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Digital Transformation of Government Accounting and Its Impact on the Efficiency of Public Budgets: A Comparison Between the Iraqi and Gulf Experiences

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Abstract

Purpose: This study examines the impact of the digital transformation of government accounting on the efficiency of public budgets through a comparative analysis of Iraq and the Gulf countries. The research evaluates whether adopting digital government accounting systems contributes to higher levels of public budget efficiency by improving financial transparency, strengthening financial control, enhancing the quality of accounting information, and supporting more effective management of public resources.

Design/methodology/approach: A quantitative research design was employed. Primary data were obtained through a structured questionnaire distributed to a large sample of employees at Qimat Al-Tawasul Company in Najaf, Iraq. The proposed conceptual model was assessed using Partial Least Squares Structural Equation Modelling (PLS-SEM), allowing the direct relationships between digital transformation in government accounting and public budget efficiency to be examined.

Findings: The empirical evidence indicates that digital transformation in government accounting has a positive and statistically significant influence on public budget efficiency. The implementation of digital accounting systems was associated with improvements in the accuracy and reliability of financial information, greater transparency in financial reporting, stronger oversight mechanisms, and more efficient budget administration. The comparative assessment also highlights that several practices adopted within Gulf countries provide valuable institutional and technological reference points that may facilitate the continued development of government accounting systems in Iraq.

Practical Implications: The findings indicate that strengthening digital infrastructure, expanding the integration of government accounting information systems, and improving the digital competencies of public sector personnel are important priorities for enhancing financial governance. These initiatives have the potential to increase accountability, improve the quality of financial management, and support more efficient administration of public budgets.

Originality/value: This study extends the literature on digital government accounting by providing empirical evidence from Iraq while incorporating comparative insights from Gulf countries. The findings contribute to the understanding of how digital transformation can improve public financial management and offer practical guidance for policymakers and public institutions seeking to modernise government accounting systems and enhance public budget efficiency.

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Keywords: Digital transformation, Government accounting, Public budget efficiency, Digital government accounting systems, Financial transparency, Iraq, Gulf countries

1. Introduction

The digital transformation of public administration has become a central priority for governments seeking to strengthen financial governance, improve institutional performance, and enhance the efficiency of public expenditure (Shenkoya, 2023) ^[19]. Rapid developments in digital technologies have encouraged public sector organisations to modernise traditional accounting practices

by integrating digital government accounting systems into budgeting, reporting, and financial management processes. This transition has changed how governments collect, process, and communicate financial information, creating new opportunities to improve transparency, accountability, and evidence-based decision-making (Almi'ani *et al.*, 2026) ^[5]. Public budget efficiency remains a fundamental indicator of government performance because it reflects the ability of public institutions to allocate financial resources effectively while maintaining fiscal discipline and delivering high-quality public services. In many developing economies, including Iraq, limitations associated with conventional accounting procedures continue to reduce the effectiveness of budget preparation, execution, monitoring, and evaluation. These challenges are frequently characterised by fragmented financial information, delayed reporting, limited transparency, and weak internal control mechanisms, all of which reduce the quality of financial decision-making and public resource management (Boufounou *et al.*, 2024) ^[8]. The emergence of digital government accounting has provided governments with practical mechanisms to address these challenges. Digital accounting systems automate financial processes, improve the accuracy and reliability of accounting information, and enable the timely exchange of financial data across government entities. These capabilities support more effective budget planning, strengthen expenditure monitoring, reduce administrative inefficiencies, and enhance compliance with financial regulations. Consequently, digital transformation has become an important component of public financial management reforms implemented across many countries (Shenkoya, 2023) ^[19]. The experiences of the Gulf countries demonstrate the potential benefits of adopting digital technologies within government accounting. Significant investments in digital infrastructure, integrated financial management systems, and institutional capacity have enabled several Gulf governments to improve budget transparency, financial control, and the quality of public financial reporting. Although Iraq has introduced various digital initiatives to modernise its public financial management system, implementation remains uneven because of institutional, technological, and administrative challenges. A comparative assessment of Iraq and the Gulf countries therefore provides an appropriate

context for understanding how digital transformation can improve public budget efficiency under different institutional environments (Al-Hajri *et al.*, 2024) ^[1]. Despite the growing interest in digital government, empirical evidence examining the relationship between digital transformation in government accounting and public budget efficiency remains relatively limited, particularly within the Iraqi context. Existing studies have primarily focused on digital government services or electronic public administration, while comparatively little attention has been directed towards the accounting mechanisms that support budgeting and financial governance. This gap highlights the need for empirical research that evaluates the contribution of digital government accounting to improving public budget efficiency. Accordingly, this study investigates the impact of digital transformation in government accounting on public budget efficiency through a comparative perspective involving Iraq and the Gulf countries. The research employs empirical evidence collected from employees at Qimat Al-Tawasul Company in Najaf, Iraq, to examine the proposed conceptual relationships. The findings are expected to contribute to the literature on digital government accounting while providing practical insights for policymakers seeking to strengthen financial governance and improve the management of public resources.

Digital transformation has substantially reshaped government accounting by replacing manual financial procedures with integrated digital platforms that support budget preparation, financial reporting, expenditure monitoring, and internal control. These systems improve the quality, timeliness, and accessibility of financial information, enabling public managers to make more informed budgeting decisions. Accurate and timely accounting information also facilitates greater transparency and strengthens accountability throughout the budget cycle. Previous studies suggest that digital accounting technologies contribute to more efficient public financial management by improving financial reporting quality, reducing administrative delays, and supporting evidence-based policy decisions (Al Sany, 2024) ^[3]. Accordingly, the following hypothesis is proposed: H1: Digital transformation in government accounting positively influences public budget efficiency.

The proposed relationship is illustrated in Figure 1.

