating financial corruption during the preparation and implementation of government budgets. The descriptive component comprises a review of the relevant literature, international implementation experience and theoretical frameworks relating blockchain technology to public financial management. The analytical component examines empirically the relationship between blockchain applications as the independent construct and the reduction of financial corruption as the dependent construct. A quantitative approach was adopted because the research question concerns the magnitude and statistical significance of that relationship, and because disaggregating blockchain into four dimensions requires an estimator capable of apportioning explained variance among correlated predictors.

The study population comprised employees of Iraqi government institutions responsible for the administration of public funds, specifically the Ministry of Finance, the National

Vol: 18 **No:** 03 **Year:** 2026 **ISSN:** 1309-8055 (Online) (**pp.** 94-112) **Doi:** 10.34109/ijefs.2026180305

Audit Office, state banks and financial regulatory bodies. These bodies were selected because their personnel hold direct operational responsibility for budget preparation, execution and oversight, and are therefore positioned to assess both existing control weaknesses and the plausible contribution of ledger-based systems. A random sample of 120 individuals was drawn from this population. Table 1 reports the distribution of respondents by educational qualification.

Table 1

Distribution of the Sample by Educational Qualification (N = 120)

Educational qualification	f	%
Bachelor	58	48.3
Master	40	33.3
PhD	22	18.3
Total	**120**	**100.0**

Note. f = frequency. Gender and age were not recorded in the survey instrument.

The principal instrument was a structured questionnaire comprising 22 items. Twelve items measured blockchain applications across the four dimensions specified in the theoretical framework, with three items per dimension addressing digital transparency, data security, decentralisation and transaction traceability respectively. The remaining ten items measured respondents' assessment of blockchain's effect on curbing corruption in budgetary processes. All items were recorded on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Item wording was adapted from instruments previously validated in comparable settings (Alkhwaldi et al., 2024; Majeed & Taha, 2024), which supports content validity while allowing adaptation to the Iraqi public-sector context.

Internal consistency was assessed using Cronbach's alpha for each construct and for the instrument. Table 2 reports the coefficients. All values exceed the conventional threshold of 0.70, indicating that the instrument measures each construct with acceptable reliability and is appropriate for the inferential analysis that follows.

Table 2

Internal Consistency Reliability of the Study Constructs

Construct	Items	Cronbach's α
Digital transparency	3	0.87
Data security	3	0.84

Vol: 18 **No:** 03 **Year:** 2026 **ISSN:** 1309-8055 (Online) (**pp.** 94-112) **Doi:** 10.34109/ijefs.2026180305

Construct	Items	Cronbach's α
Decentralisation	3	0.85
Transaction traceability	3	0.88
Reducing financial corruption	10	0.90
Overall instrument	**22**	**0.89**

Note. Values of $\alpha \geq .70$ indicate acceptable internal consistency. The four blockchain dimensions together comprise the 12-item independent construct reported in the Methodology.

Data Analysis Techniques

Data were analysed in four stages. Descriptive statistics established the prevailing level of each construct. Pearson correlation established the direction and strength of the bivariate associations. Multiple linear regression estimated the joint effect of the four blockchain dimensions on the reduction of financial corruption, with the coefficient of determination indicating the proportion of variance explained. Partial least squares structural equation modelling in SmartPLS was then applied to evaluate the measurement and structural components of the proposed model. The conceptual model positions blockchain applications, comprising digital transparency, data security, decentralisation and transaction traceability, as the independent construct, and the reduction of financial corruption during budget preparation and execution as the dependent construct. Figure 1 presents the model.

RESULTS

Data were obtained from the 120 respondents described in Table 1, all of whom were employees of government financial institutions. Respondents' educational profile is reported in that table; gender and age were not recorded in the survey instrument, and no claim is therefore made regarding their distribution. Reliability coefficients for the five constructs are reported in Table 2 and range from 0.84 to 0.90, with an overall instrument value of 0.89.

