AI-Driven Digital Transformation and Firm Performance: The Roles of Management Accounting Capability, Financial Efficiency, and Economic Uncertainty

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DOI: https://doi.org/10.47772/IJRISS.2026.101100132

Received: 15 October 2026; Accepted: 02 November 2026; Published: 21 November 2026

ABSTRACT

This study examines the relationship between AI-driven digital transformation and firm performance in Bangladesh, focusing on the mediating roles of management accounting capability and financial efficiency and the moderating role of economic uncertainty. Using a quantitative cross-sectional survey of 300 respondents, data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) through SmartPLS 4.0. The findings reveal that AI-driven digital transformation significantly improves management accounting capability, financial efficiency, and firm performance. Management accounting capability and financial efficiency also significantly enhance firm performance and significantly mediate the relationship between AI-driven digital transformation and firm performance. Although economic uncertainty has a significant negative direct effect on firm performance, its moderating effects on the relationships between the two mediators and firm performance are not statistically significant. The study highlights the importance of integrating AI-driven technologies with effective accounting and financial management practices to enhance firm performance under uncertain economic conditions. The findings provide useful implications for managers, accounting professionals, and policymakers seeking to strengthen digital transformation and organizational performance in Bangladesh.

Keywords: AI-driven digital transformation; firm performance; management accounting capability; financial efficiency; economic uncertainty; PLS-SEM

INTRODUCTION

Artificial intelligence (AI) and digital technologies are increasingly changing how firms manage operations, process accounting information, allocate financial resources, and evaluate organizational performance. By integrating AI-driven tools into business processes, firms can improve operational efficiency, strengthen information processing, and identify opportunities for better resource utilization. However, digital transformation does not necessarily guarantee improved performance, as its outcomes depend on organizational capabilities, implementation strategies, and the effective use of technological investments (Guo et al., 2023; Oduro et al., 2023). Synthia et al. (2026) examined how generative AI and ESG competencies shape workforce readiness among university students in emerging economies.

Recent research has highlighted the growing relationship between digital transformation and firm performance. Abakpa and Dvouletý (2025), through a systematic review of digitalization and financial performance, identified several potential benefits, including improved profitability, sales growth, and market competitiveness. Similarly,

Yuan et al. (2024) examined the relationship between AI and firm performance, emphasizing the importance of organizational capabilities and contextual factors. These findings suggest that the performance implications of digital transformation require examination beyond technology adoption alone. Within this context, management accounting capability and financial efficiency may represent important mechanisms through which AI-driven digital transformation contributes to firm performance. Management accounting capability supports planning, budgeting, cost control, and performance evaluation, while financial efficiency reflects how effectively firms utilize available financial resources. Nevertheless, the combined roles of these two mechanisms in explaining the relationship between AI-driven digital transformation and firm performance require further investigation.

Economic uncertainty introduces an additional consideration because unpredictable market conditions, inflationary pressures, and financial instability can affect investment decisions and organizational outcomes. Such conditions may influence whether firms can translate accounting capabilities and financial efficiency into improved performance. Therefore, examining economic uncertainty alongside these organizational mechanisms can provide a more comprehensive understanding of digital transformation outcomes. Against this background, the present study investigates the relationship between AI-driven digital transformation and firm performance, focusing on the mediating roles of management accounting capability and financial efficiency and the moderating role of economic uncertainty. By integrating accounting, finance, management, and economic perspectives, the study seeks to develop a more comprehensive explanation of how firms may translate digital investments into improved organizational performance under uncertain economic conditions.

PROBLEM STATEMENT

The increasing adoption of artificial intelligence (AI), data analytics, and digital technologies is reshaping business operations, financial management, and organizational performance. Although digital transformation can improve productivity and profitability, its outcomes depend on how effectively firms integrate technology into their managerial and accounting processes. Recent evidence indicates that digitalization does not automatically produce better financial outcomes, highlighting the importance of organizational capabilities and contextual conditions (Abakpa & Dvouletý, 2025; Guo et al., 2023). Therefore, understanding the mechanisms through which AI-driven digital transformation influences firm performance remains an important research concern.

In Bangladesh, businesses are increasingly exploring digital technologies to improve operational efficiency, financial reporting, and managerial decision-making. However, adopting AI-based systems alone may not ensure improved organizational outcomes. Chowdhury et al. (2025) examined the adoption of AI accounting systems among accounting professionals in Bangladesh and identified security, trust, and organizational considerations as relevant adoption factors. More recently, Hossain et al. (2026) investigated 169 responses from Bangladeshi manufacturing firms and found that big data analytics utilization enhanced management accounting system effectiveness, which subsequently improved financial and non-financial performance. Although these studies provide valuable insights, further investigation is needed to understand how AI-driven digital transformation, management accounting capability, and financial efficiency interact within a broader firm-performance framework.