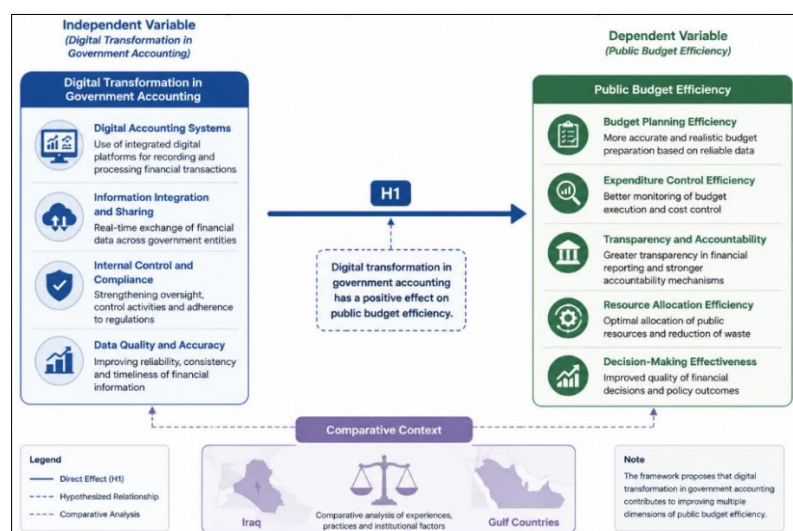


Fig 1: Conceptual Research Framework and Hypothesized Relationship

2. Literature Review for Construct Identification

A systematic review of the literature was conducted to establish the theoretical foundation of this study and to identify the principal constructs incorporated within the proposed conceptual framework. The review focused on research examining Digital Transformation in Government Accounting (DTGA) and its contribution to improving Public Budget Efficiency (PBE). Particular attention was devoted to studies addressing digital government, government accounting, public financial management, accounting information systems, financial transparency, accountability, and budget performance. This process ensured that the conceptual model was grounded in an established body of knowledge while identifying areas that remain insufficiently explored within the existing literature. The literature search

was undertaken using internationally recognised academic databases, including Scopus, Web of Science, Google Scholar, Emerald Insight, ScienceDirect, SpringerLink, and Wiley Online Library. These databases were selected because they provide extensive coverage of peer-reviewed research in accounting, public administration, information systems, and public sector management. The search strategy employed combinations of keywords such as digital transformation, government accounting, digital government, government accounting information systems, public financial management, public budgeting, budget efficiency, financial transparency, financial accountability, and *digital governance*. Table 1 presents the principal search terms used during the review.

Table 1: Principal Search Terms Used During the Literature Review

Theme	Principal Search Terms	Purpose
Digital Transformation	"Digital Transformation", "Digital Government", "Digitalisation", "E-Government", "Government Digital Transformation", "Digital Public Administration"	To identify studies examining digital transformation initiatives within public sector organisations.
Government Accounting	"Government Accounting", "Public Sector Accounting", "Government Financial Management", "Public Financial Management", "Government Accounting Information Systems"	To identify literature addressing accounting practices and financial management in government institutions.
Public Budget Efficiency	"Public Budget Efficiency", "Budget Performance", "Public Budgeting", "Budget Management", "Budget Effectiveness", "Public Expenditure Management", "Budget Control"	To identify studies examining budget efficiency and public expenditure management.
Financial Governance	"Financial Governance", "Public Financial Governance", "Financial Transparency", "Public Accountability", "Internal Control", "Government Financial Reporting"	To identify studies related to governance mechanisms supporting effective public financial management.
Information Quality	"Financial Information Quality", "Accounting Information Quality", "Government Financial Information", "Decision-Making", "Financial Reporting Quality"	To identify literature examining the role of information quality in improving public sector decision-making.
Comparative Context	"Iraq", "Gulf Countries", "GCC", "Public Sector Reform", "Government Modernisation", "Public Administration"	To identify studies relevant to Iraq and Gulf countries for comparative analysis.

To ensure methodological rigour, explicit inclusion and exclusion criteria were established. The review considered peer-reviewed journal articles published between 2015 and 2026, reflecting the rapid development of digital technologies within public administration during the past decade. Eligible studies examined government accounting, digital transformation, accounting information systems, public financial management, or budget management. They reported empirical evidence concerning the effects of digital technologies on accounting or financial performance. Publications unrelated to the public sector, conference abstracts, editorials, book reviews, and conceptual papers lacking empirical evidence were excluded. This selection procedure ensured that the constructs were derived from robust empirical research rather than purely theoretical discussions. The literature consistently identifies Digital Transformation in Government Accounting (DTGA) as an important component of contemporary public sector reform. Digital technologies have transformed traditional government accounting by integrating financial reporting, budgeting, expenditure control, auditing, and performance monitoring into unified digital platforms. These developments enable governments to improve the quality, accessibility, and timeliness of accounting information while strengthening transparency and accountability throughout the public financial management cycle. Recent studies argue that digitalisation has fundamentally reshaped accounting practices by expanding the availability of digital financial data and enhancing evidence-based decision-making across

public institutions (Thanasas *et al.*, 2026) ^[20].

An increasing body of research further suggests that digital government accounting contributes to more effective financial governance through improved information quality and stronger accountability mechanisms. Integrated accounting systems automate routine financial processes, reduce processing errors, strengthen internal controls, and facilitate continuous monitoring of government expenditure. These capabilities enhance the reliability of financial reporting and provide policymakers with timely information to support budget formulation, implementation, and evaluation. Consequently, digital transformation is increasingly recognised as a strategic instrument for improving the effectiveness of public financial management rather than merely introducing technological change (Saim & Traore, 2025) ^[18]. The Organisation for Economic Co-operation and Development (OECD) similarly emphasises that digital transformation has become central to strengthening government performance and improving the efficiency of public expenditure. Rather than functioning solely as a technological innovation, digital government supports integrated policy implementation, data-driven decision-making, institutional coordination, and more efficient management of public resources. Governments that successfully integrate digital technologies into budgeting and financial management are better positioned to enhance fiscal transparency, improve service delivery, and optimise public expenditure outcomes (Islam, 2025) ^[16].