Table 3 reports the descriptive statistics. All five constructs recorded means above 4.00 on the five-point scale, indicating broad agreement among respondents that blockchain properties are relevant to the control of financial corruption. The reduction of financial corruption recorded the highest mean (M = 4.35, SD = 0.62), followed by digital transparency (M = 4.32, SD = 0.65) and transaction traceability (M = 4.28, SD = 0.60). Data security recorded the lowest mean (M = 4.15, SD = 0.70), though the spread between

Vol: 18 **No:** 03 **Year:** 2026 **ISSN:** 1309-8055 (Online) (**pp.** 94-112) **Doi:** 10.34109/ijefs.2026180305

the highest and lowest dimension is narrow at 0.17 scale points, indicating a consistent rather than divided assessment across the four properties.

Table 3

Descriptive Statistics for the Study Variables

Variable	M	SD	Level
Digital transparency	4.32	0.65	High
Transaction traceability	4.28	0.60	High
Decentralisation	4.20	0.68	High
Data security	4.15	0.70	High
Reducing financial corruption	**4.35**	**0.62**	**High**

Note. M = mean; SD = standard deviation. All items were rated on a five-point Likert scale; means above 3.67 are classified as high.

Multiple regression was used to estimate the joint effect of the four blockchain dimensions on the reduction of financial corruption. The estimated model takes the form $RFC = \beta_0 + \beta_1 DT + \beta_2 DS + \beta_3 DC + \beta_4 TT + \varepsilon$, where RFC denotes the reduction of financial corruption, DT digital transparency, DS data security, DC decentralisation and TT transaction traceability. Table 4 reports the standardised coefficients with their associated test statistics.

Table 4

Multiple Regression Results Predicting Reduction of Financial Corruption

Predictor	β	t	p	Decision
Digital transparency	0.32	4.12	< .001	Supported
Transaction traceability	0.30	3.98	< .001	Supported
Data security	0.28	3.85	< .001	Supported
Decentralization	**0.25**	**3.45**	**.001**	**Supported**

Note. β = standardised regression coefficient. Model: $R^2 = .72$; reported $F = 45.36$, $p < .001$. See Section 4.5 for a note on the reported F statistic.

All four dimensions exert a positive and statistically significant effect, so the principal hypothesis and all four sub-hypotheses are supported. The four predictors jointly account for 72% of the variance in the reduction of financial corruption. The ordering of the coefficients is the substantive finding. Digital transparency carries the largest effect (β = 0.32), followed by transaction traceability (β = 0.30), data security (β = 0.28) and decentralisation (β = 0.25). Transparency and traceability, the two properties that make

Vol: 18 **No:** 03 **Year:** 2026 **ISSN:** 1309-8055 (Online) (**pp.** 94-112) **Doi:** 10.34109/ijefs.2026180305

financial activity observable, together outweigh security and decentralisation, the two that restrict control over the record. This suggests that blockchain reduces corrupt opportunity principally by raising the probability that irregularity is detected, rather than by dispersing authority over financial systems.

4.5 Verification of the reported model statistics

One feature of the output requires explicit comment. With four predictors and the sample of 120 reported in the Methodology, an R^2 of .72 implies $F(4, 115) = 73.93$. The reported value of 45.36 corresponds instead to a sample of approximately 76. Either the F statistic or the analytic sample size is mistranscribed, and the discrepancy should be resolved against the original output before submission. The coefficients in Table 4, the coefficient of determination and the substantive ordering of the four dimensions are internally consistent and are unaffected by this issue. Table 5 reports the derived assessment statistics.

Table 5

Derived Model Assessment Statistics

Statistic	Symbol	Value	Interpretation
Explained variance	R^2	0.72	72% of variance accounted for
Unexplained variance	$1 - R^2$	0.28	Attributable to omitted factors
Effect size	f^2	2.571	Large (≥ 0.35)
Predictors in model	k	4	Four blockchain dimensions
Recomputed F for N = 120	**F(4, 115)**	**73.93**	**Differs from reported 45.36**

Note. Derived by the authors from the coefficients reported in Table 4. $f^2 = R^2/(1 - R^2)$. The recomputed F assumes N = 120 as stated in the Methodology.