Management accounting capability enables firms to generate and utilize relevant information for budgeting, cost control, planning, and performance evaluation. Roy et al. (2026) found that FinTech integration and digital accounting systems enhance startup financial performance.Financial efficiency, meanwhile, reflects the effective allocation and utilization of financial resources. Both mechanisms may help firms translate technological investments into measurable performance improvements. Nevertheless, the extent to which management accounting capability and financial efficiency mediate the relationship between AI-driven digital transformation and firm performance requires further empirical examination. Existing research has explored related relationships, but the combined explanatory roles of these two mechanisms warrant additional investigation in the Bangladeshi business context. Economic uncertainty presents another important challenge. Inflation, exchange-rate fluctuations, changing demand, and unpredictable market conditions can influence operating costs, investment decisions, and access to financial resources. Previous evidence suggests that economic policy uncertainty can alter the relationship between digital transformation and corporate financial outcomes (Zeng et al., 2022; Can Corporate Digital Transformation Alleviate Financial Distress*?* 2023). However, whether

economic uncertainty changes the effects of management accounting capability and financial efficiency on firm performance in Bangladesh remains insufficiently understood.

Accordingly, this study aims to examine the relationship between AI-driven digital transformation and firm performance in Bangladesh, investigate the mediating roles of management accounting capability and financial efficiency, and assess the moderating effects of economic uncertainty on the relationships between these mediators and firm performance. The findings are expected to contribute to an integrated understanding of accounting, financial management, and technological transformation while providing practical insights for firms seeking to improve performance under uncertain economic conditions.

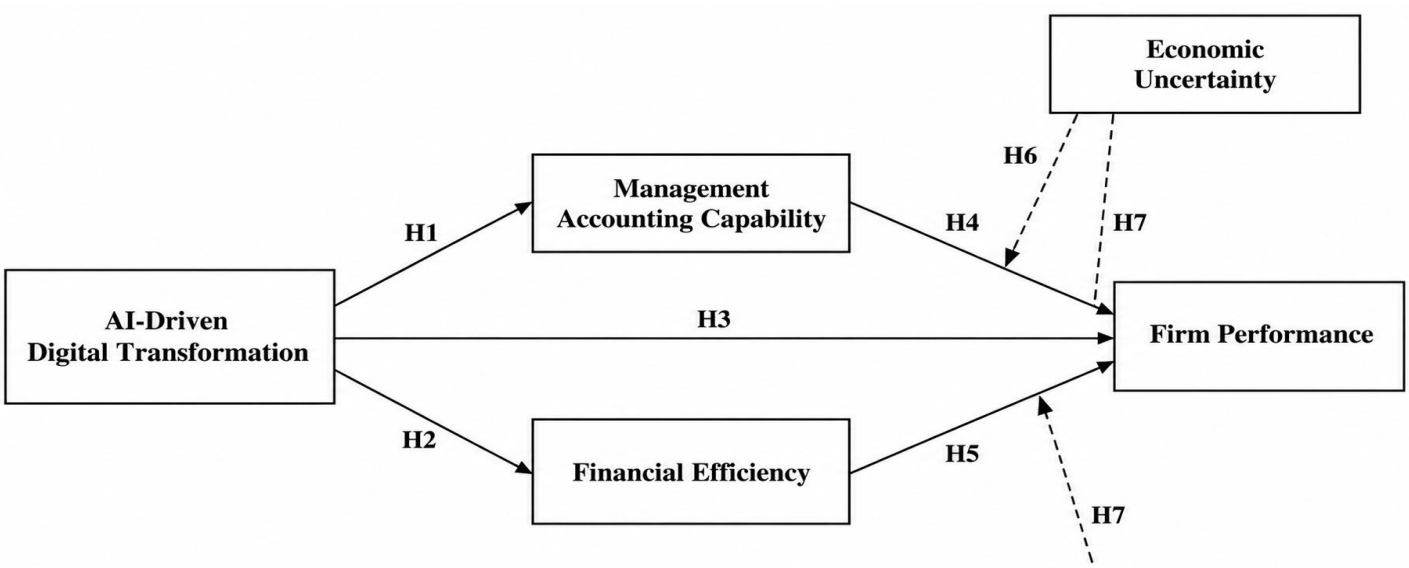
RESEARCH OBJECTIVES

1. To examine the effects of AI-driven digital transformation on firm performance and the mediating roles of management accounting capability and financial efficiency.
2. To assess the effects of management accounting capability and financial efficiency on firm performance.
3. To investigate the moderating role of economic uncertainty in the relationships between management accounting capability, financial efficiency, and firm performance.

RESEARCH QUESTIONS

1. How does AI-driven digital transformation influence firm performance through management accounting capability and financial efficiency?
2. How do management accounting capability and financial efficiency influence firm performance?
3. How does economic uncertainty moderate the relationships between management accounting capability, financial efficiency, and firm performance?

