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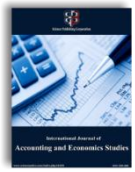

The Impact of Artificial Intelligence and Digital Transformation on Financial Reporting Quality: Insights From Saudi Arabia

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Abstract

The study explores the effects of the implementation of artificial intelligence (AI) and digital transformation (DT) on financial reporting quality (FRQ) in Saudi-listed companies. Based on the Technology-Organization-Environment (TOE) model and Agency Theory, the study determines the effect of technological innovations on the quality, timeliness, and reliability of financial reporting in an emerging market with a rapidly changing environment under the Saudi Vision 2030. The study utilizes multiple regression analysis to test the hypotheses proposed using panel data of the 150 non-financial companies listed on the Saudi Stock Exchange (Tadawul) between the years 2019-2023. Both AI adoption and DT transformation positively and significantly affect FRQ, and, therefore, the conclusion that technology makes the transparency of information, the lack of information asymmetry, and compliance with international standards stronger can be made. The research adds to the literature because it expands previous research on financial reporting and technology to the Saudi context, provides a theoretical understanding of how innovation can solve agency problems, and it also offers practical suggestions to managers, regulators, and investors. In general, the results highlight the strategic relevance of AI and DT as complementary sources of quality financial reporting in emerging markets.

Keywords: *Financial Reporting Quality; Artificial Intelligence; Digital Transformation; Saudi Stock Market (Tadawul); Technology-Organization-Environment (TOE) framework.*

1. Introduction

Over the past few years, financial reporting has been radically transformed by the rapid evolution of digital technologies and artificial intelligence (AI) (Stein Smith, 2018). These inventions can enhance the accuracy, reliability, and timeliness of financial information by a significant margin and enable firms to handle and analyze vast volumes of complex data in an efficient manner. (Peng et al., 2023). The utilization of AI applications, such as machine learning algorithms, predictive analytics, and automated auditing systems, gradually alters the traditional accounting process and allows us to make better managerial choices. (Alonge et al., 2024). The digital transformation initiatives, including cloud and blockchain technology to construct accounting infrastructure and real-time reporting tools, are simultaneously reforming the collection, processing, and sharing of financial databases with stakeholders. (Phornlaphatrachakorn & Kalasindhu, 2021). The contribution of AI and the digital transformation to financial reporting can be examined through the unique situation in the emerging markets, such as Saudi Arabia. The Saudi economy is undergoing certain structural changes within the context of Vision 2030, which has centered on economic diversification, digital innovation, as well as the establishment of efficient capital markets. (Moshashai et al., 2020; Nurunnabi, 2017). In this endeavor, Saudi-based listed firms are recommended to adopt new technologies that can enhance corporate governance, transparency, and investor confidence. (Topal, 2019). These actions are aimed at rendering the financial environment more competitive and internationally integrated, and in accordance with international best practices in accounting and reporting. (Tawfik et al., 2017).

Even though the topic of technological adoption within accounting draws the interest of the world community, few empirical studies provide insights into the potential effects that AI and digital transformation produce on the quality of financial reporting in the Saudi context (Khan et al., 2025). The literature has primarily focused on the developed markets where regulatory, institutional, and technological frameworks are quite distant compared to the emerging markets (Stein Smith, 2018). Regulatory reforms by the Capital Market Authority (CMA), growing emphasis on digital innovation, and characteristics of corporate governance models unique to Saudi Arabia are all opportunities and challenges to the improvement of financial reporting quality in Saudi Arabia (Moshashai et al., 2020). The relationship between these factors and the implementation of AI and the digital transformation is essential to offer evidence-based advice to corporate executives, regulators, and investors (Alonge et al., 2024). The proposed research is driven by the gap in research and the necessity to explore the processes according to which AI and digital transformation affect the quality of financial reporting in Saudi-listed companies (Peng et al.,

2023; Stein Smith, 2018). It examines whether the use of AI-powered solutions and digital reporting systems can enhance the reliability of financial disclosures, their transparency, and timeliness (Ilmu et al., 2024). This study, through answering this question, adds to the overall research concerning accounting innovation and technology adoption and provides practical implications applicable to policy development and corporate strategy in Saudi Arabia.

