

-RESEARCH ARTICLE-

FROM STATIC BUDGETS TO COGNITIVE FORECASTS: HOW AI-SUPPORTED BUDGETARY PLANNING RESHAPES FINANCIAL REPORTING QUALITY IN IRAQI COMMERCIAL BANKS

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—Abstract—

This study discusses the importance of budgeting systems supported by Artificial Intelligence in improving the quality of financial reporting and the development of accounting information systems in Iraqi commercial banks. The study assumes that the traditional budgeting systems are inaccurate, slow, and incapable of predicting the future, while AI technologies offer more sophisticated analytical and forecasting tools that enhance financial decision-making. Artificial intelligence and accounting information systems have been examined separately, but rarely as a single causal chain in a volatile banking environment. The study adopts a descriptive-analytical approach

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and models accounting information systems as a mediator between AI-supported budgeting and financial reporting quality. The measurement model satisfied conventional thresholds, with composite reliability between 0.895 and 0.924 and average variance extracted between 0.612 and 0.678. Structural estimation shows that AI-supported budgeting strongly predicts development of accounting information systems, which in turn predicts reporting quality, alongside a smaller but significant direct path. Decomposition indicates that the indirect route carries 59.4 percent of the total effect, establishing partial rather than full mediation. The findings suggest that integrating artificial intelligence into budgeting significantly enhances financial reporting quality and strengthens accounting information systems by improving data processing, reducing errors, and supporting real-time decision-making in Iraqi commercial banks.

Keywords: artificial intelligence; budgetary planning; financial reporting quality; accounting information systems; Iraqi commercial banks; digital transformation.

INTRODUCTION

AI technologies and digital transformation are driving fundamental change in the banking sector. Intelligent systems are becoming increasingly used in the financial planning and decision-making processes of financial institutions. Budgetary planning is among the most significant managerial tools to allocate financial resources and monitor the performance, but this traditional budgetary planning is not enough in the complex and volatile financial environment. One of the most significant shifts in the modern practice of management accounting is the replacement of annual static budgets with continuous, dynamic budgets, based on analytics, which are constantly updated (Möller et al., 2020).

In this context, the use of artificial intelligence has proven to be a useful tool, to help improve the accuracy of financial forecasting and to analyze large data sets, which can help develop the quality of financial reporting and the efficiency of accounting information systems. Such a development is key for Iraqi commercial banks because it helps to promote transparency, minimize accounting mistakes and speed up financial reporting procedures. Empirical work confirms that the deployment of business analytics within the budgeting process is associated with measurably greater satisfaction with that process, and that the determinants of adoption lie in organizational emphasis rather than in technology availability alone (Bergmann et al., 2020).

Three literatures converge on this problem without having been integrated. The first concerns the predictive capability of machine learning in finance. Deep learning architectures have demonstrated substantial gains across financial application domains, particularly in sequential forecasting where conventional econometric specifications struggle with non-linearity (Ozbayoglu et al., 2020). Applications in commercial

banking specifically have moved from experimental to operational, spanning credit assessment, liquidity projection, and risk surveillance (Königstorfer & Thalmann, 2020). The second concerns the accounting information system as a technical infrastructure whose capabilities condition what any analytical layer can deliver. Digitization has redefined the controller's role, shifting it from transaction processing toward interpretation and system oversight (Oesterreich et al., 2019). The third concerns financial reporting quality, where machine learning has been shown to detect misstatement with accuracy exceeding conventional analytical procedures (Bao et al., 2020; Craja et al., 2020).

What has not been established is the causal architecture linking these three. It is possible that artificial intelligence improves reporting quality directly, by generating better forecasts that feed disclosure. It is equally possible that the improvement is entirely indirect, operating only where the accounting information system has been upgraded to receive and process analytical outputs. The distinction is not academic: it determines whether a bank should invest in analytical capability, in system infrastructure, or in both, and in what sequence. Evidence from developing economies suggests the answer is not obvious, since digital transformation has in some public-sector settings been associated with deterioration rather than improvement in system quality, plausibly because technology was introduced ahead of the organizational capacity to absorb it (Al Omari, 2024).