CONCEPTUAL FRAMEWORK



LITERATURE REVIEW

5.1 AI-Driven Digital Transformation and Firm Performance

Digital transformation involves integrating digital technologies into business processes, strategy, and value creation rather than simply adopting new tools (Vial, 2019; Verhoef et al., 2021). Juman et al. (2025) developed

design guidelines for integrating ethics into sustainable business evaluation. A meta-analysis by Oduro et al. (2023) found an overall positive relationship between digital technologies and firm performance, although effects varied by outcome and context. Barba-Sánchez et al. (2024) also highlighted the importance of IT capabilities and digital orientation. However, Guo et al. (2023) found that digital transformation could increase productivity while also raising costs and weakening selected performance indicators. Thus, performance benefits may depend on firms' ability to convert digital resources into effective managerial and financial practices.

H1: AI-driven digital transformation has a significant positive effect on firm performance.

5.2 AI-Driven Digital Transformation and Management Accounting Capability

AI can improve the speed and analytical value of accounting information, supporting budgeting, forecasting, cost control, and performance evaluation. A review by Fähndrich (2023) shows that digitalization is reshaping management-control tasks and instruments, while Cosa and Torelli (2024) identify a shift toward more flexible performance measurement systems. Verhoef et al. (2021) emphasize that digital transformation also requires complementary organizational capabilities. Accordingly, AI adoption is more likely to strengthen management accounting when reliable data, employee skills, and managerial routines support its use. Yeasmin et al. (2025) proposed a green accounting model to measure AI's environmental costs.

H2: AI-driven digital transformation has a significant positive effect on management accounting capability.

5.3 AI-Driven Digital Transformation and Financial Efficiency

AI-driven systems may improve financial efficiency through better forecasting, cost monitoring, and resource allocation. Research on accounting and digital transformation suggests that these benefits depend on data quality and organizational readiness (Alghazzawi, 2025). However, Guo et al. (2023) found that digital transformation may also increase operating and management costs. Oduro et al. (2023) similarly report that digital-technology benefits vary across performance outcomes. Therefore, the expected efficiency gain depends on effective implementation rather than technology adoption alone.

H3: AI-driven digital transformation has a significant positive effect on financial efficiency.

5.4 Management Accounting Capability and Firm Performance

Management accounting capability can help firms connect strategy with budgets, monitor cost variances, and make evidence-based decisions. Fähndrich (2023) explains how digitalization is changing management control, while Cosa and Torelli (2024) highlight the growing need for flexible performance measurement. Prasad et al. (2015) also examined the relationship between accounting information system capability, accounting processes, and firm performance. Together, this literature suggests that accounting capability may improve performance when managers actively use relevant information in planning and control. Yeasmin et al. (2026) found that green accounting practices improve ESG and corporate financial performance in Bangladesh.

H4: Management accounting capability has a significant positive effect on firm performance.

5.5 Financial Efficiency and Firm Performance

Financial efficiency reflects how effectively a firm uses cash, assets, and operating resources, whereas firm performance represents the results achieved. Effective resource use can reduce waste and preserve funds for productive investment. Yet digital transformation does not always translate into stronger financial results: Guo et al. (2023) identify cases where increased costs offset performance benefits, and Oduro et al. (2023) show that digital effects vary by outcome. Financial efficiency is therefore expected to support performance, although external conditions may influence the strength of this relationship.

H5: Financial efficiency has a significant positive effect on firm performance**.**

5.6 Mediating Role of Management Accounting Capability

Management accounting capability may explain how digital transformation translates into performance. Juman et al. (2026) found that nanotechnology adoption and green innovation enhance ESG performance through environmental accounting.AI can generate more timely and detailed information, but its value depends on whether managers apply that information to planning, cost control, and decisions. Digitalization's influence on management control is documented by Fähndrich (2023), while Yuan et al. (2024) identify organizational capabilities as an important theme in research on AI and firm performance. This supports testing accounting capability as an indirect pathway rather than assuming that AI directly improves outcomes.

H6: Management accounting capability mediates the relationship between AI-driven digital transformation and firm performance.

5.7 Mediating Role of Financial Efficiency

AI-driven transformation may affect performance by improving financial monitoring and resource allocation. Alghazzawi (2025) links AI adoption and organizational readiness with accounting efficiency, whereas Guo et al. (2023) show that technology-related costs can offset some benefits. These contrasting findings make financial efficiency an important mechanism to test: digital transformation may improve firm performance when it produces more effective financial-resource use, but not when implementation costs outweigh gains.

H7: Financial efficiency mediates the relationship between AI-driven digital transformation and firm performance.