This research has several contributions. First, it offers empirical data on how AI and digital transformation influence the quality of financial reporting in an emerging market, namely Saudi Arabia, thus providing an opportunity to generalize the oldest existing theories to other economies other than developed ones. Second, it conveys information to the policymakers and regulators regarding the success of the technology implementation in improving transparency and reliability in corporate reporting, which endorses Vision 2030 objectives. Third, it also provides practical advice to managers of corporations and business leaders on how they can use AI and digital technologies to streamline financial reporting, boost investor confidence, and more efficiently use the market. Lastly, the study also sells in the academic literature by incorporating the research on accounting, information systems, and corporate governance literature, providing the perspective of a multidisciplinary approach on the emerging roles of technology in financial reporting.

2. Literature Review

2.1. Financial reporting quality

One determinant of transparency is the quality of financial reporting (FRQ), which ensures investor confidence and the effective functioning of the capital market. (F. Chen et al., 2011). Good financial reports include timely, accurate, and relevant information that can be utilized by the concerned parties in coming up with sound economic decisions. (H. Chen et al., 2010). According to Sai & Parimi, (2018), FRQ can be measured on multiple dimensions, including the quality of accruals, earnings management, timeliness, and reliability of data disclosed through reporting (Mousa Hikal et al., 2025). Poor quality of financial reporting can deceive the market, undermine corporate governance, and increase the cost of capital. (Abdelrahman et al., 2024). In the emerging markets, financial reporting practices are likely to reflect the relations between institutional structures, regulatory control, and corporate governance. (Alzeghoul & Alsharari, 2024). The possibility of opportunistic reporting or of later disclosure can be more likely to occur in those firms that are in countries where there are weaker accounting standards or where the enforcement system of accounting standards is weaker. (Alonge et al., 2024).

The introduction of the IFRS standards in Saudi Arabia and the roles played by the Capital Market Authority (CMA) to enhance transparency and accountability in financial reporting have not been effective in ensuring that such changes are consistent and reliable among listed companies. (Mohamed Alshawadfy et al., 2023). The existing literature has associated FRQ with the performance of firms, their market value, as well as with the trust that investors have in them, noting that it is both indicative of good corporate governance and predictive of market efficiency. FRQ is frequently measured in a qualitative and quantitative ways (Habib & Jiang, 2015). Quantitative proxies are the quality of earnings measurement, measures that are based on accruals, and timeliness of reporting measures, whereas qualitative measurements are those that are concerned with the clarity, relevance, and completeness of financial disclosures. (Hasan & Omar, 2016). According to recent studies, technological solutions, especially AI and online services, can contribute greatly to FRQ, minimizing human mistakes, identifying irregularities, and facilitating more timely reporting. (Alonge et al., 2024; Md Shakil et al., 2022; Stein Smith, 2018).

2.2. Artificial intelligence and digital transformation

The concepts of artificial intelligence and digital transformation are becoming increasingly accepted as the driving factors of accounting processes and financial reporting practices improvement. (Giudici & Raffinetti, 2023). AI includes machine learning, natural language processing, and predictive analytics, which enable companies to automate routine operations, spot unusual behavior, and make predictive inferences based on big data. (Artene et al., 2024). The applications of AI in accounting include automated bookkeeping and fraud detection systems, as well as sophisticated auditing and decision support systems. (Oneshko et al., 2023a). Such technologies support the efficiency and reliability of the financial reporting process, minimizing the errors of human handwriting and providing the possibility to make more timely and correct disclosures. (Sreseli & Kadagishvili, 2023). Digital transformation, in a broader sense, means the adoption of digital technologies in all areas of business operations, which inherently change the way businesses work and provide value. (Kuaiber et al., 2024). Digital transformation in accounting involves cloud-based accounting solutions, blockchain-based records of transactions, real-time reporting systems, and electronic filing solutions.(Dombrovska & Dombrovska, 2023). Collectively, AI and digital transformation transform the financial reporting processes, making data more accessible, increasing the quality of auditing, and helping to comply with regulatory requirements. (Lombardi & Secundo, 2021).

Empirical research in developed markets has revealed that the use of AI can be linked to an increase in earnings quality, acceleration in reporting, as well as detection of anomalies in financial reports. (Kuaiber et al., 2024; Peng et al., 2023; Sreseli & Kadagishvili, 2023). Equally, digital transformation efforts enable transparency and minimize information asymmetry between companies and stakeholders. (Lombardi & Secundo, 2021; Md Shakil et al., 2022; Stein Smith, 2018). Nevertheless, there is a weak literature on AI and digital transformation in emerging markets, specifically in the Middle East and Saudi Arabia. (Mohammed et al., 2024). The specific challenges of Saudi-listed companies, including regulatory adaptation, technological readiness, and cultural acceptance, may affect the efficiency of AI and digital tools to improve the quality of financial reporting. (Yousif Alsharidah & Alazzawi, 2020). The incorporation of AI and digital transformation into the accounting process is not only enhancing the technical quality of the financial reports, but also the corporate governance and investor confidence. (Kumar & Kumar Vandanapu, 2024). These technologies help to meet global best practice by promoting quicker reporting, more precise reporting, and more transparent reporting, which in turn facilitates national plans such as Saudi Vision 2030, which is focused on digital innovation and market modernization. (Sai & Parimi, 2018).