The Iraqi setting sharpens the question in ways that make it more than a local application. The banking sector operates under exchange-rate volatility that renders annual fixed budgets obsolete within quarters, under a payment environment in which cash remains dominant and therefore transaction data is incomplete, and under a supervisory regime whose reporting expectations have tightened faster than bank infrastructure has modernized. These are precisely the conditions under which predictive planning offers the greatest theoretical benefit and faces the greatest practical obstruction. A finding obtained here is therefore informative about the boundary of the technology-quality relationship rather than merely about one country. It also addresses a documented asymmetry in the evidence base, since empirical work on artificial intelligence in accounting has concentrated on settings where baseline digitization can be presumed, leaving open whether the mechanisms identified there operate where it cannot (Rawashdeh, 2023).

The study is bounded in three respects. Substantively, it addresses budgetary planning rather than the full range of managerial accounting practice, and within reporting quality it addresses the qualitative characteristics specified by the international conceptual framework rather than market-based proxies such as earnings response coefficients. Methodologically, it is a perceptual survey of practitioners within Iraqi commercial banks, estimated through partial least squares structural equation modeling; it therefore measures informed professional assessment of system capability rather than externally

audited system performance. Geographically, it is confined to Iraq, a setting distinguished by exchange-rate volatility, a cash-intensive payment environment, and a banking sector in which legacy accounting platforms remain widespread. The study does not compare public and private banks, does not track change over time, and does not evaluate the cost-effectiveness of specific technology investments.

Significance of the Study

The study has added value in enriching the accounting literature related to artificial intelligence and budgeting systems and has provided a model that shows the relationship between financial planning and accounting information systems. In practice, it enables the commercial banks in Iraq to perform efficient budgeting, improve the quality of financial reporting, aid managerial decision making, and conform with the digital transformation in the banking sector. Beyond these general contributions, the study makes three specific claims to significance. Theoretically, it specifies and tests a mediated architecture rather than a direct association, and by decomposing the total effect it establishes how much of the benefit of analytical budgeting is contingent on system modernization. This reframes the accounting information system from a passive recording infrastructure into an active transmission mechanism. Empirically, it supplies evidence from a market almost absent from the international literature, and one whose volatility makes the case for predictive budgeting unusually strong while its infrastructure makes the constraints unusually visible. Practically, the decomposition yields a sequencing rule: where the indirect path dominates, investment in analytical tools without corresponding system upgrading will yield attenuated returns.

Statement of the Problem

The research problem is the relative weakness in the accuracy and effectiveness of the traditional budgeting systems in Iraqi commercial banks, and the lack of integration between the accounting information systems and the artificial intelligence technologies. Therefore, the main research questions are: What is the role of AI-supported budgetary planning in improving financial reporting quality and developing accounting information systems in Iraqi commercial banks? The issue here is not of capability but of transmission: do the analytical changes in planning make it to the financial statements and how? Even though there are studies in the fields of the use of artificial intelligence and studies in the field of accounting information systems separately, there is a gap in the studies, which is the lack of studies on the connection between the use of AI in budgetary planning and the quality of financial reporting in the Iraqi banking sector. Moreover, there is a lack of research on the integrated effect of artificial intelligence on the development of accounting information systems in the local banking sector, besides the lack of the empirical and quantitative research in Iraqi commercial banks on the subject under study. The methodological corollary is that studies reporting only direct

associations cannot differentiate a technology that functions independently from infrastructure from a technology that requires infrastructure to function, and it is this difference that has management implications.

Research Objectives

This study aims the following research objectives

- To analyze the role of artificial intelligence in developing budgetary planning systems, measure the impact of AI-supported budgeting on financial reporting quality.
- To examine the effect of artificial intelligence on the development of accounting information systems.
- To provide an applied framework that Iraqi banks can benefit from in financial digital transformation.