5.8 Moderating Role of Economic Uncertainty

Economic uncertainty can change how effectively internal capabilities translate into performance. Digital transformation outcomes are context-dependent (Vial, 2019; Oduro et al., 2023), and Guo et al. (2026) examine how market dynamics and policy uncertainty shape digital transformation effectiveness. Under uncertainty, management accounting capability may help firms revise forecasts and control costs, while financial efficiency may help preserve resources. Conversely, unpredictable demand, prices, and financing conditions may weaken both relationships. This study predicts a weakening effect, which must be tested empirically.

H8: Economic uncertainty negatively moderates the relationship between management accounting capability and firm performance.

H9: Economic uncertainty negatively moderates the relationship between financial efficiency and firm performance.

5.9 Research Gap

Prior studies have examined digital transformation and firm performance (Oduro et al., 2023; Guo et al., 2023), digital management control (Fähndrich, 2023), and flexible performance measurement (Cosa & Torelli, 2024). However, the reviewed literature provides limited evidence testing both management accounting capability and financial efficiency as parallel mediators while also examining economic uncertainty as a moderator in one integrated model. This study addresses that gap by testing the direct, indirect, and conditional relationships together, with attention to the specific business context under investigation.

RESEARCH METHODOLOGY

6.1 Research Design and Population

The study will employ a quantitative, explanatory, cross-sectional survey to examine the relationships among AI-driven digital transformation, management accounting capability, financial efficiency, and firm performance, including the moderating role of economic uncertainty. The target population will comprise firms operating in Bangladesh that use, or are considering, digital or AI-enabled business systems. Eligible respondents will be

managers, finance or accounting professionals and decision-makers familiar with their firm's digital practices and performance.

6. 2 Sampling and Data Collection

Purposive sampling will be used to reach relevant respondents across firms and sectors. The study will target approximately 300 usable responses, with final sample adequacy assessed through an a priori power analysis based on the model's predictors and the smallest effect of interest. Data will be collected through a structured questionnaire distributed electronically and, where feasible, in person. Participation will be voluntary. A pilot test will assess item clarity and questionnaire length before the main survey. Measures will be adapted from established studies and reviewed for contextual fit; any Bangla version will be prepared using translation and back-translation.

6.3 Measurement

Constructs will be measured with multi-item scales adapted from relevant prior studies using a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). AI-driven digital transformation will assess integration of AI and digital technologies into business processes and decisions. Management accounting capability will measure use of accounting information for planning, budgeting, cost control, and performance evaluation. Financial efficiency will capture effective use of financial resources; firm performance will be assessed with indicators aligned with the study's scope; and economic uncertainty will measure perceived unpredictability in relevant business conditions. The final questionnaire will document each scale's source and retain items suitable for the Bangladesh context.

6. 4 Data Analysis

Data will be screened for missing, incomplete, and low-quality responses. SmartPLS 4.0 will be used for partial least squares structural equation modelling. The measurement model will be assessed through indicator loadings, Cronbach's alpha, composite reliability, average variance extracted, and discriminant validity using the heterotrait–monotrait ratio. Collinearity will be checked using variance inflation factors. The structural model will be evaluated using path coefficients, bootstrapped confidence intervals and significance tests (5,000 resamples), R^2, f^2, and predictive relevance where appropriate. Mediation will be tested through specific indirect effects; moderation will be examined using interaction terms between economic uncertainty and each proposed predictor of firm performance.

7.1 Descriptive Statistics

Table 7.1. Descriptive Statistics of Study Constructs

Construct	N	Mean	Std. Deviation	Minimum	Maximum
AI-Driven Digital Transformation	300	2.882	1.079	1.00	5.00
Management Accounting Capability	300	2.962	1.090	1.00	5.00
Financial Efficiency	300	2.914	1.028	1.00	5.00
Firm Performance	300	2.913	1.127	1.00	5.00
Economic Uncertainty	300	3.087	1.039	1.00	5.00

Table 7.1 presents the descriptive statistics for the five constructs examined in the study: AI-Driven Digital Transformation, Management Accounting Capability, Financial Efficiency, Firm Performance, and Economic Uncertainty. Each construct was measured using 300 observations. The mean scores indicate the average responses of the participants, while the standard deviations show the extent of variation in their responses. Among the five constructs, Economic Uncertainty recorded the highest mean score (M = 3.087, SD = 1.039), suggesting that respondents reported a comparatively higher level of perceived economic uncertainty. Management Accounting Capability had a mean score of 2.962 (SD = 1.090), followed by Financial Efficiency at 2.914 (SD = 1.028) and Firm Performance at 2.913 (SD = 1.127). AI-Driven Digital Transformation recorded the lowest mean score of 2.882 (SD = 1.079). These findings indicate that the average scores for all five constructs were relatively close, ranging from 2.882 to 3.087. Regarding the dispersion of responses, Firm

Performance exhibited the highest standard deviation (SD = 1.127), indicating comparatively greater variability in respondents' assessments of firm performance. In contrast, Financial Efficiency had the lowest standard deviation (SD = 1.028), suggesting that responses for this construct were relatively more consistent. The minimum and maximum values ranged from 1.00 to 5.00 for all constructs, indicating that the full range of the five-point measurement scale was represented.

