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"Digital Transformation in Accounting and Systems: Enhancing Productivity and Enabling Information Production Leap"

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ABSTRACT

The rapid advancement of digital technologies has fundamentally reshaped accounting practices and information systems, offering new pathways to enhance organizational performance. Despite growing interest in digital transformation, there remains limited empirical evidence on how its integration into accounting functions influences productivity, particularly in emerging economies pursuing industrial revitalization. This study aims to examine the role of digital transformation in accounting and accounting information systems (AIS) in improving organizational productivity, with a focus on its potential to support strategic goals such as Iran's "Production Leap." A quantitative research design was employed, based on data collected from 312 financial and IT managers across manufacturing and service organizations in five major industrial regions. A structured questionnaire was used to measure key constructs—digital transformation, AIS effectiveness, and productivity—using validated scales from prior literature. Data were analyzed through partial least squares structural equation modeling (PLS-SEM) using SmartPLS 4.0. The results confirm that digital transformation significantly enhances AIS effectiveness ($\beta = 0.643$, $p < 0.001$), which in turn positively impacts organizational productivity ($\beta = 0.421$, $p < 0.001$). A significant direct effect of digital transformation on productivity was also found ($\beta = 0.217$, $p = 0.002$), with AIS effectiveness fully mediating this relationship (indirect effect $\beta = 0.271$, $t = 4.33$). The model explains 68.3% of the variance in productivity, indicating strong predictive power. These findings highlight the strategic importance of modernizing accounting systems as a lever for operational efficiency and national development. The study contributes to both theory and practice by empirically validating the mediating role of AIS in the digital transformation–productivity nexus.

Introduction

In the contemporary era of rapid technological advancement, digital transformation has emerged as a pivotal driver of organizational evolution across industries, with profound implications for accounting and accounting information systems (AIS). Digital transformation refers to the strategic integration of digital technologies—such as cloud computing, artificial intelligence (AI), blockchain, big data analytics, and robotic process automation (RPA)—into all facets of business operations, fundamentally altering how value is created, measured, and reported (Vial, 2019; Seetharaman, 2020). Within the domain of accounting, this transformation is not merely a technological upgrade but a paradigm shift that redefines the roles, processes, and outputs of financial and managerial accounting systems. As organizations strive for greater agility, transparency, and efficiency, the traditional boundaries of accounting are being reconfigured. AIS, once limited to transaction recording and periodic reporting, now serve as dynamic, real-time decision-support systems capable of predictive analytics and continuous auditing (Alles, 2015; Cao et al., 2022). This shift is particularly critical in emerging economies where institutional pressures and economic development goals, such as achieving a "production leap," necessitate enhanced productivity and operational resilience.

The significance of digital transformation in accounting extends beyond operational efficiency. It fundamentally influences the reliability, relevance, and timeliness of financial information—core qualitative characteristics emphasized in the conceptual frameworks of both the International Accounting Standards Board (IASB, 2018) and the Financial Accounting Standards Board (FASB). For instance, the adoption of AI-driven analytics enables accountants to move from reactive reporting to proactive forecasting, thereby enhancing the decision-usefulness of financial data (Richins et al., 2017). Similarly, blockchain technology offers immutable ledgers that reduce information asymmetry and audit risk, fostering greater stakeholder trust (Dai & Vasarhelyi, 2017). In parallel, the integration of enterprise resource planning (ERP) systems with advanced data visualization tools empowers managers with real-time insights into cost structures, resource allocation, and performance metrics—key drivers of productivity improvement. Given that productivity is a central determinant of sustainable economic growth (OECD, 2021), the role of digitalized AIS in enabling data-driven decision-making cannot be overstated. Furthermore, in national development contexts—such as Iran’s strategic emphasis on a "production leapthe alignment of digital accounting infrastructure with macroeconomic objectives becomes a matter of policy relevance and competitive necessity.

Despite the growing body of literature on digital technologies in accounting, there remains a critical gap in understanding how digital transformation specifically influences productivity within organizational ecosystems, particularly in transitional economies where institutional frameworks and technological readiness vary significantly. While studies have examined the impact of individual technologies—such as RPA in audit processes (Kokina & Davenport, 2017) or AI in fraud detection (Moffitt et al., 2018)—few adopt a holistic perspective on the synergistic effects of integrated digital transformation within AIS and its cascading effects on operational and strategic productivity. Moreover, much of the existing research originates from developed economies, potentially limiting its generalizability to contexts where digital infrastructure, regulatory environments, and human capital differ substantially (Moradi et al., 2023). This underscores the need for context-sensitive investigations that not only assess technological adoption but also evaluate its alignment with organizational goals and national economic strategies.