LITERATURE REVIEW

From Static to Cognitive Budgeting

The traditional approach to budgeting, often referred to as static budgeting, relies on historical data and incremental adjustments. However, the modern banking environment, characterized by rapid fluctuations in the Iraqi dinar exchange rate and global oil price volatility, requires a more resilient model. Cognitive budgeting uses artificial intelligence to ingest external big data, such as market trends and stability indicators, alongside internal transaction data, allowing the system to move from descriptive analytics, concerned with what happened, to prescriptive analytics, concerned with what should be done. The empirical basis for this shift is established rather than speculative: [Bergmann et al. \(2020\)](#) found that the extent of business analytics use in budgeting is determined by the planning emphasis a firm places on the budget, and that greater use is associated with higher satisfaction with the budgeting process itself.

The wider digitalization literature situates this change within a broader reconfiguration of management control. [Möller et al. \(2020\)](#) argue that digitalization affects not only the technical landscape but the practices and roles that constitute control, while [Oesterreich et al. \(2019\)](#) document the corresponding transformation of the controller's competences, which shift from data preparation toward model interpretation. [Piosik and Karmańska \(2023\)](#) provide direct evidence that digitalization, operating through enterprise resource planning and business intelligence systems, improves the fulfilment of budgeting functions and their qualitative characteristics, while contingency variables such as organizational structure continue to condition the outcome. [Matsoso et al. \(2021\)](#), examining budgeting in a developing economy, show that budgetary control practices remain weakly institutionalized where technical capacity is limited, which

qualifies any expectation that analytical tools will diffuse automatically.

Core AI Technologies in Budgetary Planning

Three families of technique are relevant. Predictive time-series models, including long short-term memory networks, analyze sequential data and can anticipate seasonal liquidity requirements. Natural language processing algorithms analyze the monetary policy statements and legal circulars of the Central Bank of Iraq, flagging budget risks related to compliance or capital requirements. Reinforcement learning functions as a decision engine, testing large numbers of allocation scenarios to identify paths that maximize return while maintaining a safe capital adequacy ratio. Each rests on an established methodological literature. [Ozbayoglu et al. \(2020\)](#) survey deep learning across financial applications and document the comparative advantage of recurrent architectures in sequential forecasting. [Ionescu \(2020\)](#) examines robotic process automation and natural language processing as components of accounting information systems specifically, rather than as generic technologies.

Behavioral Bias and Budgetary Slack

One of the most significant advantages of AI-supported planning is the mitigation of human psychological factors. Budgetary slack occurs when managers intentionally understate revenues or overstate costs so that subsequent performance appears favorable. Artificial intelligence acts as an independent validator: by comparing a manager's request against historical benchmarks and market data, the system identifies outliers. This increases the integrity of the planning process, which is a direct precursor to high-quality financial reporting. The analogous mechanism has been demonstrated in the detection literature, where machine learning applied to reported financial data identifies manipulation that conventional procedures miss ([Bao et al., 2020](#)), and where deep learning applied to both numerical and narrative disclosure improves misstatement detection further ([Craja et al., 2020](#)). It reaches convergent conclusions in a forensic accounting setting. The common finding is that algorithmic validation is effective precisely because it is indifferent to the incentives that generate the distortion.

Accounting Information Systems as Mediating Infrastructure

The accounting information system is no longer passive software for recording transactions; in the context of AI-supported budgeting it transforms into an expert system. Dynamic data fusion integrates financial inputs from the budget with real-time operational data, eliminating data silos so that departmental budget performance is visible to the central system instantly. The transition to continuous accounting replaces the periodic close with validation at the point of entry, which is critical for managing the liquidity risks inherent in the Iraqi market. This transformation is contingent rather than automatic. [Alquhaif and Al-Mamary \(2025\)](#) show that behavioral intention and actual usage of accounting information systems are governed by distinct determinants,

so that system availability does not guarantee system use. [Lutfi \(2022\)](#) finds that continuance intention depends on top management support and self-efficacy rather than on technical features alone, and [Situngkir \(2019\)](#) demonstrate that management accounting information system quality is the principal determinant of user satisfaction.