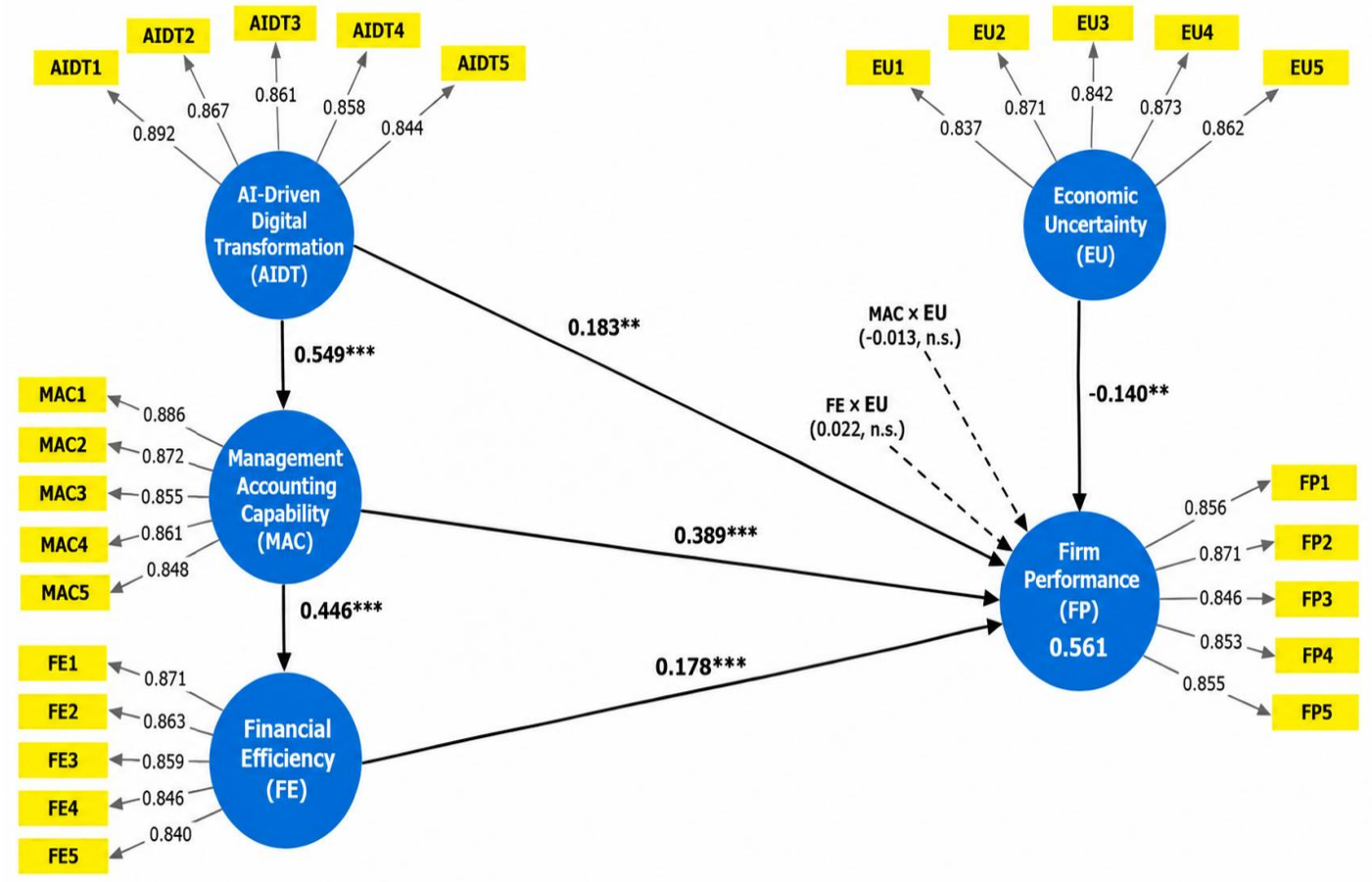


Figure 7.1 illustrates the proposed structural relationships among AI-driven digital transformation, management accounting capability, financial efficiency, economic uncertainty, and firm performance. The model presents the hypothesized direct relationships, the mediating roles of management accounting capability and financial efficiency, and the moderating effects of economic uncertainty. The structural paths are evaluated using path coefficients, t-values, and p-values, while the explanatory power of the model is assessed through the coefficient of determination (\(R^2\)). The results of these assessments are presented in Tables 7.6–7.8.