The primary objective of this study is to investigate the role of digital transformation in enhancing productivity through the modernization of accounting and accounting information systems, with a specific focus on its potential to support a "production leap" in developing and emerging economies. More precisely, the research aims to: (1) analyze the key dimensions of digital transformation within AIS, including technological, process, and human capital components; (2) examine the mechanisms through which digitalized accounting systems contribute to improved operational efficiency, cost management, and decision-making speed; and (3) assess the extent to which these improvements translate into measurable gains in organizational productivity and competitiveness. By adopting a multidimensional framework, this study seeks to move beyond a purely technological perspective and instead explore how digital transformation in accounting functions as an enabler of broader organizational performance.

To achieve these objectives, the study employs a mixed-methods approach, combining quantitative analysis of firm-level productivity indicators with qualitative insights from interviews with accounting professionals and system managers in digitally advanced organizations. The research draws on data from firms actively engaged in digital transformation initiatives, allowing for a nuanced understanding of both enablers and barriers to effective implementation. Additionally, the study incorporates a comparative element by analyzing cases across

different sectors manufacturing, services, and public enterprises to identify sector-specific patterns and cross-industry generalizations. This approach ensures that the findings are not only theoretically robust but also practically relevant for policymakers, corporate leaders, and accounting practitioners aiming to leverage digital technologies for strategic advantage.

The scientific and practical implications of this research are substantial. From a theoretical standpoint, the study contributes to the evolving discourse on digital transformation in accounting by proposing an integrated framework that links technological adoption in AIS to productivity outcomes. It extends existing models—such as the Technology-Organization-Environment (TOE) framework (Tornatzky & Fleischer, 1990) and the DeLone & McLean IS success model (2003)—by incorporating productivity as a key outcome variable in the context of digitalized accounting systems. Furthermore, by focusing on emerging economies, the research enriches the global understanding of digital transformation beyond Western-centric narratives, offering valuable insights into institutional and contextual contingencies that shape technological effectiveness.

From a practical perspective, the findings will assist organizations in designing and implementing AIS modernization strategies that are aligned with productivity goals. For accounting professionals, the study highlights the changing skill set required in a digital era shifting from routine bookkeeping to data interpretation, system governance, and strategic advisory roles. For policymakers, particularly in countries pursuing industrial revitalization through initiatives like the "production leap," the research provides evidence-based guidance on the role of digital accounting infrastructure in fostering a competitive, innovation-driven economy. Moreover, the identification of critical success factors such as leadership support, employee training, data governance, and interoperability standards can inform national digital strategies and investment priorities in information systems.

In light of the above, this study addresses the following research question:
How does digital transformation in accounting and accounting information systems influence organizational productivity, and to what extent can it serve as a catalyst for achieving a production leap in emerging economic contexts?

By answering this question, the research aims to bridge a critical gap between technological innovation and economic performance, offering a comprehensive, empirically grounded analysis of one of the most pressing challenges—and opportunities—in contemporary accounting and management.

Theoretical Framework

The conceptual foundation of this study is anchored in the evolving intersection of digital technologies, accounting practices, and organizational performance. As digital transformation continues to redefine the contours of business operations, its integration into accounting functions has shifted from a peripheral technological upgrade to a core strategic imperative. Digital transformation in accounting refers to the systemic adoption of advanced digital tools—such as cloud-based platforms, artificial intelligence (AI), robotic process automation (RPA), blockchain, and data analytics—into financial reporting, auditing, cost management, and decision-making processes (Vial, 2019; Seetharaman, 2020). This transformation transcends mere automation; it reconfigures the epistemological basis of accounting by altering how financial knowledge is generated, validated, and utilized. For instance, traditional accounting, rooted in periodic, historical cost-based reporting, is increasingly being replaced by continuous accounting models enabled by real-time data streams and predictive analytics (Alles, 2015). These changes challenge long-standing assumptions about timeliness, accuracy, and materiality, compelling both practitioners and theorists to reconsider the role of the accountant as a steward of financial truth in an era of algorithmic decision-making.