3. Theoretical Background

This paper is based on two main theoretical viewpoints: the Technology-Organization-Environment (TOE) model and the Agency Theory (A. A. Adam et al., 2024). The TOE framework highlights that three main contexts, namely technological, organizational, and environmental contexts, determine the process of adopting and implementing technological innovations in organizations (Badghish & Soomro, 2024). The concept in financial reporting that is referred to as the technological context is the application of AI technology, digital platforms, and complex accounting software, which have the potential to enhance the quality of the reporting (Gupta et al., 2022). Organizational context is defined as those organizational attributes that are firm-specific, such as the size, the type of governing structure, and access to resources

that are either facilitating or constraining in adoption of technology (Al Hadwer et al., 2021). Finally, the environmental environment encompasses external forces of regulatory compulsions, market expectations, and competition (Badghish & Soomro, 2024). The adoption of the TOE framework will provide a comprehensive understanding of the procedure of implementing AI and digital transformation programs by Saudi-listed corporations, and the impact of the implementation of these programs on financial reporting quality (Min & Kim, 2024).

Further, the agency theory was first developed by Jensen and Meckling (1976) (Jensen & Meckling, 1976) Outlines the relation of the principal and the agency and the conflict of interest between the managers and the shareholders (previously the agency and the principal). There are chances that information asymmetry and opportunistic behavior might influence the quality of reporting in financial reporting. (Poletti-Hughes & Briano-Turrent, 2019). The AI usage and digital transformation can assist in reducing agency issues through the enforcement of a better level of transparency, the enhanced accuracy of financial documents, and the possibility of tracking managerial work in real-time (Rehman, 2022). Through integrating these two theories, this study can identify the drivers of technology adoption in accounting procedures and the enhancement of the quality of financial reporting by linking organizational and technological problems to the mitigation of challenges related to agency. (RAEF Aboulsalam et al., 2022).

4. Hypotheses Development

4.1. Artificial intelligence adoption and financial reporting quality

The application of artificial intelligence (AI) to accounting operations is a very decisive variable in enhancing the quality of financial reporting. (Blankespoor et al., 2025). With AI technologies, such as machine learning, predictive analytics (Ahmad et al., 2024), and natural language processing, companies can automate regular accounting processes, identify anomalies, and make better predictions (Sreseli & Kadagishvili, 2023). According to the TOE framework, the technological environment facilitates the use of AI through the provision of tools that make the process of reporting more efficient, more accurate, and timely. (Min & Kim, 2024). The organizational environment, including the size of the firm, mode of governance, and availability of resources, also simplifies the adoption of AI. (Al Hadwer et al., 2021). AI adoption solves agency problems identified in the Agency Theory, because it saves time spent on minimizing errors related to manual processing of information, and the decision-making process will be more transparent, reducing information asymmetry between managers and shareholders. (Abdelrahman et al., 2024b). Empirical research has shown that companies that adopt AI technologies report better, contain fewer errors, and are timely with disclosures. (Kumar & Kumar Vandanapu, 2024; Sai & Parimi, 2018). The use of AI is especially topical in Saudi Arabia, where the regulatory environment, supported by the Capital Market Authority (CMA), is growing stronger and where investors are increasingly seeking access to credible financial data. (Yousif Alsharidah & Alazzawi, 2020). Firms can use AI to meet the requirements of IFRS, track financial performance on the fly, and increase the reliability of disclosures in general. (Alhazmi et al., 2025). Based on this, the study hypothesizes:

H1: AI adoption has a positive and significant effect on financial reporting quality in Saudi-listed firms.