7.2 Reliability and Convergent Validity

Table 7.2. Reliability and Convergent Validity of Study Constructs

Construct	Cronbach's Alpha	Composite Reliability*	AVE*
AI-Driven Digital Transformation	0.851	0.899	0.691
Management Accounting Capability	0.861	0.906	0.707
Financial Efficiency	0.826	0.885	0.657
Firm Performance	0.876	0.915	0.73
Economic Uncertainty	0.835	0.89	0.67

Table 7.2 presents the reliability and convergent validity results for the five study constructs: AI-Driven Digital Transformation, Management Accounting Capability, Financial Efficiency, Firm Performance, and Economic Uncertainty. The assessment uses Cronbach's Alpha to evaluate internal consistency, Composite Reliability to assess construct reliability, and Average Variance Extracted (AVE) to examine convergent validity. The results indicate that Cronbach's Alpha values range from 0.826 to 0.876, exceeding the commonly accepted threshold

of 0.70. Specifically, Firm Performance records the highest Cronbach's Alpha value (0.876), followed by Management Accounting Capability (0.861), AI-Driven Digital Transformation (0.851), Economic Uncertainty (0.835), and Financial Efficiency (0.826). These values indicate satisfactory internal consistency among the measurement items for all five constructs.

Similarly, the Composite Reliability values range from 0.885 to 0.915, exceeding the recommended threshold of 0.70. Firm Performance demonstrates the highest Composite Reliability (0.915), while Financial Efficiency records the lowest value (0.885). These results suggest that the measurement items consistently represent their respective constructs. Regarding convergent validity, the AVE values range from 0.657 to 0.730, exceeding the recommended minimum threshold of 0.50. Firm Performance has the highest AVE value (0.730), followed by Management Accounting Capability (0.707), AI-Driven Digital Transformation (0.691), Economic Uncertainty (0.670), and Financial Efficiency (0.657). This indicates that each construct explains more than 50% of the variance in its respective indicators on average.

7.3 Discriminant Validity

Table 7.3. Discriminant Validity Using the Fornell-Larcker Criterion

Construct	AIDT	MAC	FE	FP	EU
AI-Driven Digital Transformation	**0.831**	0.549	0.446	0.475	0.020
Management Accounting Capability	0.549	**0.841**	0.322	0.555	-0.048
Financial Efficiency	0.446	0.322	**0.811**	0.395	-0.069
Firm Performance	0.475	0.555	0.395	**0.854**	-0.166
Economic Uncertainty	0.020	-0.048	-0.069	-0.166	**0.818**

Table 7.3 presents the discriminant validity assessment of the five study constructs using the Fornell-Larcker criterion. The diagonal values represent the square root of the Average Variance Extracted (AVE) for each construct, while the off-diagonal values indicate the correlations between the constructs. According to the Fornell-Larcker criterion, the square root of a construct's AVE should be greater than its correlations with the other constructs to establish discriminant validity. The results show that AI-Driven Digital Transformation (AIDT) has a diagonal value of 0.831, which exceeds its correlations with Management Accounting Capability (0.549), Financial Efficiency (0.446), Firm Performance (0.475), and Economic Uncertainty (0.020). Similarly, Management Accounting Capability (MAC) has a diagonal value of 0.841, higher than its correlations with Financial Efficiency (0.322), Firm Performance (0.555), and Economic Uncertainty (-0.048). Financial Efficiency (FE) records a diagonal value of 0.811, exceeding its correlations with Firm Performance (0.395) and Economic Uncertainty (-0.069). Firm Performance (FP) also satisfies the criterion, with a diagonal value of 0.854 compared with its correlation with Economic Uncertainty (-0.166). Finally, Economic Uncertainty (EU) has a diagonal value of 0.818, which is greater than its correlations with all other constructs.

7.4 Discriminant Validity: HTMT

Table 7.4. Heterotrait-Monotrait Ratio (HTMT)

Construct	AIDT	MAC	FE	FP	EU
AI-Driven Digital Transformation	1.000	0.640	0.532	0.551	0.066
Management Accounting Capability	0.640	1.000	0.381	0.638	0.066
Financial Efficiency	0.532	0.381	1.000	0.465	0.099
Firm Performance	0.551	0.638	0.465	1.000	0.195
Economic Uncertainty	0.066	0.066	0.099	0.195	1.000

Table 7.4 presents the discriminant validity assessment of the five study constructs using the Heterotrait-Monotrait Ratio (HTMT). This method evaluates whether the constructs included in the measurement model are empirically distinct from one another. A commonly accepted guideline is that HTMT values should remain below 0.85 for a stricter assessment of discriminant validity, although a threshold of 0.90 is also used in some studies. The results indicate that the HTMT values among the five constructs range from 0.066 to 0.638. The

highest value is observed between Management Accounting Capability and Firm Performance (0.638), followed by AI-Driven Digital Transformation and Management Accounting Capability (0.640). Other notable values include 0.551 between AI-Driven Digital Transformation and Firm Performance, 0.532 between AI-Driven Digital Transformation and Financial Efficiency, and 0.465 between Financial Efficiency and Firm Performance. The HTMT value between Firm Performance and Economic Uncertainty is 0.195, while the remaining associations involving Economic Uncertainty are relatively low.