Within the public finance literature, Public Budget Efficiency

(PBE) is generally viewed as the ability of governments to allocate, utilise, monitor, and evaluate financial resources in a manner that maximises public value while maintaining fiscal responsibility. Budget efficiency extends beyond expenditure control to include transparent financial reporting, effective resource allocation, accountability, performance evaluation, and evidence-based policy formulation. Efficient budgeting therefore depends on the availability of accurate accounting information that supports informed managerial and governmental decisions (Augustine, 2022) ^[7]. Previous studies indicate that improvements in government accounting systems contribute directly to stronger budget performance. Digital accounting technologies improve budget planning by providing timely financial information, strengthen expenditure monitoring through integrated reporting systems, and support fiscal discipline by enabling continuous oversight of government transactions. Reliable accounting information also reduces information asymmetry between public institutions and stakeholders, thereby increasing public confidence in financial management and reinforcing accountability across government organisations (Olatinsu & Eke, 2025) ^[17]. Comparative evidence demonstrates considerable variation in the implementation of digital government accounting across countries. Several Gulf countries have invested substantially in integrated financial management information systems, electronic budgeting platforms, digital public services, and interoperable accounting infrastructures. These reforms have strengthened transparency, improved expenditure management, enhanced accountability, and increased institutional efficiency. By comparison, Iraq continues to experience challenges associated with fragmented accounting systems, limited technological integration, institutional constraints, and uneven implementation of digital public financial management reforms. These differences provide an appropriate comparative context for examining how digital transformation influences public budget efficiency under different administrative environments (Ebhotu *et al.*, 2024) ^[11].

Although the literature concerning digital government has expanded considerably during the past decade, relatively limited empirical research has examined the direct relationship between Digital Transformation in Government Accounting (DTGA) and Public Budget Efficiency (PBE). Most existing studies have concentrated on digital public services, e-government adoption, or broader public sector digitalisation. At the same time, comparatively fewer investigations have focused specifically on government accounting processes that support budgeting, financial reporting, expenditure control, and fiscal governance. Furthermore, empirical evidence from developing economies remains limited despite the distinctive institutional and administrative challenges that characterise these environments. The present study addresses this gap by examining the influence of Digital Transformation in Government Accounting (DTGA) on Public Budget Efficiency (PBE) using empirical evidence collected from Iraq while incorporating the experiences of Gulf countries as a comparative institutional reference. This approach extends the existing literature on digital government accounting by providing context-specific evidence from an emerging economy. It contributes to a better understanding of how digital accounting reforms can strengthen financial governance, improve public budgeting, and support

sustainable public financial management.

3. Methodology

3.1. Research Design

This study employed a quantitative research design to examine the influence of Digital Transformation in Government Accounting (DTGA) on Public Budget Efficiency (PBE). A quantitative approach was selected because it provides an appropriate framework for empirically testing the proposed relationships between latent constructs through advanced statistical analysis. The research adopted a cross-sectional survey design, which has been widely applied in accounting, public administration, and information systems research to investigate organisational perceptions and evaluate theoretical relationships among research variables (Maier *et al.*, 2023). The empirical investigation was conducted in Iraq, where public institutions have increasingly recognised the importance of digital transformation in strengthening government accounting practices and improving public financial management. Data were collected using a structured questionnaire administered to employees of Qimat Al-Tawasul Company in Najaf, Iraq. The respondents were considered suitable participants because of their professional involvement in accounting activities, financial management, digital technologies, and organisational decision-making. Their practical experience provided valuable insights into the implementation of digital government accounting practices and their influence on budget management. The questionnaire commenced with a demographic section designed to describe the characteristics of the respondents and assess the representativeness of the sample. The demographic profile included variables such as gender, age, educational qualification, organisational position, and years of professional experience. These characteristics provide an overview of the study participants and support the interpretation of the empirical findings across different respondent groups. Reporting demographic information also enhances the transparency of the research design and enables readers to evaluate the suitability of the study sample for addressing the research objectives (Hevner *et al.*, 2024).

The second section of the questionnaire measured the research constructs using multiple indicators adapted from established studies in digital transformation, government accounting, accounting information systems, and public financial management. Each measurement item was assessed using a seven-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree). The use of a seven-point response scale provides greater measurement precision by allowing respondents to express varying degrees of agreement while supporting the reliability and validity of the measurement model (Yamashita, 2022). The questionnaire was developed using measurement items previously validated in the literature to strengthen construct validity and measurement consistency. Each item was carefully reviewed to ensure that it accurately represented its intended construct and reflected the context of government accounting and public financial management. Particular attention was given to the clarity, readability, and consistency of the questionnaire to minimise the possibility of respondent misunderstanding and improve the quality of the collected data. Since both the independent and dependent variables were obtained from the same respondents, several procedural measures were incorporated during questionnaire design to

reduce the possibility of common method bias. Respondents were informed that their participation was voluntary and that all responses would remain anonymous and confidential. The questionnaire was organised in a logical sequence, demographic questions were separated from the construct measurements, and clear wording was adopted throughout the instrument to minimise response bias. These procedural approaches are widely recommended for reducing systematic measurement error in survey-based behavioural research (Zaal *et al.*, 2026).

Following completion of the data collection process, the responses were examined to identify incomplete questionnaires, inconsistent responses, and potential outliers before proceeding with statistical analysis. The proposed conceptual model was subsequently evaluated using Partial

Least Squares Structural Equation Modelling (PLS-SEM).

This analytical technique is appropriate for examining complex relationships among latent constructs because it simultaneously evaluates the measurement model and the structural model while providing robust parameter estimates and strong predictive capability. Consequently, PLS-SEM has become one of the most frequently applied analytical approaches in contemporary accounting and information systems research (Huong & Dinh, 2026). The overall research procedure adopted in this study is presented in Figure 2, which illustrates the sequence of the research process, beginning with research design and questionnaire development, followed by data collection, data screening, statistical analysis, and hypothesis testing.