Considered individually, each dimension operates through a distinct mechanism. Digital transparency enhances the capacity of oversight bodies to identify financial irregularities, because a record that cannot be retrospectively adjusted removes the principal means by which manipulation is concealed. Data security safeguards against unauthorised alteration and sustains confidence in the integrity of the digital financial system. Decentralisation reduces the likelihood of monopolisation by limiting the control any single actor exercises over financial resources. Transaction traceability facilitates continuous auditing and

Vol: 18 **No:** 03 **Year:** 2026 **ISSN:** 1309-8055 (Online) (**pp.** 94-112) **Doi:** 10.34109/ijefs.2026180305

supports the early identification of potential violations by rendering the movement of funds observable from appropriation through to disbursement.

DISCUSSION

The findings indicate a strong positive association between blockchain applications and the reduction of financial corruption in budget preparation and execution, with the four dimensions jointly explaining 72% of the variance. This is consistent with the systematic evidence that digital systems reduce corrupt opportunity by increasing the visibility of transactions and removing discretionary contact points (Khan et al., 2021), and with quantitative evidence that e-government measurably improves procurement competitiveness and compliance (Kochanova et al., 2020). The contribution of the present study lies less in confirming the association than in decomposing it.

Digital transparency emerged as the strongest predictor. An immutable, timestamped record accessible to oversight bodies raises the expected cost of irregularity because it removes the possibility of subsequent adjustment, which is consistent with the argument that distributed ledgers change who is able to verify a claim rather than merely how quickly it is recorded (Lombardi et al., 2022). Transaction traceability followed closely, and the two findings are conceptually linked: traceability operationalises transparency by making the path of funds auditable from appropriation to disbursement, which is the precondition for the continuous assurance that Bonsón and Bednárová (2019) describe.

Data security recorded a significant but smaller coefficient. Cryptographic authentication prevents undetected alteration and supports confidence in the integrity of the record, and Fang et al. (2023) report corresponding improvements in accounting information quality following adoption. That its effect is smaller than transparency suggests respondents regard integrity of the record as necessary but not sufficient: a secure record that is not observed by oversight bodies does not deter misuse.

Decentralisation recorded the smallest coefficient of the four. This is theoretically notable, because decentralisation is frequently presented as the defining property of distributed ledgers. Lumineau et al. (2021) argue that it constitutes a distinct organisational form, coordinating through code rather than hierarchy, and it is precisely this that makes it the most institutionally demanding of the four properties to implement in a public budgeting context, where the allocation of fiscal authority is constitutionally determined. Respondents may therefore be discounting a property whose realisation they judge improbable within existing governance arrangements, a reading consistent with evidence that adoption is governed by facilitating conditions rather than technical merit (Alkhwaldi

Vol: 18 **No:** 03 **Year:** 2026 **ISSN:** 1309-8055 (Online) (**pp.** 94-112) **Doi:** 10.34109/ijefs.2026180305

et al., 2024) and that Iraqi practitioners condition their intentions on regulatory clarity (Majeed & Taha, 2024).

Theoretical and Practical Implications

Theoretically, the results indicate that blockchain's contribution to anti-corruption is not undifferentiated, and that treating adoption as a unitary construct, as most of the literature does, conceals which property carries the effect. Practically, the ordering implies a sequencing rule for reform: investment should begin with the publication and traceability of budget execution data, which require no change to the constitutional allocation of fiscal authority, before proceeding to decentralised validation, which does. Implementation experience supports this ordering, since the deployments that have delivered measurable gains paired technical change with institutional reform rather than substituting one for the other (Shang & Price, 2019; Tan et al., 2022). Methodologically, the study contributes a four-dimension instrument that permits diagnosis of which property a given institution is failing to realise.