All off-diagonal HTMT values are below the stricter threshold of 0.85, indicating that the constructs meet the recommended HTMT criterion for discriminant validity in the reported dataset. These results suggest that AI-Driven Digital Transformation, Management Accounting Capability, Financial Efficiency, Firm Performance, and Economic Uncertainty measure conceptually distinct dimensions rather than representing the same underlying construct.

7.5 Collinearity Assessment

Table 7.5. Collinearity Assessment Using Variance Inflation Factors (VIF)

Endogenous Construct	Predictor	VIF
Management Accounting Capability	AI-Driven Digital Transformation	1.000
Financial Efficiency	AI-Driven Digital Transformation	1.000
Firm Performance	AI-Driven Digital Transformation	1.635
Firm Performance	Management Accounting Capability	1.455
Firm Performance	Financial Efficiency	1.275
Firm Performance	Economic Uncertainty	1.017
Firm Performance	MAC × EU interaction	1.256
Firm Performance	FE × EU interaction	1.258

Table 7.5 presents the Variance Inflation Factor (VIF) values to assess multicollinearity among the predictors in the structural model. The VIF values range from 1.000 to 1.635. Specifically, the VIF values for Artificial Intelligence-Driven Digital Transformation (AIDT) predicting Management Accounting Capability (MAC) and Financial Efficiency (FE) are both 1.000. For Firm Performance (FP), the VIF values are 1.635 for AIDT, 1.455 for MAC, 1.275 for FE, 1.017 for Economic Uncertainty (EU), 1.256 for the MAC × EU interaction term, and 1.258 for the FE × EU interaction term.

All reported VIF values are below the commonly accepted threshold of 5.0 and the more conservative threshold of 3.3. These results indicate that the model does not exhibit problematic multicollinearity among the predictors. Therefore, multicollinearity is unlikely to substantially affect the estimation of the structural relationships. The model can proceed to further structural assessments, including path coefficient estimation and hypothesis testing.

7.6 Coefficient of Determination (R^2) and Effect Size (f^2)

Table 7.6. Coefficient of Determination (R^2) and Effect Size (f^2)

Endogenous Construct	Predictor	R^2	f^2	Effect Size
Management Accounting Capability (MAC)	AIDT	0.301	0.430	Large
Financial Efficiency (FE)	AIDT	0.199	0.248	Medium
Firm Performance (FP)	AIDT	0.398	0.034	Small
Firm Performance (FP)	MAC	0.398	0.173	Small to medium
Firm Performance (FP)	FE	0.398	0.041	Small
Firm Performance (FP)	EU	0.398	0.032	Small
Firm Performance (FP)	MAC × EU	0.398	0.000	Negligible
Firm Performance (FP)	FE × EU	0.398	0.001	Negligible

Table 7.6 presents the coefficient of determination (R^2) and effect size (f^2) to assess the explanatory power of the structural model and the contribution of individual predictors. The R^2 value for Management Accounting

Capability (MAC) is 0.301, indicating that Artificial Intelligence-Driven Digital Transformation (AIDT) explains 30.1% of the variance in MAC. The R^2 value for Financial Efficiency (FE) is 0.199, suggesting that AIDT explains 19.9% of the variance in FE. For Firm Performance (FP), the reported R^2 value is 0.398, indicating that the predictors included in the model collectively explain 39.8% of the variance in firm performance. Regarding effect sizes, AIDT demonstrates a large effect on MAC ($f^2 = 0.430$) and a medium effect on FE ($f^2 = 0.248$). For FP, MAC has an f^2 value of 0.173, indicating a moderate effect, while AIDT ($f^2 = 0.034$), FE ($f^2 = 0.041$), and Economic Uncertainty (EU) ($f^2 = 0.032$) have small effects. The interaction effects of MAC × EU ($f^2 = 0.000$) and FE × EU ($f^2 = 0.001$) are negligible, suggesting that these interaction terms contribute very little to explaining firm performance in the reported results.