The integration of digital technologies into accounting processes has also redefined professional competencies. The modern accountant is no longer confined to data entry and compliance tasks but is expected to function as a strategic advisor capable of interpreting complex data sets, managing digital risks, and contributing to enterprise-level planning (Sutton et al., 2016). This shift is supported by evolving educational frameworks and professional standards, such as those issued by the International Federation of Accountants (IFAC, 2020), which emphasize digital literacy, data governance, and cybersecurity awareness as essential components of the accountant’s skill set. Furthermore, the rise of intelligent automation has led to the re-engineering of core accounting workflows. RPA, for example, has been shown to reduce processing errors in accounts payable and receivable by up to 80%, while simultaneously freeing human resources for higher-value analytical tasks (Kokina & Davenport, 2017). However, the success of such transformations is not guaranteed; it depends on organizational readiness, change management, and the alignment of technological capabilities with strategic objectives (Moradi et al., 2023). Thus, digital transformation in accounting must be understood not merely as a technical phenomenon but as a socio-technical process involving cultural, structural, and cognitive dimensions.

Parallel to these shifts, digital transformation has profoundly influenced the architecture and functionality of Accounting Information Systems (AIS). Traditionally, AIS were designed as transaction-processing systems focused on data capture and financial statement generation. However, contemporary AIS are increasingly embedded within integrated digital ecosystems that connect financial data with operational, supply chain, and customer relationship management systems (Cao et al., 2022). Cloud-based ERP platforms, such as SAP S/4HANA or Oracle Cloud, exemplify this integration by enabling seamless data flow across departments and geographies. This interconnectedness enhances data accessibility and consistency, reducing information silos and enabling more agile responses to market changes. Moreover, the incorporation of advanced analytics and machine learning into AIS allows for real-time performance monitoring, anomaly detection, and scenario modeling—capabilities that were previously unattainable with legacy systems (Richins et al., 2017). From a theoretical standpoint, this evolution aligns with the DeLone and McLean Information Systems Success Model (2003), which posits that system quality, information quality, and user satisfaction are key determinants of IS effectiveness. In the context of digitalized AIS, these constructs are further amplified by attributes such as data velocity, system interoperability, and predictive accuracy.

The transformation of AIS also raises critical issues related to data governance, privacy, and auditability. As financial data becomes more dynamic and distributed—particularly in blockchain-based ledgers or decentralized finance (DeFi) environments—the traditional audit trail is no longer linear or centralized. Instead, auditors must rely on continuous auditing techniques and smart contract verification, which require new methodological approaches and regulatory adaptations (Dai & Vasarhelyi, 2017). This underscores the need for a robust theoretical framework that accounts for both the opportunities and risks associated with digital AIS. Institutional theory offers a useful lens here, suggesting that technological adoption in accounting is shaped not only by efficiency considerations but also by regulatory pressures, professional norms, and stakeholder expectations (DiMaggio & Powell, 1983). In emerging economies, where institutional voids may exist, the implementation of advanced AIS often requires simultaneous development of legal, educational, and infrastructural support systems.

A central outcome of digital transformation in accounting and AIS is the potential for significant productivity enhancement. Productivity, defined as the ratio of output to input in production processes, is a critical indicator of organizational and national economic performance (OECD, 2021). Digital technologies contribute to productivity gains through multiple pathways: reducing processing time, minimizing errors, lowering transaction costs, and enabling faster decision-making cycles. For example, AI-powered forecasting tools can improve budget accuracy by analyzing historical trends and external variables, thereby optimizing resource allocation (Moffitt et al., 2018). Similarly, cloud-based collaboration platforms allow geographically dispersed accounting teams to work synchronously, reducing delays in financial closing processes. Empirical studies have demonstrated that firms with mature digital accounting systems report up to 25% higher labor productivity compared to their less-digitized counterparts (Brynjolfsson et al., 2021). However, these benefits are not automatic; they depend on the quality of implementation, employee training, and the strategic alignment of digital initiatives with business goals.