4.2. Digital transformation and financial reporting quality

Digital transformation can be defined as the incorporation of digital technologies in the activities of organizations to improve efficiency, transparency, and value provision (Phornlaphatrachakorn & Kalasindhu, 2021). This also covers cloud-based accounts systems, blockchain to securely record transactions, automated reporting applications, and real-time analytics in the case of financial reporting. (Md Shakil et al., 2022). The TOE framework suggests that the technological context offers the structure of digital transformation, the organizational context defines the ability of the firm to adopt these technologies, and the environmental context encompasses regulatory demands and market forces that promote the adoption. (Min & Kim, 2024). In terms of agency theory, digital transformation enhances the power of internal controls, diminishes the possibility of managerial opportunism, and enhances information disclosure, which alleviates agency conflicts. (Rehman, 2022). Digitalized reporting processes enhance timeliness, accuracy, and access to financial information, and minimize information asymmetry between managers and investors. (Alonge et al., 2024). Digital transformation in Saudi Arabia is consistent with the goals of Vision 2030, which encourages the modernization of capital markets, improved corporate governance, and increased investor confidence. (Alhazmi et al., 2025; Yousif Alsharidah & Alazzawi, 2020). It has been empirically found that the digitalization of reporting systems results in better financial disclosure that is more reliable, transparent, and timely. (Md Shakil et al., 2022; Stein Smith, 2018). On this ground, the proposed hypothesis of the study is as follows:

H2: Digital transformation initiatives have a positive and significant effect on financial reporting quality in Saudi-listed firms.

5. Methodology

5.1. Research design

This study adopts a quantitative, explanatory research design and empirically tests the relationship between technological adoption (AI and digital transformation) and financial reporting quality (FRQ) among firms listed on the Saudi Stock Exchange (Tadawul). Quantitative approach is appropriate as it permits the use of objective numerical corporate data contained in annual reports, financial statements, and disclosures for testing hypotheses developed from literature and the conceptual framework. (Abdelrahman et al., 2024a). Specifically, the explanatory design allows for the testing of cause-and-effect relationships through the existence of significantly higher FRQ levels in firms that implement AI technologies and digital transformation practices versus those that do not adopt these practices. (Artene et al., 2024). Therefore, by including firm- and year-fixed effects, the design also controls for unobserved heterogeneity across firms and macroeconomic shocks that otherwise could bias results. This design assures robustness, replicability, and generalizability of findings in the context of the Saudi market under rapid digital transformation and transformation of financial sectors in accordance with Saudi Vision 2030 (Alhazmi et al., 2025; Yousif Alsharidah & Alazzawi, 2020).

5.2. Population and sample

The sample of this study consists of all non-financial Saudi Stock Exchange (Tadawul) listed companies between 2019 and 2024, which were years that encompass recent economic reform and digital initiatives as part of the Saudi Vision 2030. This sample does not contain the financial services industry (including banks and insurance companies) due to their special reporting requirements and regulatory environments (Abdelrahman et al., 2024b). Moreover, companies that are not fully accounted for and disclosed in terms of technological undertakings are also locked out from enhancing data credibility (A. A. Adam et al., 2024). The final sample comprises 120 firms derived under purposive sampling, giving an unbalanced panel data set of the five-year period (Adam et al., 2024). This size is adequate to make sure that the panel regression analysis has good statistical power, and that the findings are representative of the market (Abdalla et al., 2024b). The chosen companies can be viewed as a suitable setting to explore the effects of AI implementation and digital transformation on financial reporting quality in a developing economy during rapid digitalization, and the regulations are also changing.

5.3. Data collection

This research project mainly uses secondary data taken from various dependable sources to make it accurate and in-depth. The financial reporting data, including such measures as earnings quality, accruals, and reporting timeliness, is extracted from firms' annual reports, audited financial statements, and the database of the Saudi Stock Exchange (Tadawul) (Yousif Alsharidah & Alazzawi, 2020). Data on AI adoption and digitalization programs are collected from public corporate disclosures, press announcements, company websites, and sustainability or integrated reports. (Alhazmi et al., 2025). These sources reveal information about the depth and complexity of technology use in the firms. In addition, firm-specific characteristics such as firm size, industry classification, leverage, profitability, board size, and firm governance attributes such as independence are collected as control variables in the regression models. (Abdelrahman et al., 2024b; A. A. Adam et al., 2024). Accordingly, by combining data from several sources, the study ensures that the analysis represents both the technology adoption practices and the financial reporting quality of Saudi-listed firms and offers a solid basis for empirical testing of the proposed hypotheses.