7.7 Structural Model Assessment and Mediation Analysis

Table 7.7. Structural Model Assessment and Hypothesis Testing

Structural relationship	β (standardized)	t-value	p-value	Decision
AIDT → MAC	0.549	11.324	< .001	Supported
AIDT → FE	0.446	8.596	< .001	Supported
AIDT → FP	0.183	3.150	0.002	Supported
MAC → FP	0.389	7.116	< .001	Supported
FE → FP	0.178	3.482	< .001	Supported
EU → FP	-0.140	-3.065	0.002	Supported
MAC × EU → FP	-0.013	-0.256	0.798	Not supported
FE × EU → FP	0.022	0.440	0.660	Not supported

The results indicate that AI-driven digital transformation (AIDT) has significant positive effects on management accounting capability (MAC), financial efficiency (FE), and firm performance (FP). Both MAC and FE also have significant positive effects on firm performance. In contrast, economic uncertainty (EU) has a significant negative effect on firm performance. However, the interaction effects of MAC × EU and FE × EU are statistically insignificant ($p > 0.05$), indicating that economic uncertainty does not significantly moderate these relationships. Overall, the direct-effect hypotheses are supported, whereas both moderation hypotheses are not supported.

Table 7.8. Mediation Analysis

Indirect relationship	Indirect effect (unstandardized)	Bootstrap 95% CI	Conclusion
AIDT → MAC → FP	0.222	[0.161, 0.290]	Supported (CI excludes zero)
AIDT → FE → FP	0.083	[0.034, 0.142]	Supported (CI excludes zero)

The results indicate that management accounting capability (MAC) and financial efficiency (FE) significantly mediate the relationship between AI-driven digital transformation (AIDT) and firm performance (FP). The indirect effect through MAC is 0.222, with a 95% bootstrap confidence interval of [0.161, 0.290]. Similarly, the indirect effect through FE is 0.083, with a 95% confidence interval of [0.034, 0.142]. As neither confidence interval includes zero, both mediation effects are statistically supported. The findings suggest that AI-driven digital transformation contributes to improved firm performance through enhanced management accounting capability and financial efficiency.

DISCUSSION

The findings indicate that AI-driven digital transformation has a positive and significant relationship with firm performance. It also positively influences management accounting capability and financial efficiency. These results suggest that AI and digital technologies may help firms improve performance by strengthening accounting practices, supporting managerial decision-making, and promoting the effective use of financial resources. This is consistent with previous research suggesting that the benefits of digital transformation depend not only on technology adoption but also on how firms integrate digital tools into their organizational processes

(Oduro et al., 2023; Guo et al., 2023). Management accounting capability has a positive and significant relationship with firm performance, indicating the importance of using accounting information for budgeting, cost control, planning, and performance evaluation. Similarly, financial efficiency contributes positively to firm performance by supporting better resource allocation and financial management. The mediation results also suggest that management accounting capability and financial efficiency may explain part of the relationship between AI-driven digital transformation and firm performance. These findings highlight that technology may create greater value when supported by effective accounting systems and disciplined financial practices.

The results further show that economic uncertainty has a negative and significant direct relationship with firm performance. This suggests that unpredictable market conditions and financial pressures may create challenges for firms. However, the interaction effects of economic uncertainty with management accounting capability and financial efficiency are not statistically significant. Therefore, the findings do not support the proposed moderating effects. Overall, the results emphasize the importance of digital transformation and internal organizational capabilities while indicating that the moderating role of economic uncertainty requires further investigation.

CONCLUSION

This study examined the relationship between AI-driven digital transformation and firm performance, considering the mediating roles of management accounting capability and financial efficiency and the moderating role of economic uncertainty. The findings indicate that digital transformation is positively associated with firm performance, management accounting capability, and financial efficiency. Both management accounting capability and financial efficiency also show positive relationships with firm performance and appear to mediate the relationship between digital transformation and firm performance. Although economic uncertainty is negatively associated with firm performance, its moderating effects are not statistically significant. The study therefore highlights the importance of combining digital technology with effective accounting and financial management practices to improve organizational performance.

THEORETICAL IMPLICATIONS

This study contributes to the literature by examining management accounting capability and financial efficiency as two potential mechanisms linking AI-driven digital transformation with firm performance. It also distinguishes the direct relationship between economic uncertainty and firm performance from its proposed moderating effects. The findings provide a basis for further research on how technological adoption and internal organizational capabilities jointly influence firm outcomes.

PRACTICAL IMPLICATIONS

The findings suggest that firms should integrate AI and digital technologies into accounting, budgeting, financial planning, and managerial decision-making. Investment in technology should be supported by employee training, reliable information systems, and regular monitoring of financial performance. Firms should also strengthen financial planning and risk-management practices to respond more effectively to economic uncertainty. For businesses in Bangladesh, combining digital readiness with effective financial and accounting management may help improve organizational performance.

LIMITATIONS AND FUTURE RESEARCH

This study has limitations that should be considered when interpreting the findings. A cross-sectional research design limits the ability to establish causal relationships, while purposive sampling may restrict the generalizability of the results. If the measures rely on self-reported responses, respondents' perceptions may also influence the findings. Future research could use longitudinal data, larger and more diverse samples, and objective financial indicators. Further studies could also examine other factors, such as firm size, digital maturity, and organizational readiness, to understand when digital transformation produces stronger performance outcomes.

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