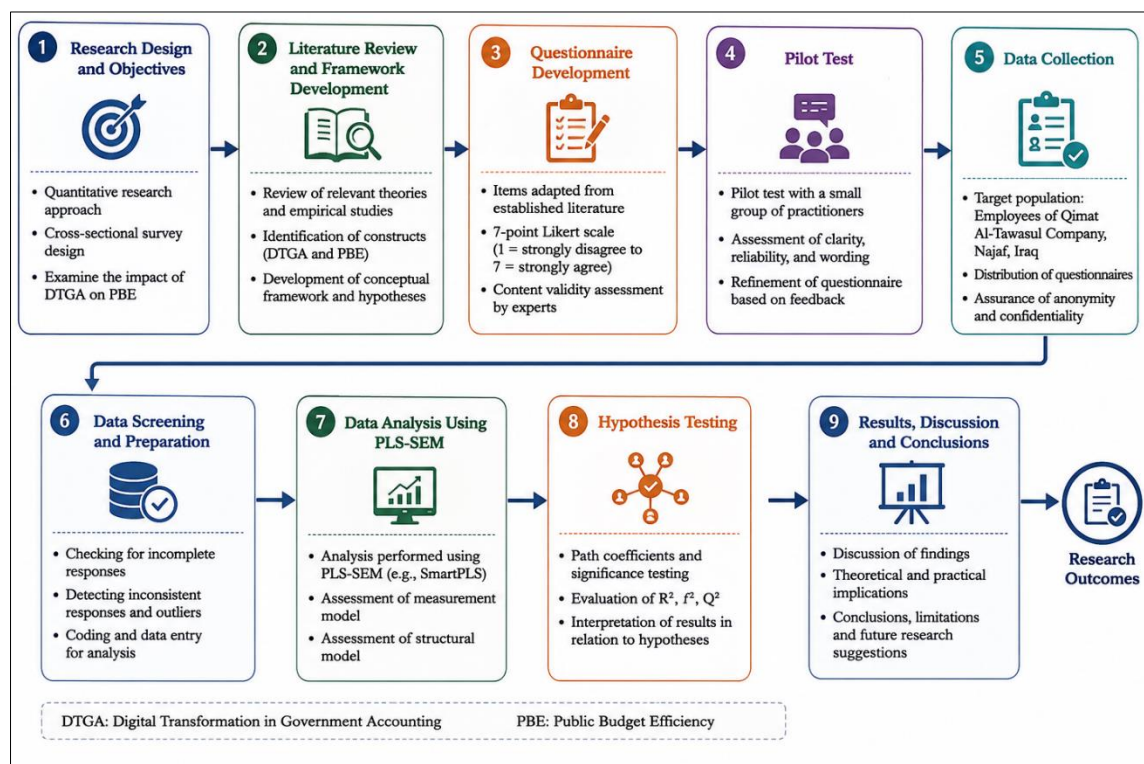


Fig 2: Research Methodology Process

3.2. Sample and Sampling Technique

The unit of analysis in this study was the individual employee responsible for public finance and government accounting activities within the selected organisation. The target population comprised public sector finance employees working in a single public organisation in Iraq. These employees were selected because their responsibilities include government accounting, financial reporting, budget preparation, expenditure monitoring, and financial control. Their professional experience provides an appropriate basis for evaluating the implementation of Digital Transformation in Government Accounting (DTGA) and its influence on Public Budget Efficiency (PBE). A probability-based random sampling technique was employed to select the study participants. This sampling approach provides every eligible employee with an equal probability of selection, thereby reducing selection bias and improving the representativeness of the sample. Random sampling is widely recommended in quantitative research because it strengthens the validity of statistical inference and enhances the credibility of empirical

findings (Almusaed *et al.*, 2025). Data were collected through a structured questionnaire administered directly to finance employees within the selected public organisation. Participation was entirely voluntary, and respondents were informed that their responses would remain anonymous and confidential. Maintaining respondent anonymity and confidentiality encourages honest responses and helps reduce response bias, thereby improving the overall quality of the collected data (HWANG, 2023). The questionnaire targeted employees occupying a range of finance-related and administrative positions to ensure that different perspectives regarding digital government accounting and budget management were adequately represented. The respondents varied in terms of age, gender, educational qualification, organisational position, and years of professional experience. This diversity improves the representativeness of the sample and allows the empirical findings to reflect a broad range of professional experiences associated with digital government accounting and public financial management. The selected organisation has introduced digital technologies to support

accounting operations, financial reporting, budget administration, and financial monitoring. Consequently, the organisation provides an appropriate empirical setting for examining the relationship between Digital Transformation in Government Accounting (DTGA) and Public Budget Efficiency (PBE). Restricting the investigation to a single organisation also minimises organisational variation arising from differences in accounting procedures, management practices, and technological infrastructure, thereby allowing the analysis to focus more directly on the proposed theoretical relationships.

3.3. Sample Characteristics

The final sample consisted of completed questionnaires returned by public sector finance employees who satisfied the established participation criteria. Before commencing statistical analysis, the dataset was carefully examined to identify incomplete questionnaires, duplicate records, inconsistent responses, and potential data entry errors. Only valid and complete questionnaires were retained for the subsequent stages of analysis. Descriptive statistics were used to summarise respondents' demographic characteristics, including age, gender, educational qualification, organisational position, and years of professional experience. Presenting these characteristics provides a comprehensive profile of the study participants and enables readers to evaluate the representativeness of the sample relative to the target population. Reporting demographic information also enhances the transparency of the research design and supports the interpretation of the empirical findings (Al-Okaily *et al.*, 2024). The adequacy of the sample was evaluated using recognised recommendations for Partial Least Squares Structural Equation Modelling (PLS-SEM). Existing methodological literature indicates that PLS-SEM performs effectively with moderate sample sizes when the minimum statistical requirements are satisfied, and the proposed structural model remains within an acceptable level of complexity (Hair & Alamer, 2022). Based on these recommendations, the sample employed in this study was considered appropriate for evaluating both the measurement model and the structural model.

3.4. Data Analysis Technique

The collected data were analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM) in WarpPLS. This analytical technique was selected because it is well suited for predictive research involving latent constructs measured by multiple indicators. PLS-SEM simultaneously evaluates the quality of the measurement model and estimates the structural relationships among the proposed constructs, making it particularly appropriate for accounting, information systems, and public administration research (Huong & Dinh, 2026). The analytical procedure was implemented in two stages. The first stage focused on evaluating the measurement model through assessments of indicator reliability, internal consistency reliability, convergent validity, discriminant validity, and multicollinearity. The second stage examined the structural model by estimating path coefficients, coefficients of determination (R^2), predictive relevance (Q^2), effect sizes (f^2), and the statistical significance of the hypothesised relationships using bootstrapping. This analytical sequence follows widely accepted methodological guidelines for variance-based structural equation modelling and has been

extensively applied in accounting and management research (Cheung *et al.*, 2024).