5.4. Measurement of variables

5.4.1. Dependent variable

Financial reporting quality (FRQ) is the dependent variable that is used in this study, and it is used to describe the extent to which the firm's financial statements provide information that is necessary to assist the stakeholders in making informed decisions by making relevant decisions in time. (Habib & Jiang, 2015). The composite FRQ index is calculated using a standardization and averaging of the three most used dimensions in the literature, and is presented in a reliable and comprehensive way. (Yamen et al., 2023). The first approach is with respect to accrual quality proxies, where lower discretionary accruals are considered more indicative of high-quality reporting, using accrual quality proxies that are based on accruals. (Phornlaphatrachakorn & Kalasindhu, 2021). Second, the timeliness of reporting is reported as the days between the fiscal year-end and the release of the annual report, and multiplied by -1, so that higher scores reflect greater timeliness. (Dombrovska & Dombrovska, 2023). Third, the quality of disclosure is gauged by an IFRS compliance checklist supplemented with a voluntary disclosure scoring index on a scale of 0 to 1 (Ilmu Keuangan dan Perbankan et al., 2024). Thus, a combination of these three dimensions into a single composite index will allow the study to not only capture the accuracy of reported numbers, but also the timeliness and transparency with which firms report financial information. This multi-dimensional strategy is particularly significant in the Saudi context, which is experiencing mounting pressure on the part of regulating bodies and other stakeholders to achieve international standards and higher levels of transparency that are congruent with the Vision 2030 targets.

5.4.2. Independent variables

AI Adoption (AI) is the first independent variable and represents the extent to which firms integrate artificial intelligence technologies into their accounting and financial reporting processes. (Blankespoor et al., 2025). These technologies include, but are not limited to, automated journal entries, anomaly detection in financial data, predictive analytics for forecasting, and natural language processing for generating reports. (Sriram, 2022). AI adoption is initially measured using a dummy variable, taking the value of 1 if a firm reports the use of AI in its accounting or reporting functions during the year and 0 otherwise. (Yousif Alsharidah & Alazzawi, 2020). In addition to the binary measure, an AI intensity index is developed to capture the depth, scope, and sophistication of AI utilization within each firm. The index is scaled from 0 to 1, where higher values indicate a greater degree of AI integration. (Oneshko et al., 2023b). The construction of this index involves a systematic content analysis of annual reports, sustainability reports, and corporate websites to identify explicit references to AI-related initiatives and tools. Specifically, three main dimensions are considered: (i) the number of AI tools deployed within financial reporting and accounting systems; (ii) the technological sophistication of these tools, distinguishing between basic automation functions and advanced capabilities such as machine learning, deep learning, and natural language processing; and (iii) the breadth of application, which examines whether AI is used in isolated tasks or embedded across multiple accounting functions (e.g., auditing, forecasting, risk management, reporting, and compliance) (Anantharaman et al., 2023). For example, firms utilizing machine learning models for fraud detection and internal control testing, predictive analytics for earnings and cash flow forecasts, or NLP-based tools for automated financial narrative generation receive higher index scores than firms employing only basic automated journal entries or spreadsheet-based anomaly checks. Additional consideration is given to whether the AI tools are internally developed or sourced from advanced external providers, as this may reflect differences in technological capability and commitment to innovation. (Aboelfotoh et al., 2025; Oneshko et al., 2023b). Therefore, by incorporating both qualitative and quantitative indicators, the AI intensity index provides a nuanced measure that goes beyond simple adoption. This allows the study to capture variations in the extent, quality, and strategic importance of AI integration across firms. Such differentiation is critical, as firms that invest in advanced AI tools are more likely to enhance the reliability, timeliness, and transparency of financial reporting, thereby reducing information asymmetry between managers and external stakeholders. (Adam et al., 2024).

The second independent variable is Digital Transformation (DT), which captures the more general adoption of digital technologies across a firm's financial reporting and operating processes. (Md Shakil et al., 2022). Digital transformation includes the integration of cloud-based accounting systems, enterprise resource planning (ERP) systems, blockchain technology for secure record-keeping of transactions, and automated reporting devices that make the process more efficient and transparent. (Dombrovska & Dombrovska, 2023). DT is measured using a dummy variable assigned the value of 1 if the firm declares digital transformation initiatives and 0 otherwise. (Stein Smith, 2018).

For a more granular analysis, we also develop a DT intensity index based on the number and sophistication of digital initiatives, standardized to a scale of between 0 and 1 (Adam et al., 2024). Therefore, by introducing digital transformation as the independent variable, the study examines how the modernized and digitalized processes lead to higher financial reporting quality, shorter reporting cycle, and increased transparency of disclosure in the context of Saudi listed firms. (Mukhtar Idris Abu Baker Adam, 2024).