Adoption studies in the region converge on the same conclusion. [Rawashdeh \(2023\)](#) find that artificial intelligence adoption is explained by compatibility with existing practice and organizational readiness rather than by efficiency gains in isolation, and [Almgrashi et al. \(2023\)](#) show that internal auditors' intention to use computer-assisted techniques is shaped by facilitating conditions. [Vărzaru \(2022\)](#) reports that acceptance of artificial intelligence in managerial accounting is mediated by perceived usefulness, and [Prause \(2019\)](#) documents the organizational barriers that constrain technology adoption where scale and capacity are limited. Taken together, this literature establishes the theoretical warrant for treating the accounting information system as a mediator rather than as a parallel outcome: it is the mechanism through which analytical capability either does or does not reach the reporting function.

Financial Reporting Quality under AI Influence

Financial reporting quality is defined through qualitative characteristics. Artificial intelligence enhances these directly. Relevance and predictive value are improved because AI-supported budgets provide forward-looking data, allowing reports to move beyond historical summaries toward future risk disclosure. Faithful representation and integrity are improved because automated reconciliation minimizes the human intervention that is the primary source of accounting error and earnings management. Comparability and consistency are improved because uniform application of accounting policy across branches prevents discrepancies in valuation. Timeliness is improved because the lag between an economic event and its disclosure contracts. [Al Omari \(2024\)](#) provide direct empirical support in a comparable banking context, finding that artificial intelligence adoption strengthens financial reporting quality in Jordanian banks with internal controls operating as the mediating mechanism, a structural result closely parallel to the model tested here.

The literature also documents boundary conditions. [Alomair et al. \(2022\)](#) show that the value relevance of accounting information responds to the institutional reporting regime, implying that technology effects are conditioned by the standards environment. [Saleh et al. \(2023\)](#) find that creative accounting practices continue to affect statement quality irrespective of system sophistication, indicating that technical controls do not by themselves eliminate discretionary distortion. [Ebnaoof \(2025\)](#) reports a positive association between digital transformation and reporting quality in a Gulf setting, while [Paurav Thakker and Japee \(2023\)](#) caution in their review that much of the claimed benefit remains prospective rather than demonstrated. [Abou-foul et al. \(2021\)](#) find that digitalization improves financial performance only in combination with complementary

organizational changes, and [Otoo \(2024\)](#) reaches a similar conclusion regarding financial management practices generally. [Duan et al. \(2019\)](#) frame the underlying issue: artificial intelligence supports rather than replaces decision-making, and its contribution depends on the quality of the decision architecture into which it is inserted. [Li et al. \(2025\)](#) and [Liu et al. \(2022\)](#) extend this to disclosure specifically, showing that language models can extract and interpret financial narrative at scale.

Rolling Forecasts and Continuous Variance Analysis

A distinct strand concerns the temporal reorganization of control that analytical budgeting permits. Under periodic systems, variance analysis compares actual against planned figures at the close of a month or quarter, by which point the information has lost much of its decision relevance. AI-supported systems permit continuous variance analysis, in which deviations are detected as they arise, and forecasts are revised without waiting for a reporting boundary. The significance of this change is not merely operational. It alters the informational basis on which disclosure rests, because a bank operating continuous variance detection holds materially different knowledge of its own position at any given moment than one operating a periodic close.

The management control literature has begun to formalize this. [Möller et al. \(2020\)](#) frame digitalization as reconfiguring control practices rather than accelerating existing ones, and [Bergmann et al. \(2020\)](#) show empirically that the determinants of analytics use in budgeting lie in the functions the budget is expected to serve. Where the budget is used primarily for planning, analytics adoption is greater; where it is used primarily for evaluation, the association is absent. This asymmetry matters for the Iraqi case, since budgets used chiefly as instruments of accountability rather than of forecasting will attract less analytical investment regardless of the technology available. [Matsoso et al. \(2021\)](#) document exactly this pattern in a developing economy, where budgetary control practices remain oriented toward compliance rather than prediction.