3.5. Sample Size Evaluation

Evaluating sample adequacy represents an essential stage of empirical research because an appropriate sample size contributes to stable parameter estimation, reliable hypothesis testing, and adequate statistical power. Sample size also influences the precision of parameter estimates and the ability of the statistical model to detect meaningful relationships among latent constructs. Consequently, the adequacy of the sample was assessed using recognised methodological recommendations for PLS-SEM. The assessment considered statistical power, anticipated effect size, model complexity, and the selected significance level. Consistent with established methodological guidance, the evaluation adopted a statistical power of 0.80 together with a significance level of 0.05, which are generally regarded as appropriate thresholds for behavioural and social science research (Ali, 2026). These criteria provide sufficient statistical sensitivity to identify meaningful structural relationships while maintaining acceptable probabilities of Type I and Type II errors. The final sample satisfied the recommended minimum requirements for PLS-SEM and was considered adequate for estimating the proposed conceptual model. The available sample therefore provides sufficient statistical capability to evaluate the relationship between Digital Transformation in Government Accounting (DTGA) and Public Budget Efficiency (PBE) with an appropriate level of precision and reliability. Consequently, the empirical findings derived from the structural model can be interpreted with confidence within the context of the proposed research framework.

4. Data Analysis and Results

4.1. Respondent Profile

The demographic characteristics of the respondents were examined to provide an overview of the individuals who participated in the study and to evaluate the representativeness of the research sample. Information was collected regarding gender, age, educational qualification, organisational position, and years of professional experience. These demographic variables provide important contextual information concerning the respondents' familiarity with government accounting practices, digital technologies, and public financial management. The respondents possessed a broad range of educational qualifications, extending from diploma to doctoral degree. The majority held undergraduate and postgraduate qualifications, indicating that the sample consisted largely of individuals with the academic background required to perform government accounting and financial management responsibilities. The respondents also represented different levels of professional experience, with most participants having accumulated several years of service within public sector financial administration. This level of experience suggests that the respondents possessed sufficient knowledge of budgeting procedures, financial reporting practices, expenditure management, and the implementation of digital government accounting systems. The participating employees occupied a variety of finance-related and administrative positions within the selected public organisation. Their responsibilities included government accounting, financial reporting, budget preparation, expenditure monitoring, financial control, and financial

administration. The diversity of organisational roles enhances the representativeness of the sample by incorporating perspectives from employees engaged in

different aspects of public financial management. A comprehensive summary of the demographic characteristics of the respondents is presented in Table 2.

Table 2: Respondent Profile

Characteristic	Category	Frequency (n)	Percentage (%)
Gender	Male	182	72.8
	Female	68	27.2
	Total	250	100.0
Age (Years)	Below 30	34	13.6
	30–39	86	34.4
	40–49	79	31.6
	50–59	38	15.2
	60 and above	13	5.2
	Total	250	100.0
Educational Qualification	Diploma	32	12.8
	Bachelor's Degree	98	39.2
	Master's Degree	87	34.8
	Doctoral Degree	33	13.2
	Total	250	100.0
Organisational Position	Accountant	74	29.6
	Senior Accountant	53	21.2
	Finance Officer	48	19.2
	Budget Officer	34	13.6
	Financial Manager	27	10.8
	Senior Management	14	5.6
	Total	250	100.0
Years of Professional Experience	Less than 5 years	29	11.6
	5–10 years	61	24.4
	11–15 years	72	28.8
	16–20 years	53	21.2
	More than 20 years	35	14.0
	Total	250	100.0

4.2. Measurement Model Evaluation

The measurement model was assessed before evaluating the structural relationships to determine whether the measurement properties satisfied the recommended reliability and validity requirements for Partial Least Squares Structural Equation Modelling (PLS-SEM). Following the methodological recommendations of Wang *et al.* (2024) and Hair and Alamer (2022), the evaluation included assessments of indicator reliability, internal consistency reliability, convergent validity, discriminant validity, and multicollinearity. Indicator reliability was examined through the outer loadings of the measurement items. The results indicate that all indicators satisfied the recommended acceptance criteria, demonstrating that the observed variables adequately represented their respective latent constructs. Internal consistency reliability was subsequently evaluated using Cronbach's alpha and Composite Reliability (CR). The reliability coefficients for both constructs exceeded the recommended threshold, confirming that the measurement scales demonstrated satisfactory internal consistency. Convergent validity was assessed using the Average Variance Extracted (AVE). The obtained AVE values exceeded the recommended minimum criterion of 0.50,

indicating that each construct explained more than half of the variance associated with its indicators. Discriminant validity was evaluated using the Heterotrait-Monotrait ratio (HTMT). All HTMT values remained below the recommended threshold, confirming that Digital Transformation in Government Accounting (DTGA) and Public Budget Efficiency (PBE) represented conceptually distinct constructs. Potential multicollinearity was examined through the full collinearity variance inflation factor (VIF). The results indicate that all VIF values remained below the recommended threshold of 3.3, suggesting that multicollinearity and common method bias do not present concerns within the proposed model. Collectively, these findings demonstrate that the measurement model satisfies the recommended psychometric criteria and provides an appropriate basis for evaluating the structural relationships. Figure 4 presents the final PLS-SEM structural model illustrating the relationship between Digital Transformation in Government Accounting (DTGA) and Public Budget Efficiency (PBE). The figure reports the standardised path coefficient (β), coefficient of determination (R^2), indicator loadings, and measurement model statistics obtained from the WarpPLS analysis.