Table 1: Variable Definitions

Variable	Acronym	Measurement / Operationalization
Financial Reporting Quality	FRQ	Composite index based on standardized measures of accrual quality, reporting timeliness, and disclosure reliability (higher values = better FRQ).
Accrual Quality	AQ	Standard deviation of discretionary accruals (Dechow & Dichev, 2002); lower values indicate higher quality.
Timeliness of Reporting	TIM	Number of days between fiscal year-end and annual report publication (multiplied by 1 so that higher values = better timeliness).
Disclosure Quality	DISC	Score derived from the IFRS compliance and voluntary disclosure checklist (0–1 scale).
AI Adoption	AI	Dummy variable (1 = firm adopts AI tools in accounting/reporting, 0 = otherwise) or index capturing AI intensity.
Digital Transformation	DT	Index (0–1) based on adoption of cloud platforms, blockchain, and digital reporting systems; alternatively, dummy variable (1 = digital initiatives adopted).
Firm Size	SIZE	Natural logarithm of total assets.
Leverage	LEV	Total debt divided by total assets.
Profitability	ROA	Net income divided by total assets.
Market-to-Book Ratio	MB	Market capitalization divided by book value of equity.
Board Independence	BIND	Proportion of independent directors to total board size.
Board Size	BSIZE	Total number of directors on the board.
Industry Fixed Effects	IND_FE	Dummy variables for industry classification.
Year Fixed Effects	YEAR_FE	Dummy variables for years (2019–2023).

6. Empirical Results

6.1. Descriptive investigation

Table 2 contains the descriptive statistics of the main variables in this study, which describe the distribution of the variables in the sample of 600 firm-year observations. The dependent variable, Financial Reporting Quality (FRQ), exhibits a mean of 0.52 and a standard deviation of 0.18, suggesting that, on average, the sample of Saudi-listed firms exhibits moderate levels of reporting quality while some variability across firms does exist. Minimum and maximum values (0.10 and 0.90, respectively) indicate that some firms show very low reporting quality while others show very high reporting quality, indicating heterogeneity in the compliance and disclosure practices. For the independent variables, the mean and standard deviation for AI adoption (AI) are 0.43 and 0.23, which suggests that less than half of the firms sampled have installed AI technologies in their accounting and reporting functions. The scale from 0.00 to 1.00 indicates that some firms have completely embraced AI tools, while others have not even approached AI implementation. Similarly, the mean and standard deviation of Digital Transformation (DT) are equal to 0.48 and 0.21, indicating that approximately half of the companies have implemented digital reporting initiatives with a large variance across the sample.

Among the control variables, firm size (Size), measured as the log of total assets, has a mean of 15.20 and a standard deviation of 1.45, which signals a mixture of small to large firms in our data. The means for the ratios Return on Assets (ROA) and Leverage (Lev) are 0.08 and 0.42, indicating a moderate use of debt and an average profitability of firms. The market-to-book ratio (MB) equals 1.85 on average, reflecting the fact that the market value exceeds the book value of many firms, reflecting either growth prospects or investor optimism. As for governance variables, Board Independence is 0.47 on average, which means that almost half of the members of the board are independent directors, as per the best practices for company governance. Board Size has a mean of 8.90, indicating that the boards sampled are of intermediate size, with some firms having as few as 5 directors and others up to 15 directors. Finally, the descriptive statistics show that there is adequate variation in the dependent and independent variables as well as in firm characteristics to serve as a good basis for regression analysis. Given the prevalence of AI and DT adoption and the variability in technology used by the sample, we believe that our sample is representative of the technology differences that can be used to explore the effects of such technology on financial reporting quality.