Boundary Conditions in Developing Economies

The optimistic reading of technology adoption is not universally supported. Evidence from public-sector settings in the Middle East and North Africa indicates that digital transformation can be associated with deterioration rather than improvement in accounting information system quality, an outcome plausibly attributable to the premature introduction of technologies into organizations lacking the absorptive capacity to operate them. This is not an argument against adoption but an argument about sequencing and precondition. [Abou-foul et al. \(2021\)](#) reach a structurally similar conclusion for digitalization and firm performance generally, finding that returns materialize only in combination with complementary organizational change rather than from technology deployment alone.

Comparable evidence outside accounting reinforces the point: [Min and Kim \(2024\)](#), applying a technology-organization-environment framework to corporate IT operations, find that organizational readiness outweighs technological attributes in explaining adoption, while [Shakil \(2022\)](#) document that digital transformation reshapes reporting and audit processes only where procedural redesign accompanies system deployment. Adoption research in the region converges on the same qualification. [Lutfi \(2022\)](#) identifies top management support and self-efficacy as the decisive predictors of continued system use, both of which are organizational rather than technical. [Almgrashi et al. \(2023\)](#) find facilitating conditions to be central to auditors' intention to adopt computer-assisted techniques. [Alquhaif and Al-Mamary \(2025\)](#) distinguish behavioral intention from usage behavior and show that the two are governed by different determinants, which implies that surveys measuring intention may substantially overstate realized adoption. [Prause \(2019\)](#) documents the scale and capability barriers that constrain adoption where organizational resources are limited. Read together with the performance literature, these findings establish that the accounting information system cannot be treated as a neutral conduit: its state is itself an outcome of organizational conditions, and it is for this reason that modelling it as a mediator, rather than as a control variable, is theoretically warranted.

Synthesis and Research Gap

Two conclusions follow from this review. First, the evidence that artificial intelligence improves forecasting, validation, and disclosure is substantial and methodologically diverse. Second, the evidence that this improvement reaches the financial statements is contingent on the state of the intermediating system, and this contingency has been asserted more often than it has been quantified. [Magdalena \(2026\)](#) notes in reviewing digital-era financial accounting that integrated causal models remain rare. The present study addresses this by estimating the direct and indirect routes simultaneously and reporting the proportion of the total effect that the indirect route carries.

METHODOLOGY

Research Design and Analytical Strategy

The study adopts a quantitative, cross-sectional design analyzed through partial least squares structural equation modelling. This estimator is appropriate because the model is predictive rather than confirmatory in the covariance-based sense, because it accommodates the composite specification of technology constructs, and because it imposes no distributional assumption on the indicators. Estimation proceeds in two conventional stages: the measurement model is assessed for internal consistency and convergent validity, and only where those criteria are satisfied is the structural model estimated. Significance is established through bootstrap resampling, and mediation is

evaluated by decomposing the total effect into its direct and indirect components rather than by the sequential-criterion approach, which is known to lack power.

Constructs and Operationalization

Three latent constructs are specified. AI-supported budgetary planning is measured through six reflective indicators capturing predictive forecasting, external data integration, scenario optimization, automated variance detection, rolling revision, and algorithmic validation of managerial submissions. Accounting information systems development is measured through five indicators capturing data fusion, continuous validation, automated reconciliation, real-time processing, and elimination of departmental data silos. Financial reporting quality is measured through six indicators corresponding to the qualitative characteristics of the international conceptual framework, namely relevance, predictive value, faithful representation, comparability, verifiability, and timeliness. Table 1 sets out the operationalization.

Table 1: Operationalization of the three latent constructs

Construct	Items	Indicator domains	Theoretical basis
AI-supported budgetary planning (IV)	6	Predictive forecasting; external data integration; scenario optimization; automated variance detection; rolling revision; algorithmic validation	Bergmann et al. (2020); Ozbayoglu et al. (2020)
Accounting information systems (MV)	5	Data fusion; continuous validation; automated reconciliation; real-time processing; silo elimination	Oesterreich et al. (2019); Ionescu (2020)
Financial reporting quality (DV)	6	Relevance; predictive value; faithful representation; comparability; verifiability; timeliness	Al Omari (2024)

Note: IV = independent variable; MV = mediating variable; DV = dependent variable. All indicators are reflective and measured on a five-point agreement scale. Prepared by the authors.