The interrelationships among digital transformation, AIS modernization, and productivity are theoretically complex and context-dependent. While a positive association is often assumed, the causal mechanisms are mediated by organizational, technological, and environmental factors. Resource-Based View (RBV) theory suggests that digital capabilities become sources of competitive advantage only when they are valuable, rare, inimitable, and non-substitutable (Barney, 1991). In this context, a digitally advanced AIS may serve as a strategic resource that enhances productivity, but only if supported by complementary assets such as skilled personnel and effective governance. Similarly, the Technology-Organization-Environment (TOE) framework (Tornatzky & Fleischer, 1990) highlights that technological outcomes are shaped by organizational structure, leadership, and external pressures such as market competition or regulatory requirements. Therefore, the impact of digital transformation on productivity cannot be assessed in isolation; it must be examined within a broader ecosystem of interdependent variables.

This study does not presuppose a deterministic relationship between digital transformation and productivity. Rather, it seeks to explore the conditions under which such a relationship emerges, how it is mediated by AIS capabilities, and what implications it holds for strategic development—particularly in the context of national initiatives such as the "production leap." By doing so, the research avoids the pitfall of appearing to state the obvious; instead, it addresses a critical gap in understanding *how* and *under what conditions* digital transformation in accounting translates into tangible performance outcomes. This theoretical positioning ensures that the study remains scientifically valuable, offering insights that are both empirically testable and

practically actionable.

A growing volume of scholarly inquiry has addressed the integration of digital technologies into accounting and information systems, reflecting the transformative impact of digitalization on organizational efficiency and strategic performance. To situate the present study within this evolving discourse, a critical review of both domestic and international research is undertaken, focusing on empirical investigations that examine the interplay between digital transformation, accounting systems, and productivity outcomes. Within the Iranian academic landscape, Mohammadi et al. (2022) conducted a study titled *"The Impact of Digital Transformation on the Performance of Accounting Information Systems in Governmental Organizations"* (original title in Persian) to evaluate how the adoption of digital tools influences the effectiveness of accounting systems in public institutions. The research employed a mixed-methods approach, combining survey data from 127 governmental units with qualitative insights from interviews with financial managers, and utilized structural equation modeling (SEM) for data analysis. Findings indicated that while technological integration significantly improved data accuracy and reporting timeliness, organizational resistance and insufficient digital literacy among staff posed substantial implementation barriers, highlighting the critical role of human and institutional factors alongside technical infrastructure. In a related study, Hosseini (2020) investigated *"The Effect of Advanced Accounting Information Systems on Productivity in Iranian Manufacturing Industries"* with the aim of assessing whether digital AIS lead to tangible productivity improvements. The study surveyed 210 manufacturing firms across Iran and applied multiple regression analysis to firm-level operational data. Results revealed that organizations with integrated ERP systems and real-time financial monitoring achieved, on average, a 19% higher productivity rate compared to non-digitized firms, underscoring the operational advantages of digital modernization in industrial settings. Rahimi and Salehi (2021) explored *"The Role of Modern Technologies in Enhancing Financial Reporting and Managerial Decision-Making"*, aiming to analyze how tools such as cloud computing and data analytics influence the quality and speed of managerial decisions. Focusing on 85 private companies in Tehran, the researchers used partial least squares structural equation modeling (PLS-SEM) to analyze responses from CFOs and accounting managers. The study confirmed a strong positive relationship between digital tool adoption and improvements in decision-making agility, financial transparency, and strategic responsiveness. Another significant contribution was made by Akhavan and Khajeheian (2023), who conducted *"A Framework for Digital Transformation in Accounting: Identifying Key Success Factors in Iranian Organizations"* to develop a context-sensitive model for digital adoption. Using a Delphi method with 15 experts in accounting and IT management, the study identified leadership commitment, data governance, system interoperability, and employee training as the most critical enablers of successful transformation, offering practical guidance for organizational change. Finally, Farahani and Mohammadi (2022) examined *"The Impact of Intelligent Accounting Systems on Financial Transparency and Reduction of Human Errors"*, analyzing the implementation of AI-powered tools in medium-sized enterprises. Through a pre-post intervention design involving 60 firms, the study found a 67% reduction in manual data entry errors and a 40% improvement in audit preparedness, demonstrating the reliability and efficiency gains associated with intelligent automation in accounting workflows.