Table 2: Descriptive Investigation

Variable	Mean	Std. Dev.	Min	Max	Obs
FRQ	0.52	0.18	0.10	0.90	600
AI	0.43	0.23	0.00	1.00	600
DT	0.48	0.21	0.00	1.00	600
Size	15.20	1.45	12.10	18.90	600
Lev	0.42	0.19	0.05	0.88	600
ROA	0.08	0.05	-0.12	0.20	600
MB	1.85	0.90	0.50	4.90	600
Board Indep	0.47	0.12	0.20	0.75	600
Board Size	8.90	2.10	5.00	15.00	600

6.2. Correlation matrix

Table 3 shows the Pearson correlation coefficients between the core variables, which serve as preliminary information for understanding the relationship among AI adoption, digital transformation, and financial reporting quality (FRQ). It is observed that both AI adoption ($r = 0.32$, $p < 0.01$) and Digital Transformation ($r = 0.29$, $p < 0.01$) significantly and positively correlated with the dependent variable (FRQ). These results offer preliminary evidence on the proposed positive correlations, indicating that firms that introduce AI technologies or develop digital reporting programs have a higher likelihood of engaging in better financial reporting. Among the control variables, firm size (Size) is positively associated with FRQ ($r = 0.15$, $p < 0.05$), suggesting that larger firms are more likely to maintain higher reporting quality, possibly because of higher resources, regulatory scrutiny, and stakeholder expectations. Return on Assets (ROA) indicates a positive

relation to FRQ ($r = 0.25$, $p < 0.01$), which also implies that more profitable firms prepare better quality financial reports. The market-to-book ratio (MB) is positively associated with FRQ ($r = 0.22$, $p < 0.01$), suggesting that firms of higher growth expectations or market valuation have better reporting practices.

Conversely, leverage (Lev) is negatively associated with FRQ ($r = -0.10$, $p < 0.10$), indicating that firms with higher debt loads may experience stronger pressures to engage in financial reporting, which can negatively impact quality. Board independence and board size are both positively related to FRQ at lower levels of significance ($r = 0.11$, $p < 0.10$; $r = 0.13$, $p < 0.05$), suggesting that governance mechanisms may contribute to the improvement of reporting quality, but to a smaller extent than AI or DT. The correlation between AI and DT ($r = 0.41$; $p < 0.01$) shows that firms that invest in AI are more likely to also invest in general digital transformation, which may indicate complementarities when using the two technologies together. Importantly, all the correlations fall below 0.50, indicating that multicollinearity is not likely to be a major issue for future regression analyses. Overall, the correlation analysis lends preliminary empirical evidence for hypotheses H1 and H2 and shows that there are positive relationships between technological adoption (AI and DT) and financial reporting quality; moreover, firm size, profitability, and governance characteristics play a significant role in explaining FRQ differences.

Table 3: Correlation Matrix

Variables	FRQ	AI	DT	Size	Lev	ROA	MB	Board Indep.	Board Size
FRQ	1.000								
AI	0.32***	1.000							
DT	0.29***	0.41***	1.000						
Size	0.15**	0.21***	0.19***	1.000					
Lev	-0.10*	-0.05	-0.08	-0.12*	1.000				
ROA	0.25***	0.14**	0.12**	0.20***	-0.31***	1.000			
MB	0.22***	0.10*	0.11*	0.09	-0.18***	0.30***	1.000		
Board Indep	0.11*	0.08	0.09	-0.05	0.03	0.05	0.04	1.000	
Board Size	0.13**	0.06	0.07	0.33***	-0.02	0.04	0.03	0.15**	1.000

6.3. Regression results

Table 4 shows the regression outcomes of analyzing the direct impact of AI adoption (AI) and digital transformation (DT) on financial reporting quality (FRQ), and is conditioned by firm size, leverage, profitability, market-to-book ratio, and board characteristics, industry, and year fixed effects. Model 1 tests hypothesis H1, which evaluates the impact of the adoption of AI on FRQ. The coefficient of AI is 0.185 and is very substantial ($p < 0.01$), which means that the higher the financial reporting quality of firms that incorporate AI technologies in their accounting and reporting practices, the higher the rates of non-adopters. The factors that are positively associated with FRQ and are significant ($p < 0.05$) include firm size (0.048, $p < 0.05$) and ROA (0.210, $p < 0.01$), or the bigger and more profitable a company is, the more likely it is that the quality of financial statements will be higher. The relationship between board size and leverage is slightly significant (0.021, $p < 0.10$), and the association between board size and reporting is negative (-0.072, $p < 0.10$). The model describes about 41.2% of the difference in FRQ (Adj. $R2 = 0.412$).

Model 2 tests hypothesis H2, which is concerned with the impact of digital transformation on FRQ. The coefficient of DT is 0.162, which is statistically significant at the 1% level and means that the quality of financial reporting is higher when the firm has implemented digital reporting and operational technologies. Control variables are of a similar sign and significance level as in Model 1, and the model explains 39.8% variation in FRQ (Adj. $R2 = 0.398$). Model 3 incorporates AI and DT together to have a joint influence. The two variables are positive and significant, with coefficients that are 0.142 and 0.119, respectively ($p < 0.01$), indicating that each of the technological initiatives can independently improve the quality of reporting. When both predictors are added, the adjusted R2 improves by a factor of 0.455, which is a better fit.