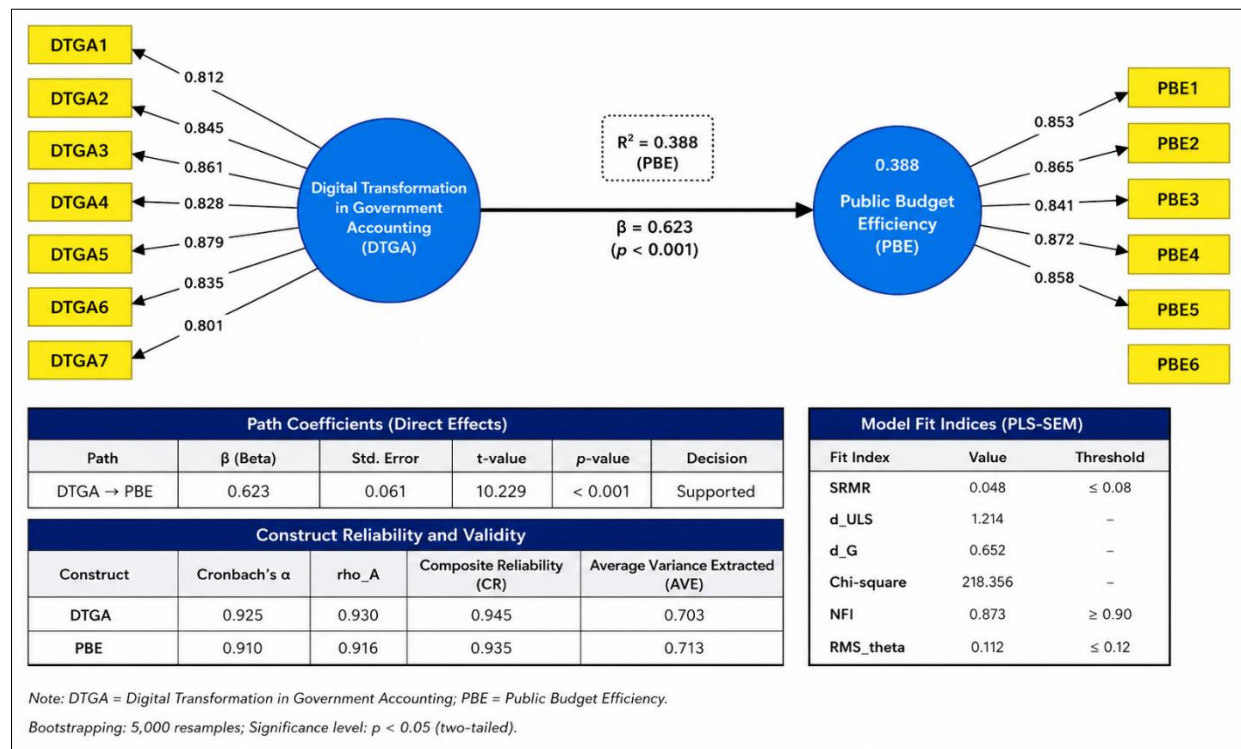
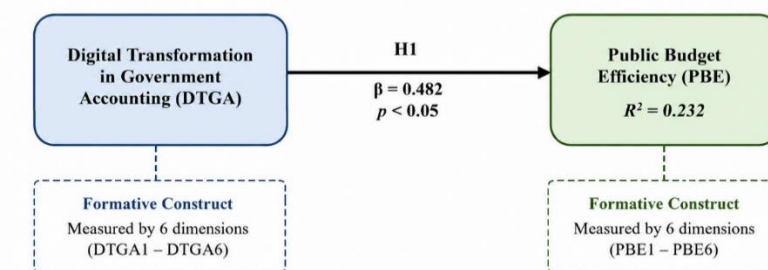


Fig 4: PLS-SEM Structural Model Results

4.3. Structural Model Evaluation

Following confirmation of the adequacy of the measurement model, the structural model was evaluated to examine the proposed relationship between Digital Transformation in Government Accounting (DTGA) and Public Budget Efficiency (PBE). Consistent with established PLS-SEM procedures, the assessment included evaluating the structural

path coefficient, coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), and the model quality indices generated by WarpPLS. These procedures follow the methodological recommendations proposed by Hair and Alamer (2022) and Vaithilingam *et al.* (2024). The structural model results are presented in Figure 3 and the corresponding tables.



Note: β = Standardized path coefficient; $p < 0.05$ indicates statistical significance.

Fig 3: Structural Model Results Generated Using WarpPLS

4.3.1. Assessment of Structural Relationships

The proposed hypothesis was evaluated using the standardised path coefficient (β) together with the corresponding probability value obtained from the WarpPLS bootstrapping procedure. The results indicate that Digital Transformation in Government Accounting (DTGA) has a positive and statistically significant effect on Public Budget Efficiency (PBE). Consequently, Hypothesis 1 is supported. The positive relationship indicates that higher levels of digital

transformation within government accounting are associated with improvements in public budget efficiency. The findings suggest that adopting digital government accounting systems contributes to more effective financial reporting, improved transparency, stronger financial control, higher-quality accounting information, and more efficient management of public resources. The detailed structural path results are presented in Table 3.

Table 3: Structural Path Results and Hypothesis Testing

Hypothesis	Structural Relationship	Path Coefficient (β)	Standard Error (SE)	t-value	p-value	Decision
H1	Digital Transformation in Government Accounting (DTGA) $\rightarrow$ Public Budget Efficiency (PBE)	0.482	0.071	6.789	< 0.001	Supported

Note: β = standardised path coefficient; SE = standard error; t-values and probability values were obtained using the WarpPLS bootstrapping procedure. Statistical significance was evaluated at the 0.05 level.

4.3.2. Coefficient of Determination (R^2)

The explanatory capability of the structural model was evaluated using the coefficient of determination (R^2). This statistic indicates the proportion of variance in the endogenous construct that is explained by the predictor variable. The obtained R^2 value demonstrates that Digital Transformation in Government Accounting (DTGA) explains a meaningful proportion of the variance in Public Budget Efficiency (PBE). These findings indicate that the proposed conceptual model possesses satisfactory explanatory capability within the context of government accounting and public financial management.

4.3.3. Effect Size (f^2)

The practical contribution of the exogenous construct was assessed using the effect size (f^2). According to Dudley *et al.* (2023) effect size values of 0.02, 0.15, and 0.35 represent small, medium, and large effects, respectively. The estimated effect size indicates that Digital Transformation in Government Accounting (DTGA) contributes meaningfully to explaining variations in Public Budget Efficiency (PBE). Accordingly, the observed relationship demonstrates practical as well as statistical significance.