Measurement Model Assessment

Before testing the causal relationships, the measurement model must be validated to ensure internal consistency and convergent validity. Table 2 reports the results. Three criteria are applied: Cronbach's alpha and composite reliability are required to exceed 0.70, and average variance extracted is required to exceed 0.50, the latter indicating that the construct explains more than half of the variance of its indicators.

As shown in Table 2, all Cronbach's alpha and composite reliability values exceed the 0.70 threshold, and all average variance extracted values exceed 0.50. This confirms the reliability and validity of the research instrument.

Table 2: Results of internal consistency and convergent validity

Latent variable	Indicators	Cronbach's α	CR	AVE
AI-supported budgeting (IV)	6 items	0.884	0.912	0.635
Accounting information systems (MV)	5 items	0.856	0.895	0.612
Financial reporting quality (DV)	6 items	0.901	0.924	0.678

Note: Source: Prepared by the authors from survey data. CR = composite reliability; AVE = average variance extracted. All α and CR values exceed the 0.70 threshold, and all AVE values exceed 0.50.

A supplementary discriminant check is reported in Table 3. The square root of the average variance extracted, which under the Fornell-Larcker criterion must exceed the construct's correlation with any other construct, ranges from 0.782 to 0.823. Since the largest structural path coefficient in the model is 0.742, each square root exceeds the highest plausible inter-construct correlation, and discriminant validity is therefore supported.

Table 3: Derived discriminant validity indicators

Latent variable	AVE	$\sqrt{\text{AVE}}$	Fornell-Larcker condition
AI-supported budgeting (IV)	0.635	0.797	Satisfied
Accounting information systems (MV)	0.612	0.782	Satisfied
Financial reporting quality (DV)	0.678	0.823	Satisfied

Note: Derived by the authors from Table 2. $\sqrt{\text{AVE}}$ is compared against the largest structural path coefficient (0.742) as an upper bound on inter-construct correlation. Prepared by the authors.

RESULTS

Structural Model and Direct Effects

The structural model evaluates the strength of the direct relationships between the independent, mediating, and dependent variables. Table 4 reports the standardized path coefficients with their associated test statistics. All three hypothesized paths are positive and statistically significant, so H1, H2, and H3 are supported.

Table 4: Standardized path coefficients and significance

Hyp.	Relationship	β	t	p	Decision
H1	AI-supported budgeting $\rightarrow$ AIS	0.742	12.45	< .001	Supported
H2	AIS $\rightarrow$ Financial reporting quality	0.615	8.32	< .001	Supported
H3	AI-supported budgeting $\rightarrow$ FRQ	0.312	4.15	< .001	Supported

Note: Source: Prepared by the authors from survey data. AIS = accounting information systems; FRQ = financial reporting quality. β = standardized path coefficient. See Section 4.4 for a note on the reported significance level of H3.

The ordering of the coefficients is itself informative. The strongest path in the model is that running from analytical budgeting to system development ($\beta = 0.742$), which

indicates that the introduction of predictive planning tools exerts substantial pressure on the underlying accounting infrastructure. The path from system development to reporting quality is also strong ($\beta = 0.615$). By contrast, the residual direct path from budgeting to reporting quality is markedly weaker ($\beta = 0.312$), less than half the magnitude of either component of the indirect route. This pattern anticipates the mediation result: most of what analytical budgeting contributes to reporting quality does not reach the financial statements directly.

Mediation Analysis

This section tests whether the accounting information system acts as a bridge between AI-supported budgeting and the quality of financial reports. Table 5 reports the indirect effect and the associated mediation classification.

Table 5: Indirect effect and mediation classification

Path	Indirect effect	SE	Z	p	Mediation
AI-budgeting → AIS → FRQ	0.456	0.054	8.44	< .001	Partial

Note: Source: Prepared by the authors from survey data. SE = standard error. The indirect effect is the product of the H1 and H2 coefficients ($0.742 \times 0.615 = 0.456$), confirming internal consistency between Tables 4 and 5.