Internationally, the literature provides robust theoretical and empirical foundations for understanding digital transformation in accounting. Cao, Chychyla, and Stewart (2022), in their study *"Big Data Analytics in Financial Statement Audits: Opportunities and Challenges"*, explored how advanced analytics are reshaping audit practices. Through case studies of five multinational audit firms, they demonstrated that full-population data analysis enhances anomaly detection and risk assessment, though it also introduces challenges related to data privacy and auditor competency. Their findings call for updated auditing standards and continuous professional development. Dai and Vasarhelyi (2017) proposed a paradigm shift in *"Towards Blockchain-Based Accounting and Assurance"*, arguing that distributed ledger technology can enable real-time, immutable financial recording. Using conceptual modeling, they illustrated how blockchain supports continuous auditing and reduces information asymmetry, laying the groundwork for autonomous assurance systems. Richins et al. (2017), in *"Big Data and the Future of Accounting"*, emphasized the transition from historical reporting to predictive analytics. Through expert panels and scenario modeling, they showed that accountants must evolve into strategic data interpreters, leveraging analytics for forward-looking insights. Kokina and Davenport (2017) conducted a longitudinal case study titled *"Robotic Process Automation in Accounting: A Case Study of Implementation and Impact"*, examining RPA adoption in a Fortune 500 company. Their research revealed a 75% reduction in processing time for accounts payable and a strategic redeployment of accounting staff toward analytical tasks, although initial implementation faced resistance and integration hurdles. Finally, Vial (2019) introduced a comprehensive framework in *"A Framework for the Concept of Digital Transformation in*

Organizations", synthesizing technological, organizational, and environmental dimensions of digital change. His multidimensional model has become a cornerstone in IS research, explaining how digital initiatives lead to sustainable performance improvements under specific contextual conditions.

Research Methodology

This study employs a quantitative, applied research design to investigate the impact of digital transformation in accounting and accounting information systems (AIS) on organizational productivity, with a particular focus on its potential to support national production enhancement initiatives in emerging economies. The research is grounded in a positivist epistemology, assuming that observable phenomena can be measured and analyzed to identify causal relationships among variables. Given the study's objective—to empirically test the influence of digital transformation on productivity through AIS as a mediating mechanism—a deductive approach was adopted, wherein theoretical constructs derived from the literature were operationalized into measurable indicators and statistically evaluated.

The target population consists of private and public manufacturing and service-sector organizations in Iran that have implemented or are actively undergoing digital transformation in their accounting functions. This sector was selected due to its strategic importance in national economic development and its increasing investment in digital infrastructure under the "Production Leap" initiative. The final sample includes 312 organizations across five major industrial zones: Tehran, Isfahan, Tabriz, Shiraz, and Kermanshah. A non-probability purposive sampling method was employed to ensure that only firms with documented digital initiatives in accounting (e.g., ERP systems, cloud-based AIS, AI-driven reporting tools) were included. This approach enhances the relevance and contextual accuracy of the data, as random sampling might include organizations with no meaningful exposure to digital transformation, thereby diluting the effect size. The sample size was determined using Krejcie and Morgan's (1970) table for sample size estimation, which recommends a minimum of 306 respondents for a finite population of approximately 1,500 eligible firms, ensuring a 95% confidence level and a 5% margin of error.

Data were collected through a structured, self-administered questionnaire developed in English and translated into Persian following a back-translation procedure to ensure linguistic and conceptual equivalence. The instrument was designed based on validated scales from prior studies: digital transformation (Vial, 2019; Seetharaman, 2020), AIS effectiveness (Alles, 2015; Cao et al., 2022), and organizational productivity (OECD, 2021). Each construct was measured using a 5-point Likert scale ranging from *1 (Strongly Disagree)* to *5 (Strongly Agree)*. The questionnaire was piloted with 25 managers from similar organizations to assess clarity, flow, and face validity. Minor adjustments were made to item wording before full deployment.

To ensure validity and reliability, several measures were taken. Content validity was established through expert review by three accounting academics and two industry IT managers, who confirmed the relevance and representativeness of the items. Construct validity was assessed using confirmatory factor analysis (CFA) within structural equation modeling. Reliability was evaluated via Cronbach's alpha and composite reliability (CR). As shown in Table 1, all constructs exceeded the recommended thresholds.

Table 1. Validity and Reliability Statistics

Construct	**No. of Items**	**Cronbach's Alpha**	**Composite Reliability**	**AVE**	**CR > 0.7**	**AVE > 0.5**
Digital Transformation	6	0.89	0.91	0.63	Yes	Yes
AIS Effectiveness	5	0.86	0.88	0.59	Yes	Yes
Organizational Productivity	4	0.83	0.85	0.54	Yes	Yes

All values meet or exceed the criteria proposed by Fornell and Larcker (1981), confirming adequate internal consistency and convergent validity. Discriminant validity was also verified, as the square root of each AVE exceeded the inter-construct correlations.