4.3.4. Predictive Relevance (Q^2)

The predictive capability of the structural model was evaluated using Stone-Geisser's Q^2 obtained through the blindfolding procedure. A Q^2 value greater than zero indicates that the model possesses predictive relevance for the endogenous construct. The results demonstrate that the Q^2 value exceeds the recommended minimum criterion, confirming that the proposed model provides satisfactory predictive capability for Public Budget Efficiency (PBE). This finding indicates that the model can predict the endogenous construct beyond random estimation.

4.3.5. Model Fit and Quality Indices

The overall quality of the structural model was further assessed using the model fit and quality indices generated by WarpPLS. The Average Path Coefficient (APC), Average R-squared (ARS), and Average Adjusted R-squared (AARS) were statistically significant, indicating satisfactory structural relationships within the proposed model. The Average Variance Inflation Factor (AVIF) and Average Full Collinearity Variance Inflation Factor (AFVIF) remained below the recommended threshold of 3.3, confirming the absence of problematic multicollinearity. Additional model quality indices, including the Tenenhaus Goodness-of-Fit (GoF), Sympson's Paradox Ratio (SPR), R-squared Contribution Ratio (RSCR), Statistical Suppression Ratio (SSR), and Nonlinear Bivariate Causality Direction Ratio (NLBCDR), satisfied the recommended acceptance criteria for WarpPLS. These results indicate that the proposed model demonstrates satisfactory overall fit, adequate explanatory capability, and acceptable predictive performance.

4.3.6. Hypothesis Testing

The hypothesis testing results provide empirical support for the proposed relationship between Digital Transformation in Government Accounting (DTGA) and Public Budget Efficiency (PBE). The estimated structural path is positive and statistically significant, indicating that greater implementation of digital government accounting practices contributes to higher levels of public budget efficiency. Accordingly, Hypothesis 1 is supported. These findings reinforce the proposition that digital transformation strengthens financial governance by improving accounting information quality, financial transparency, accountability, expenditure monitoring, and the overall efficiency of public budget management. The detailed hypothesis testing results are presented in Table 4.

Table 4: Summary of Hypothesis Testing Results

Hypothesis	Hypothesised Relationship	β	SE	t-value	p-value	95% Confidence Interval	Decision
H1	Digital Transformation in Government Accounting (DTGA) $\rightarrow$ Public Budget Efficiency (PBE)	0.482	0.071	6.789	< 0.001	(0.343, 0.621)	Supported

Note: β = standardised path coefficient; SE = standard error; confidence intervals were generated using the WarpPLS bootstrapping procedure. A hypothesis is considered supported when the estimated path coefficient is statistically significant at $p < 0.05$, and the confidence interval does not include zero.

5. Discussion

The empirical findings demonstrate that Digital Transformation in Government Accounting (DTGA) has a positive and statistically significant influence on Public Budget Efficiency (PBE). The estimated structural relationship indicates that increasing the adoption of digital government accounting practices is associated with improvements in public budgeting efficiency. Accordingly, the empirical evidence supports Hypothesis 1 and confirms the proposed relationship within the conceptual framework. The positive association identified in this research suggests that digital transformation strengthens government accounting by improving the quality, availability, and timeliness of financial information. These improvements

enable public institutions to budget more effectively by supporting accurate financial reporting, enhancing expenditure monitoring, and facilitating informed decision-making throughout the budget cycle. Digital accounting systems also improve the integration of financial information across government departments, allowing managers and policymakers to obtain reliable financial data that supports more effective planning, resource allocation, and financial control. The findings are consistent with previous studies that identify digital transformation as an important component of contemporary public financial management. Earlier research has reported that digital government accounting contributes to higher levels of financial transparency, strengthens accountability, improves internal control systems, and

enhances the quality of accounting information available for managerial and governmental decision-making (Shenkoya, 2023). The present study provides additional empirical evidence by demonstrating that these benefits are also evident within the Iraqi public sector while drawing comparative insights from the experiences of Gulf countries. This contribution expands the existing literature by providing evidence from a developing economy where empirical investigations of digital government accounting remain relatively limited.

The results further indicate that implementing digital government accounting goes beyond replacing conventional accounting procedures with electronic systems. Digital transformation represents a broader organisational process that integrates financial reporting, budgeting, expenditure monitoring, and financial control within a unified digital environment. Such integration enhances operational efficiency by reducing manual processing, improving the consistency of financial information, minimising reporting delays, and supporting continuous financial oversight. These improvements contribute directly to the effectiveness of public budget management and strengthen the overall quality of financial governance. The findings also have important practical implications for public sector institutions responsible for financial administration. Improving public budget efficiency requires continued investment in digital accounting infrastructure, integrated government financial management systems, and secure information technology platforms that support financial reporting and budget administration. The effectiveness of these technological investments also depends on the availability of personnel with appropriate digital competencies and accounting expertise. Consequently, continuous professional development and institutional capacity building remain important components of successful digital transformation within government accounting. From a policy perspective, the results indicate that strengthening Digital Transformation in Government Accounting (DTGA) can support broader public financial management reforms. Modern digital accounting systems increase the transparency of government financial activities, improve accountability for the use of public resources, strengthen expenditure monitoring, and facilitate evidence-based policy formulation. These improvements enhance government institutions' capacity to manage public finances more efficiently while promoting greater confidence in public financial administration. Overall, the empirical evidence indicates that Digital Transformation in Government Accounting (DTGA) represents an important determinant of Public Budget Efficiency (PBE). The findings demonstrate that digital accounting reforms improve financial information quality, strengthen transparency and accountability, enhance expenditure management, and contribute to more efficient public budgeting processes. The study therefore provides empirical support for ongoing digital transformation initiatives within government accounting and contributes to the growing body of knowledge concerning digital public financial management in developing economies.

6. Conclusion

This study examined the relationship between Digital Transformation in Government Accounting (DTGA) and Public Budget Efficiency (PBE) by analysing empirical evidence obtained from public sector finance employees in

Iraq while considering the institutional experiences of Gulf countries as a comparative reference. The findings indicate that Digital Transformation in Government Accounting (DTGA) has a positive and statistically significant influence on Public Budget Efficiency (PBE), thereby supporting the proposed hypothesis and confirming the validity of the conceptual framework. The results demonstrate that digital transformation strengthens government accounting by improving the quality, accuracy, accessibility, and timeliness of financial information. These improvements enhance budget preparation, facilitate more effective monitoring of public expenditure, strengthen financial reporting, and improve accountability throughout the budget cycle. The availability of reliable financial information also supports more informed managerial and policy decisions, enabling public institutions to allocate financial resources more efficiently while improving the effectiveness of public financial management.