CONCLUSION AND RECOMMENDATIONS

This study examined whether blockchain applications reduce financial corruption in the preparation and implementation of government budgets, using survey evidence from 120 employees of Iraqi public financial institutions. All four dimensions of blockchain application exert a positive and statistically significant effect, and together they account for 72% of the variance in the reduction of financial corruption. Digital transparency and transaction traceability carry the largest coefficients, indicating that the technology operates principally by making financial activity observable rather than by dispersing control over it. Blockchain should therefore be understood not as a substitute for institutional reform but as an infrastructure that makes existing oversight mandates enforceable.

Several recommendations follow. Governments should introduce blockchain within public financial management systems in a sequenced manner, beginning with the publication and traceability of budget execution data, since these deliver the largest measured effect while requiring no change to the allocation of fiscal authority. This requires prior investment in digital infrastructure of sufficient capacity and reliability to support distributed record-keeping across ministries and audit bodies. Legal frameworks should be enacted that give distributed records evidentiary standing, because without statutory recognition a ledger entry cannot substitute for the documentary record on which audit and prosecution currently rely; the evidence that practitioner intentions are conditioned by regulatory clarity makes this the binding constraint rather than a secondary consideration.

Vol: 18 **No:** 03 **Year:** 2026 **ISSN:** 1309-8055 (Online) (**pp.** 94-112) **Doi:** 10.34109/ijefs.2026180305

Collaboration between government agencies and financial technology providers should be encouraged to accelerate implementation, and targeted training should be provided so that officials in finance and audit functions can interpret ledger-based evidence rather than merely operate the systems that generate it. Smart contracts should be integrated into government procurement and disbursement processes where contractual terms are unambiguous, since automated execution removes the discretionary intervention through which manipulation typically occurs. Financial regulators should be equipped with tools for real-time monitoring, and blockchain-based platforms for public budget management should be established so that citizens and oversight bodies can observe expenditure as it occurs. Finally, applied research should continue to examine blockchain in public financial settings, including its integration with artificial intelligence for anomaly detection, an intersection that Han et al. (2023) identify as the most promising direction for continuous assurance.

LIMITATIONS AND FUTURE RESEARCH

Several limitations qualify these findings and indicate where further work is required. The study rests on a single cross-section of 120 respondents drawn from Iraqi government financial institutions, which constrains both statistical power and generalisability; the results describe perceptions within one national administrative system at one moment, and caution is warranted in extending them to jurisdictions with different regulatory traditions or levels of digital maturity. The measurement is perceptual rather than behavioural, since respondents reported their assessment of blockchain's likely effect rather than outcomes observed following an actual deployment, and self-reported data of this kind may be subject to social desirability bias in a domain where corruption is the subject of enquiry. The cross-sectional design establishes association rather than temporal precedence, so the causal ordering advanced here is theoretical rather than demonstrated. The study also examines blockchain in isolation, whereas in practice it would be deployed alongside artificial intelligence, data analytics and existing financial management information systems, and its marginal contribution within such a combination cannot be inferred from these results. Finally, the inconsistency between the reported F statistic and the stated sample size, documented above, should be resolved against the original output before the inferential findings are relied upon.

These constraints define a research agenda. Larger and more diverse samples spanning multiple countries would establish whether the ordering of the four dimensions is stable across institutional contexts, and comparative designs contrasting jurisdictions that have and have not adopted ledger-based budgeting would permit stronger causal inference.

Vol: 18 **No:** 03 **Year:** 2026 **ISSN:** 1309-8055 (Online) (**pp.** 94-112) **Doi:** 10.34109/ijefs.2026180305

Longitudinal designs tracking institutions through implementation would establish whether perceived benefits are realised and would allow behavioural indicators such as audit findings or procurement irregularities to replace perceptual measures. Research examining blockchain in combination with complementary technologies, and sector-specific studies in procurement, taxation and social transfers, would clarify where the technology delivers most value. Finally, given that the present findings locate the binding constraint in institutional rather than technical conditions, analysis of the legal and regulatory reforms required to give distributed records evidentiary standing is a priority for future work.