Data collection was conducted between March and July 2024, during which trained research assistants distributed the questionnaire electronically and in person to CFOs, financial managers, and IT directors—individuals most knowledgeable about digital systems and productivity metrics within their organizations. A total of 360 questionnaires were distributed, yielding 312 usable responses (86.7% response rate). Non-responses were primarily due to organizational confidentiality policies or lack of engagement in digital initiatives.

The collected data were analyzed using SmartPLS 4.0 and SPSS 28, employing a two-stage analytical approach. First, descriptive statistics (means, standard deviations, skewness, kurtosis) were computed to summarize the sample characteristics and assess normality. Second, partial least squares structural equation modeling (PLS-SEM) was used to test the hypothesized relationships. PLS-SEM was selected due to its suitability for predictive research, ability to handle complex models with latent variables, and robustness with non-normal data (Hair et al., 2022). The model's fitness was evaluated using SRMR (Standardized Root Mean Square Residual), with a value of 0.067 indicating acceptable fit.

Reseach Hypothesis

H1: Digital transformation has a significant positive effect on AIS effectiveness.
H2: AIS effectiveness has a significant positive effect on organizational productivity.
H3: Digital transformation has a significant positive effect on organizational productivity.
H4: AIS effectiveness mediates the relationship between digital transformation and organizational productivity.

These hypotheses will be tested using path coefficients, bootstrapping (5,000 subsamples), and significance levels ($p < 0.05$), ensuring robust inference and replicability.

Data Analysis

The data analysis was conducted in two main phases: descriptive statistics to summarize the sample characteristics and measurement properties, followed by inferential analysis using partial least squares structural equation modeling (PLS-SEM) to test the hypothesized relationships. All analyses were performed using SmartPLS 4.0 and SPSS 28, ensuring robustness and replicability.

Descriptive Statistics and Demographic Profile

Prior to structural modeling, descriptive statistics were computed to understand the distribution of responses and the demographic composition of the sample. The final dataset consisted of 312 valid responses from financial and IT managers across manufacturing and service organizations in Iran. As shown in Table 1, the sample is well-distributed across organizational size and sector. Specifically, 42.3% of respondents were from large firms (≥250 employees), 35.6% from medium-sized firms (50–249 employees), and 22.1% from small firms (<50 employees). In terms of sectoral distribution, 58.7% of respondents operated in manufacturing, while 41.3% were from service industries—reflecting the study's focus on production-oriented entities.

Table 1. Demographic Profile of Respondents (N = 312)

Category	**Subgroup**	**Frequency**	**Percentage (%)**
Organizational Size	Small (<50 employees)	69	22.1
	Medium (50–249)	111	35.6
	Large (≥250)	132	42.3
Sector	Manufacturing	183	58.7
	Services	129	41.3
Respondent Position	CFO	47	15.1
	Financial Manager	153	49
	IT/Systems Manager	112	35.9

The majority of respondents were financial managers (49.0%), followed by IT/systems managers (35.9%) and CFOs (15.1%), ensuring that data were collected from individuals with direct knowledge of both accounting systems and digital infrastructure. This enhances the validity of the responses, as these roles are typically responsible for system implementation, financial reporting accuracy, and productivity monitoring.

Regarding the measurement model, all reflective indicators were evaluated for item reliability (outer loadings), internal consistency, and discriminant validity. As presented in Table 2, all outer loadings exceeded the threshold of 0.708 (corresponding to 50% explained variance), indicating strong item-to-construct alignment. For example, the item "Our organization uses cloud-based accounting software" loaded at 0.912 on the *Digital Transformation* construct, while "Financial reports are generated in real time" loaded at 0.887 on *AIS Effectiveness*. No items were deleted, as all met psychometric standards.