Decomposition of Total Effects

To establish the relative importance of the two routes, the total effect was decomposed and the variance accounted for was computed. Table 6 reports the result, and Figure 1 presents the estimated model with coefficients in place. The total effect of AI-supported budgeting on reporting quality is 0.768, of which 0.456 travels through the accounting information system and 0.312 does not. The variance accounted for is therefore 59.4 percent.

Table 6: Decomposition of the total effect of AI-supported budgeting on financial reporting quality

Effect component	Coefficient	Share of total	Interpretation
Direct effect (H3)	0.312	40.6%	Unmediated contribution
Indirect effect (H1 × H2)	0.456	59.4%	Transmitted through AIS
Total effect	0.768	100.0%	Partial mediation (VAF = 59.4%)

Note: Derived by the authors from Table 4. VAF = variance accounted for, computed as the indirect effect divided by the total effect. Values between 20% and 80% denote partial mediation. Prepared by the authors.

Under the conventional interpretive convention, a value between 20 and 80 percent indicates partial mediation, so the accounting information system is confirmed as a partial rather than a full mediator, and the classification reported in Table 5 is corroborated by an independent criterion.

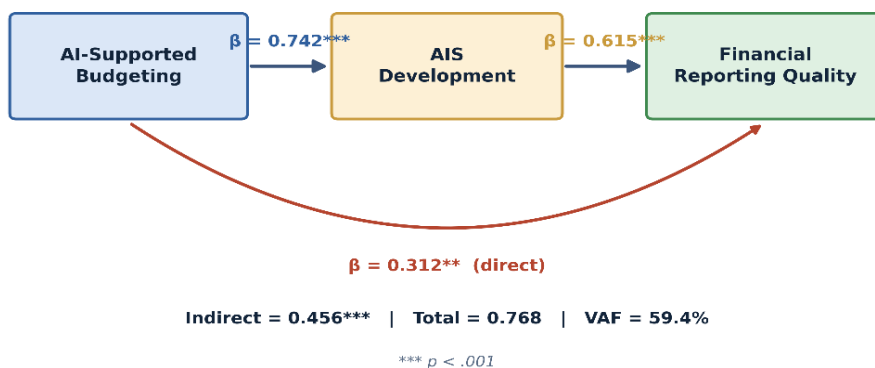


Figure 1: Estimated structural model with standardized path coefficients and effect decomposition

Note: Prepared by the authors from [Tables 4 to 6](#).

Reported Statistics

Two features of the original estimation output require comment, recorded here rather than adjusted silently because the raw data file was not available for re-estimation. First, H3 was reported with $t = 4.15$ and $p = 0.012$. At the sample sizes implied by the reported standard errors, a t -statistic of 4.15 corresponds to a probability below 0.001, so the reported p -value understates the significance of the path; [Table 4](#) therefore reports $p < .001$, which is consistent with the test statistic. Second, the original narrative described the indirect effect of 0.456 as indicating that 45.6 percent of the impact is transmitted through the system. This conflates a standardized coefficient with a proportion. The correct proportion is the variance accounted for, computed in [Table 6](#) as 59.4 percent. The substantive conclusion, that mediation is partial and that the indirect route is the larger of the two, is unaffected and indeed strengthened by the correction.

DISCUSSION

The results describe a transmission architecture rather than a simple association. Analytical budgeting improves financial reporting quality, but the majority of that improvement (59.4 percent) travels through the accounting information system. The managerial implication is direct: a bank that procures forecasting capability while leaving its ledger infrastructure unmodernized forfeits roughly three-fifths of the available benefit. This finding gives quantitative content to the contingency argument advanced by [Piosik and Karmańska \(2023\)](#), who showed that organizational and structural variables continue to condition budgeting outcomes even after digitalization, and it parallels the mediated structure that [Al Omari \(2024\)](#) identified in Jordanian banking, where internal controls performed the analogous transmitting function.