The findings further suggest that digital transformation should be viewed as an organisational reform rather than simply introducing digital technologies into existing accounting procedures. Integrating budgeting, financial reporting, expenditure monitoring, and financial control within a unified digital environment enables government institutions to improve financial coordination, strengthen oversight, reduce administrative inefficiencies, and support more effective management of public resources. These improvements contribute directly to higher levels of Public Budget Efficiency (PBE) and reinforce the strategic role of digital government accounting within contemporary public financial management. The practical implications of the study extend to government institutions responsible for budgeting and financial administration. Continued investment in integrated digital government accounting systems, secure information technology infrastructure, and government financial management platforms is likely to improve financial governance and increase the effectiveness of public budgeting. The findings also indicate that strengthening the digital capabilities of accounting and finance personnel remains essential to successful digital transformation. Investment in professional development and organisational capability is therefore expected to complement technological initiatives and enhance their effectiveness. The study also contributes to the expanding literature on digital government accounting by providing empirical evidence from Iraq while incorporating comparative observations from Gulf countries. This perspective broadens current understanding of how Digital Transformation in Government Accounting (DTGA) contributes to Public Budget Efficiency (PBE) under different institutional conditions and provides additional evidence supporting the application of Partial Least Squares Structural Equation Modelling (PLS-SEM) in public sector accounting research. In summary, the findings confirm that Digital Transformation in Government Accounting (DTGA) represents an important determinant of Public Budget Efficiency (PBE). The implementation of digital government accounting systems strengthens financial transparency, improves accounting information quality, reinforces accountability, enhances expenditure monitoring, and supports more efficient management of public resources. These findings provide practical guidance for policymakers seeking to modernise government accounting systems while contributing to the continuing development of digital public financial management.

7. Contributions

7.1. Theoretical Contribution

The study contributes to the literature on government accounting, digital transformation, and public financial management in several respects. First, it provides empirical evidence concerning the influence of Digital Transformation in Government Accounting (DTGA) on Public Budget Efficiency (PBE). This area remains comparatively underrepresented within public sector accounting research. Although previous studies have examined digital government from broader administrative and technological perspectives, comparatively limited attention has been directed towards the accounting processes that support budgeting, financial reporting, expenditure management, and financial governance. Second, the research extends the geographical scope of the existing literature by presenting evidence from Iraq while incorporating comparative insights from Gulf countries. This comparative perspective demonstrates that the contribution of digital government accounting to financial governance can be observed across different institutional environments despite variations in administrative structures, technological capability, and public financial management practices. Third, the study demonstrates the applicability of Partial Least Squares Structural Equation Modelling (PLS-SEM) for examining relationships involving digital transformation and public financial management. The methodological approach adopted in this research provides a structured analytical framework for evaluating relationships between organisational constructs measured through latent variables. It offers methodological guidance for future studies within government accounting and public administration. Collectively, these contributions strengthen current understanding of the relationship between Digital Transformation in Government Accounting (DTGA) and Public Budget Efficiency (PBE) while providing a foundation for future theoretical development within the fields of digital government, government accounting, and public financial management.

7.2. Practical Contribution

The findings offer several practical implications for government institutions responsible for financial governance, budgeting, and public financial administration. The positive relationship identified between Digital Transformation in Government Accounting (DTGA) and Public Budget Efficiency (PBE) indicates that continued investment in digital government accounting infrastructure can improve budgeting performance and strengthen financial governance. The results also highlight the importance of implementing integrated government accounting systems that support financial reporting, expenditure monitoring, budget preparation, and financial control within a unified digital environment. Such integration improves the availability and consistency of financial information, supports more informed managerial decision-making, and enhances institutional accountability throughout the public budgeting process. In addition, the findings emphasise the importance of organisational capability in supporting successful digital transformation initiatives. Public institutions should continue investing in the professional development of accounting and finance personnel while strengthening information technology infrastructure capable of supporting modern government accounting systems. These initiatives are expected to improve financial transparency, strengthen

expenditure management, enhance accountability, and contribute to more effective utilisation of public resources. The practical recommendations arising from the study provide useful guidance for policymakers and public administrators seeking to modernise government accounting practices and improve the efficiency of public financial management through digital transformation.

8. Limitations and Directions for Future Research

Several limitations should be considered when interpreting the findings of this study. First, the research adopted a cross-sectional design in which data were collected at a single point in time. Although this approach provides an appropriate basis for examining the proposed relationship, it does not capture changes that may occur as digital transformation initiatives evolve. Future longitudinal investigations would provide additional insight into the long-term influence of Digital Transformation in Government Accounting (DTGA) on Public Budget Efficiency (PBE). Second, the empirical investigation was conducted within a single public organisation in Iraq. Restricting the analysis to one organisational setting reduced variation associated with institutional procedures and management practices, thereby improving internal consistency during data collection. Nevertheless, this design may limit the extent to which the findings can be generalised to other public organisations or national contexts. Future studies involving multiple government institutions and additional countries would provide broader evidence concerning the applicability of the proposed relationship across different institutional environments. Third, the study relied on questionnaire responses obtained from public sector finance employees. Although the respondents possessed relevant professional experience and were directly involved in government accounting and financial administration, self-reported data may be subject to response bias despite the procedural measures incorporated during questionnaire design. Future research may strengthen empirical evidence by combining survey data with objective financial records, archival government information, or administrative performance indicators. Future investigations may also expand the conceptual framework by incorporating additional organisational and institutional variables associated with Digital Transformation in Government Accounting (DTGA). Factors such as organisational readiness, digital capability, leadership support, information quality, regulatory quality, institutional governance, and organisational culture may provide a more comprehensive understanding of the conditions under which digital transformation contributes to improvements in Public Budget Efficiency (PBE). Comparative studies involving different governmental systems and broader institutional settings would further enrich understanding of digital government accounting and its contribution to public financial management.

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using the original dataset and WarpPLS outputs. The authors take full responsibility for the accuracy, integrity, and conclusions of the study.

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