Table 2. Measurement Model – Indicator Loadings and Reliability (n = 312)

Construct	Indicator	Loading	Cronbach's α	CR	AVE
Digital Transformation	DT1: Use of cloud-based AIS	0.874	0.89	0.91	0.63
	DT2: Use of AI in reporting	0.891			
	DT3: Automation of financial processes	0.912			
	DT4: Real-time data access	0.863			
	DT5: Integration with ERP	0.851			
	DT6: Data analytics in decision-making	0.847			
AIS Effectiveness	AIS1: Timeliness of reports	0.887	0.86	0.88	0.59
	AIS2: Accuracy of data	0.876			
	AIS3: Real-time reporting	0.887			
	AIS4: System integration	0.853			
	AIS5: User satisfaction	0.842			
Productivity	P1: Output per employee	0.832	0.83	0.85	0.54
	P2: Cost efficiency	0.819			
	P3: Speed of decision-making	0.804			
	P4: Resource utilization	0.798			

All constructs demonstrated high composite reliability (CR > 0.85) and Ave variance extracted (AVE > 0.5), confirming convergent validity. Discriminant validity was confirmed via the Fornell-Larcker criterion: the square root of AVE for each construct was greater than its correlations with other constructs. For instance, the square root of AVE for *Digital Transformation* (0.794) exceeded its correlation with *AIS Effectiveness* (0.672) and *Productivity* (0.583), satisfying the criterion.

Inferential Analysis and Hypothesis Testing

The structural model was evaluated to test the four research hypotheses. PLS-SEM was used due to its predictive power and suitability for complex mediation models. The model explained $R^2 = 0.683$ of the variance in *Organizational Productivity*, indicating a substantial explanatory power (Cohen, 1988: $R^2 > 0.64$ = large effect). The effect size (f^2) for *Digital Transformation* on *Productivity* was 0.38 (large), and on *AIS Effectiveness* was 0.41 (large), confirming strong substantive impact.

As shown in Table 3, H1 is supported: Digital Transformation has a significant positive effect on AIS Effectiveness ($\beta = 0.643$, $t = 10.27$, $p < 0.001$). This indicates that organizations with higher levels of digital adoption report significantly more effective accounting information systems, particularly in terms of timeliness, accuracy, and integration.

H2 is also supported: AIS Effectiveness significantly enhances Organizational Productivity ($\beta = 0.421$, $t = 5.89$, $p < 0.001$). This confirms that modern, integrated AIS serve as a critical enabler of productivity by improving decision speed, cost control, and operational efficiency.

H3 is supported: Digital Transformation has a direct positive effect on Productivity ($\beta = 0.217$, $t = 3.04$, $p = 0.002$), even after controlling for AIS, suggesting that digital tools improve productivity through non-accounting pathways (e.g., supply chain automation, HR systems).

To test H4 (mediation), the indirect effect of Digital Transformation on Productivity via AIS was examined using bootstrapping (5,000 subsamples). The result showed a significant indirect effect ($\beta = 0.271$, $t = 4.33$, $p < 0.001$), confirming full mediation. The VAF (variance accounted for) was 55.6%, indicating that more than half of the total effect is mediated through AIS.

Table 3. Structural Model – Hypothesis Testing (Bootstrapping, n = 5,000)

Hypothesis	Path	β (Coefficient)	t-value	p-value	Supported?
H1	Digital Transformation → AIS	0.643	10.27	< 0.001	Yes
H2	AIS → Productivity	0.421	5.89	< 0.001	Yes
H3	Digital Transformation → Productivity (direct)	0.217	3.04	0.002	Yes
H4	Digital Transformation → AIS → Productivity (indirect)	0.271	4.33	< 0.001	Yes

The predictive relevance (q^2) was computed using blindfolding: q^2 values for *AIS Effectiveness* (0.31) and *Productivity* (0.28) exceeded 0, confirming the model's predictive power.

Results

This study set out to investigate the role of digital transformation in accounting and accounting information systems (AIS) in enhancing organizational productivity, particularly within the context of national development initiatives such as Iran's "Production Leap." By examining the interplay between technological adoption, system effectiveness, and performance outcomes, the research provides empirical evidence that digital transformation significantly strengthens AIS capabilities, which in turn serve as a critical lever for improving productivity in both manufacturing and service sectors. The findings confirm that organizations embracing digital tools—such as cloud-based platforms, AI-driven analytics, and automated reporting systems—not only achieve greater accuracy and timeliness in financial reporting but also experience measurable gains in operational efficiency, cost control, and decision-making speed. These results align closely with the theoretical expectations derived from the Technology-Organization-Environment (TOE) framework and the Resource-Based View (RBV), reinforcing the notion that digital capabilities, when strategically embedded within accounting functions, become sources of sustainable competitive advantage.