REFERENCES

Adam, I., & Fazekas, M. (2021). Are emerging technologies helping win the fight against corruption? A review of the state of evidence. Information Economics and Policy, 57, Article 100950. https://doi.org/10.1016/j.infoecopol.2021.100950

Al Shanti, A. M., & Elessa, M. S. (2023). The impact of digital transformation towards blockchain technology application in banks to improve accounting information quality and corporate governance effectiveness. Cogent Economics & Finance, 11(1), Article 2161773. https://doi.org/10.1080/23322039.2022.2161773

Alkhwaldi, A. F., Alidarous, M. M., & Alharasis, E. E. (2024). Antecedents and outcomes of innovative blockchain usage in the accounting and auditing profession: An extended UTAUT model. Journal of Organizational Change Management, 37(5), 1102–1132. https://doi.org/10.1108/JOCM-03-2023-0070

Anastasiadou, M., Santos, V., & Montargil, F. (2021). Which technology to which challenge in democratic governance? An approach using design science research. Transforming Government: People, Process and Policy, 15(4), 512–531. https://doi.org/10.1108/TG-03-2021-0045

Andersen, J. J., Johannesen, N., & Rijkers, B. (2022). Elite capture of foreign aid: Evidence from offshore bank accounts. Journal of Political Economy, 130(2), 388–425. https://doi.org/10.1086/717455

Angelis, J., & Ribeiro da Silva, E. (2019). Blockchain adoption: A value driver perspective. Business Horizons, 62(3), 307–314. https://doi.org/10.1016/j.bushor.2018.12.001

Bonsón, E., & Bednárová, M. (2019). Blockchain and its implications for accounting and auditing. Meditari Accountancy Research, 27(5), 725–740. https://doi.org/10.1108/MEDAR-11-2018-0406

Casino, F., Dasaklis, T. K., & Patsakis, C. (2019). A systematic literature review of blockchain-based applications: Current status, classification and open issues. Telematics and Informatics, 36, 55–81. https://doi.org/10.1016/j.tele.2018.11.006

Dixit, A., Deval, V., Dwivedi, V., Norta, A., & Draheim, D. (2022). Towards user-centred and legally relevant smart-contract development: A systematic literature review. Journal of Industrial Information Integration, 26, Article 100314. https://doi.org/10.1016/j.jii.2021.100314

Fang, B., Liu, X., Ma, C., & Zhuo, Y. (2023). Blockchain technology adoption and accounting information quality. Accounting & Finance, 63(4), 4125–4156. https://doi.org/10.1111/acfi.13088

Garanina, T., Ranta, M., & Dumay, J. (2022). Blockchain in accounting research: Current trends and emerging topics. Accounting, Auditing & Accountability Journal, 35(7), 1507–1533. https://doi.org/10.1108/AAAJ-10-2020-4991

Han, H., Shiwakoti, R. K., Jarvis, R., Mordi, C., & Botchie, D. (2023). Accounting and auditing with blockchain technology and artificial intelligence: A literature review. International Journal of Accounting Information Systems, 48, Article 100598. https://doi.org/10.1016/j.accinf.2022.100598

Kamel, M. A., Bakhoum, E. S., & Marzouk, M. M. (2023). A framework for smart construction contracts using BIM and blockchain. Scientific Reports, 13, Article 10217. https://doi.org/10.1038/s41598-023-37353-0

Khan, A., Krishnan, S., & Dhir, A. (2021). Electronic government and corruption: Systematic literature review, framework, and agenda for future research. Technological Forecasting and Social Change, 167, Article 120737. https://doi.org/10.1016/j.techfore.2021.120737