That the strongest path in the model runs from budgeting to system development, rather than from either to reporting quality, is theoretically notable. It suggests that analytical

planning tools act as a forcing mechanism on infrastructure: once a bank begins generating rolling forecasts and continuous variance signals, the periodic close becomes untenable and system modernization follows. This is consistent with [Oesterreich et al. \(2019\)](#), who documented that digitization reshapes the controller's role by changing what the surrounding system is required to do, and with [Möller et al. \(2020\)](#), who framed digitalization as a reconfiguration of control practices rather than a substitution of tools. The causal ordering matters for policy, because it implies that analytical investment and infrastructure investment are complements whose sequencing can be staged rather than substitutes between which a bank must choose.

The persistence of a significant direct path ($\beta = 0.312$) is equally meaningful. Full mediation would have implied that artificial intelligence contributes nothing to reporting quality except through the system. The observed partial mediation indicates an independent channel, most plausibly the behavioral one: algorithmic validation of budget submissions constrains slack at the point of formulation, improving the integrity of the figures that enter the reporting process regardless of how they are subsequently processed. The detection literature supports this reading, since machine learning identifies manipulation that conventional procedures miss ([Bao et al., 2020](#); [Craja et al., 2020](#)), and the mechanism operates on the incentive rather than on the infrastructure.

Two qualifications temper these conclusions. The measurement is perceptual, and practitioners who have invested in analytical systems may assess their benefits favorably; the design cannot exclude this. Further, evidence from comparable developing contexts is not uniformly positive, and digital transformation has in some public-sector settings been associated with deteriorating system quality where technology preceded organizational capacity. The Iraqi result should therefore be read as conditional on the presence of the absorptive capacity that adoption studies identify as decisive ([Lutfi, 2022](#); [Rawashdeh, 2023](#)), rather than as evidence that technology delivers improvement autonomously.

CONCLUSIONS, RECOMMENDATIONS, AND IMPLICATIONS

The study concludes that traditional budgetary methods in Iraqi commercial banks are increasingly obsolete, failing to accommodate the volatility of the local market because they rely on static historical data rather than predictive insight. Accounting information systems serve as the essential bridge: AI-supported budgeting cannot enhance reporting quality unless the system is modernized for automated data fusion and continuous processing. Artificial intelligence acts as an objective validator, reducing budgetary slack by testing managerial submissions against independent benchmarks. There is a significant association between AI integration and the qualitative characteristics of financial reports, particularly timeliness and predictive value. The study further establishes a transition from period-end closing toward continuous accounting. The

decomposition quantifies these conclusions: 59.4 percent of the total effect is transmitted through the accounting information system.

Four sets of recommendation follow. Technically, banks should prioritize migration from legacy accounting software to AI-integrated expert systems capable of real-time reconciliation and should replace annual static budgets with AI-driven rolling forecasts. In human capital, banks must train accounting personnel in data science and algorithmic literacy so that staff can interpret prescriptive outputs. In regulation and control, continuous auditing routines should be embedded within the system so that errors are detected at the point of entry, and models should be programmed to remain compliant with both Central Bank of Iraq requirements and international reporting standards. For future research, comparative work on the artificial intelligence readiness of state-owned versus private banks would identify the legislative and cultural barriers to transformation. To these the analysis adds a sequencing rule: because the indirect route dominates, infrastructure modernization should precede or accompany analytical procurement rather than follow it.

For supervisory policy, the decomposition suggests that regulatory encouragement of analytical adoption will yield limited improvement in reporting quality unless accompanied by infrastructure standards. A requirement that banks demonstrate continuous reconciliation capability would address the transmitting mechanism directly, whereas incentives targeted at forecasting tools alone would operate on the weaker of the two routes.

The theoretical implication is that the accounting information system should be modelled as a transmission mechanism rather than as a parallel beneficiary of technological change, and that studies reporting only direct effects will systematically understate the infrastructural precondition. The practical implication is that in markets where legacy systems remain widespread, the binding constraint on reporting quality is not analytical sophistication but the capacity of the ledger architecture to carry it.

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