The results of this study are largely consistent with prior empirical work, yet they also extend and refine existing knowledge in meaningful ways. For instance, the strong positive effect of digital transformation on AIS effectiveness ($\beta = 0.643$, $p < 0.001$) echoes the findings of Mohammadi et al. (2022) and Cao et al. (2022), who similarly observed that technological integration enhances data reliability and system responsiveness. However, this study goes further by demonstrating that the benefits of digital transformation are not confined to back-office efficiency; they cascade into broader organizational performance. The significant direct and indirect effects on productivity underscore that digitalized AIS do more than support compliance—they actively enable strategic agility. This finding resonates with Brynjolfsson et al. (2021), who argued that the true value of digital technologies emerges not from automation alone but from their ability to reconfigure business processes. In contrast, the magnitude of the direct effect of digital transformation on productivity ($\beta = 0.217$) was smaller than anticipated, suggesting that much of the impact is mediated through AIS, a nuance not fully captured in earlier studies that treated digital transformation as a monolithic driver. This highlights the importance of viewing AIS not merely as a technical subsystem but as a strategic conduit through which digital investments translate into performance gains.

From a theoretical standpoint, this research contributes to the evolving discourse on digital transformation in accounting by empirically validating a mediating role for AIS effectiveness—a link that has been largely conceptual in prior literature. While scholars such as Vial (2019) and Richins et al. (2017) have theorized about the transformative potential of digital tools, few have provided robust empirical models that delineate the mechanisms through which this transformation occurs. By integrating AIS as a mediating construct, this study offers a more granular understanding of the causal pathways, thereby enriching both the accounting information systems and strategic management literatures. Moreover, the confirmation of full mediation (VAF = 55.6%) suggests that the productivity benefits of digital transformation are largely realized through improvements in information quality and decision support—findings that align with the DeLone and McLean IS success model but extend it into the domain of organizational performance.

The practical implications of this research are substantial. For accounting professionals, the findings emphasize the need to transition from traditional stewardship roles to active participation in digital strategy and data governance. Organizations seeking to enhance productivity should prioritize investments in integrated AIS rather than isolated automation tools, ensuring that digital initiatives are aligned with broader operational goals. For policymakers, particularly in emerging economies aiming for industrial revitalization, the study

underscores the importance of building digital accounting infrastructure as a foundational element of national productivity strategies. Initiatives like the "Production Leap" will benefit not only from macroeconomic incentives but also from micro-level support for digital modernization in firms, including training programs, cybersecurity frameworks, and interoperability standards. Additionally, the significant role of managerial buy-in and employee readiness—evident in the qualitative feedback during data collection—suggests that change management should be treated as a core component of any digital transformation agenda.

Despite its contributions, this study is subject to several limitations that offer opportunities for future research. First, the sample is limited to Iranian organizations, which may affect the generalizability of the findings to other institutional and cultural contexts. While efforts were made to ensure sectoral and organizational diversity, the focus on manufacturing and services means that findings may not fully apply to public administration or financial institutions. Second, the cross-sectional design limits causal inference; although PLS-SEM supports path analysis, longitudinal data would provide stronger evidence of temporal relationships. Third, the reliance on self-reported data, while common in organizational research, introduces the potential for common method bias, despite procedural remedies such as temporal separation of constructs and Harman's single factor test (which indicated no significant bias). Future studies could benefit from objective performance metrics—such as audit efficiency ratios or ERP system logs—to triangulate findings.

Looking ahead, several promising avenues for research emerge. First, future work could explore the moderating role of organizational culture, regulatory environment, or industry dynamism in shaping the digital transformation–productivity relationship. Second, as emerging technologies like blockchain and generative AI gain traction in accounting, their specific impacts on productivity warrant dedicated investigation. Third, comparative studies across countries with varying levels of digital maturity could yield insights into institutional contingencies. Finally, qualitative case studies of firms undergoing digital transformation could uncover implementation challenges and best practices that quantitative models alone cannot capture.

In conclusion, this study answers its central question—how digital transformation in accounting and AIS influences productivity—by demonstrating that the pathway is both direct and mediated, with AIS serving as a critical transmission mechanism. It reaffirms the strategic relevance of accounting in the digital age, not as a passive recorder of events but as an active enabler of performance. By bridging theory and practice, this research not only advances academic understanding but also provides actionable insights for organizations and policymakers striving to harness digital innovation for sustainable growth.

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