Kochanova, A., Hasnain, Z., & Larson, B. (2020). Does e-government improve government capacity? Evidence from tax compliance costs, tax revenue, and public procurement competitiveness. The World Bank Economic Review, 34(1), 101–120. https://doi.org/10.1093/wber/lhx024

Lombardi, R., de Villiers, C., Moscariello, N., & Pizzo, M. (2022). The disruption of blockchain in auditing–a systematic literature review and an agenda for future research. *Accounting, Auditing & Accountability Journal*, *35*(7), 1534-1565. https://doi.org/10.1108/AAAJ-10-2020-4992

Lumineau, F., Wang, W., & Schilke, O. (2021). Blockchain governance: A new way of organizing collaborations? Organization Science, 32(2), 500–521. https://doi.org/10.1287/orsc.2020.1379

Mackey, T. K., Miyachi, K., Fung, D., Qian, S., & Short, J. (2020). Combating health care fraud and abuse: Conceptualization and prototyping study of a blockchain antifraud framework. Journal of Medical Internet Research, 22(9), Article e18623. https://doi.org/10.2196/18623

Majeed, R. H., & Taha, A. A. D. (2024). A survey study of Iraqi auditors' adoption of blockchain technology. Asian Review of Accounting, 32(3), 521–546. https://doi.org/10.1108/ARA-01-2023-0015

Marrone, M., & Hazelton, J. (2019). The disruptive and transformative potential of new technologies for accounting, accountants and accountability. Meditari

Accountancy Research, 27(5), 677–694. https://doi.org/10.1108/MEDAR-06-2019-0508

Myeong, S., & Jung, Y. (2019). Administrative reforms in the fourth industrial revolution: The case of blockchain use. Sustainability, 11(14), Article 3971. https://doi.org/10.3390/su11143971

Pascual Pedreño, E., Gelashvili, V., & Pascual Nebreda, L. (2021). Blockchain and its application to accounting. Intangible Capital, 17(1), 1–16. https://doi.org/10.3926/ic.1522

Pineda, M., Jabba, D., & Nieto-Bernal, W. (2024). Blockchain architectures for the digital economy: Trends and opportunities. Sustainability, 16(1), Article 442. https://doi.org/10.3390/su16010442

Prewett, K. W., Prescott, G. L., & Phillips, K. (2020). Blockchain adoption is inevitable—Barriers and risks remain. Journal of Corporate Accounting & Finance, 31(2), 21–28. https://doi.org/10.1002/jcaf.22415

Rawashdeh, A. (2025). Bridging the trust gap in financial reporting: The impact of blockchain technology and smart contracts. Journal of Financial Reporting and Accounting. Advance online publication. https://doi.org/10.1108/JFRA-08-2023-0518

Shang, Q., & Price, A. (2019). A blockchain-based land titling project in the Republic of Georgia: Rebuilding public trust and lessons for future pilot projects. Innovations: Technology, Governance, Globalization, 12(3–4), 72–78. https://doi.org/10.1162/inov_a_00276

Tan, E., Mahula, S., & Crompvoets, J. (2022). Blockchain governance in the public sector: A conceptual framework for public management. Government Information Quarterly, 39(1), Article 101625. https://doi.org/10.1016/j.giq.2021.101625

Weingärtner, T., Fasser, D., Reis Achintoye, P., & Refardt, D. (2021). Prototyping a smart contract based public procurement to fight corruption. Computers, 10(7), Article 85. https://doi.org/10.3390/computers10070085

Yu, J. (2024). Exploration of the application of blockchain in e-government: Opportunities and risks coexist. Information Services & Use, 44(3), 195–210. https://doi.org/10.3233/ISU-240013

Zhou, Z., Liu, X., Zhong, F., & Shi, J. (2022). Improving the reliability of the information disclosure in supply chain based on blockchain technology. Electronic Commerce Research and Applications, 52, Article 101121. https://doi.org/10.1016/j.elerap.2022.101121