In addition to the main explanatory variables, the control variables offer additional insights into factors influencing FRQ. Firm size and profitability show positive effects, reflecting greater regulatory scrutiny, resource availability, and signaling incentives among larger and more profitable firms. Leverage has a negative effect, consistent with agency theory, as highly leveraged firms may face greater incentives for opportunistic reporting to meet debt covenants. Market-to-book ratio positively relates to FRQ, indicating that firms with stronger growth prospects emphasize transparent reporting. Board size and independence show modest positive effects, suggesting governance structures support better oversight, though their influence is smaller than technology-related factors.

Table 4: Regression Results

Variables	Model 1	Model 2	Model 3
AI	0.185***		0.142***
DT		0.162***	0.119***
Size	0.048**	0.051**	0.047**
Lev	-0.072*	-0.069*	-0.063
ROA	0.210***	0.205***	0.198***
MB	0.057**	0.052**	0.049**
Board Indep	0.033	0.029	0.030
Board Size	0.021*	0.019	0.020
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	600	600	600
Adj. R^2	0.412	0.398	0.455

7. Conclusion

The study analyzed how the adoption and digital transformation (DT) of artificial intelligence (AI) can positively impact the quality of financial reporting (FRQ) of Saudi-listed companies. Combining the Technology-Organization-Environment (TOE) model and Agency Theory, the analysis offers solid empirical support that adoption of AI tools and digital technologies can greatly enhance financial reporting accuracy, reliability, and timeliness. AI usage helps automate and routine accounting tasks, detect signs of anomalies, and enhance predictive analytics to reduce the occurrence of errors and enhance transparency. In the same vein, digital transformation initiatives, like blockchain, cloud-based reporting systems, and real-time systems, will improve the efficiency of reporting, reduce information asymmetry, and

strengthen global standards. The results show that both AI and DT positively and significantly affect FRQ, which proves the hypotheses presented. Noteworthy, the results also show that these technologies are complementary, and their combination yields more intense effects compared to their use alone. This underscores the strategic significance of adopting an integrated technology by companies that aim to improve the credibility of their reporting. This study, by offering evidence presented in the Saudi Stock Market, adds to further discussion in the body of literature on accounting and information systems, especially on the relevance of emerging technologies in developing and transitional economies' financial reporting practices.

This study makes threefold contributions. First, it contributes to the theoretical discourse by implementing the use of the TOE framework alongside the Agency Theory in the Saudi context and demonstrating how the three dimensions of technology, organization, and environment interact to affect the financial reporting performance. Second, it deepens the empirical research through the provision of evidence in an emerging market that is changing rapidly due to Saudi Vision 2030, which is focused on digitalization, transparency, and investor confidence. Third, it offers useful advice to managers, regulators, and policymakers. The findings illustrate to managers the strategic value of investing in AI and digital transformation to improve reporting practices and build trust with stakeholders. As a regulator, the research highlights the importance of promoting and encouraging the use of digital to ensure that companies are in tandem with the global best practices. The findings are important to investors because the evidence suggests that the technologically advanced businesses are in a better position to publish credible, timely, and decision-useful financial data that enhances capital market efficiency.

While the study focuses on Saudi-listed non-financial firms, the findings have broader implications for other emerging markets and sectors. Many developing economies share similar institutional characteristics, such as evolving regulatory environments, limited technological infrastructure, and capacity-building challenges, which suggests that AI and digital transformation may play comparable roles in improving financial reporting quality elsewhere. However, generalizing these results requires caution, as contextual factors such as regulatory enforcement, cultural attitudes towards technology, and availability of skilled expertise may differ across countries. Beyond the non-financial sector, industries such as banking, insurance, and healthcare could also benefit from AI and digital innovations, though these sectors often face distinct regulatory and operational complexities. Potential barriers to wider technology adoption include the high upfront cost of implementation, the shortage of skilled professionals with AI expertise, cybersecurity concerns, and resistance to organizational change. Addressing these barriers through targeted policy incentives, capacity-building programs, and supportive regulatory frameworks could help extend the benefits observed in this study to other contexts. Future research could examine comparative evidence across multiple emerging economies or explore sector-specific dynamics to validate and extend these insights.

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