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Investigating the Moderating Role of AI in the Relationship Between Corporate Governance and Financial Performance: Evidence from Palestine

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Abstract: Objective: This study aims to examine the effect of corporate governance (CG) mechanisms on the financial performance (FP) of firms listed on Palestine exchange (PEX) over the period 2015–2024. It also assesses the AI moderating role in this relationship. **Method:** Fixed effects panel regression was adopted for testing the study hypotheses, as it allows for controlling unobserved and time invariant characteristics for each cross-sectional unit. Data were collected from the annual reports of 36 listed firms, while Stata 19 and MAXQDA 24 software were used for regression analysis and for measuring AI adoption through content analysis. **Results:** The study results demonstrate that board size, meeting frequency, audit and governance committees, Big 4 auditors, and board financial expertise positively affect ROA. In contrast, board education level, board independence, and gender diversity didn't show any impact. Our findings also indicate that AI positively affects the FP, and it selectively moderates the relationship by enhancing the impact of both gender diversity and board education, while weakening the effect of board meetings. Other interactions are not statistically significant. **Conclusion:** The study highlights AI as a dynamic tool that reshapes CG effectiveness in the emerging markets and providing evidence to guide boards and policymakers to optimize AI integration while considering institutional and digital maturity. **Recommendations:** This study recommends that Palestinian policymakers and corporate boards integrate AI into corporate governance mechanisms to enhance their effectiveness and improve firms' financial outcomes.

Keywords: Corporate governance, Financial performance, AI, PEX

دراسة الدور المُعدِّل للذكاء الاصطناعي في العلاقة بين حوكمة الشركات والأداء المالي: دليل من فلسطين

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الملخص: الهدف: تهدف هذه الدراسة إلى فحص أثر آليات حوكمة الشركات على الأداء المالي للشركات المدرجة في بورصة فلسطين، مع التركيز بشكل خاص على الدور المُعدِّل للذكاء الاصطناعي خلال الفترة 2015–2024. **المنهجية:** تم اعتماد نموذج الانحدار اللوحي ذو التأثيرات الثابتة لاختبار فرضيات الدراسة، لما يتيحه من إمكانية التحكم في الخصائص غير المرصودة والثابتة زمنياً لكل وحدة مقطعية. جُمعت البيانات من التقارير السنوية لـ 36 شركة مدرجة في بورصة فلسطين واستخدم برنامج Stata 19 لإجراء التحليل الاحصائي، في حين استُخدم برنامج MAXQDA 24لقياس تبنّي الذكاء الاصطناعي من خلال تحليل المحتوى. **النتائج:** تُظهر النتائج أن حجم مجلس الإدارة، وتكرار الاجتماعات، ووجود لجان التدقيق والحوكمة، والاستعانة بشركات التدقيق الأربع الكبرى (Big 4) ، والخبرة المالية لأعضاء مجلس الإدارة، تؤثر إيجابياً في معدل العائد على الأصول. في المقابل، لم يُظهر مستوى التعليم لأعضاء المجلس، أو استقلالية المجلس، أو التنوع الجندري أثراً ذا دلالة إحصائية. كما تشير النتائج إلى أن الذكاء الاصطناعي يؤثر إيجابياً في الأداء المالي، ويلعب دوراً مُعدِّلاً انتقائياً من خلال تعزيز أثر كل من التنوع الجندري ومستوى تعليم مجلس الإدارة، في حين يُضعف أثر اجتماعات المجلس. أما التفاعلات الأخرى فلم تكن ذات دلالة إحصائية. **الاستنتاجات:** تسلط الدراسة الضوء على الذكاء الاصطناعي كأداة ديناميكية تعيد تشكيل فعالية حوكمة الشركات في الأسواق الناشئة، وتقدم دليلًا عمليًا لصانعي السياسات ومجالس الإدارة لتعظيم الاستفادة من دمج الذكاء الاصطناعي مع مراعاة ظروف المؤسسات ونضجها الرقمي. **التوصيات:** توصي هذه الدراسة بأن يقوم صانعو السياسات الفلسطينية ومجالس إدارات الشركات بدمج الذكاء الاصطناعي في آليات حوكمة الشركات لتعزيز فعاليتها وتحسين النتائج المالية للشركات.

الكلمات المفتاحية: حوكمة الشركات، الأداء المالي، الذكاء الاصطناعي، بورصة فلسطين

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Introduction

Corporate governance (CG) is one of the essential issues that impacts financial markets' efficiency and achieving sustainable institutional progress, especially in light of the constant changes and increased competition within the global economy (Dang & Nguyen, 2024). According to the OECD, CG refers to "a set of relationships between a company's management, board, shareholders, and stakeholders. CG also provides the structure and systems through which the company is directed, and its objectives are set, and the means of attaining those objectives and monitoring performance are determined" (OECD, 2023).

Despite the prominent role of CG, its relationship with financial performance (FP) is not constant or uniform across different economic environments because it can be influenced by numerous contemporary contextual and institutional factors, including the digital and technological environments in which companies operate (Miao et al., 2023). Recent digital transformations, particularly over the past decade have demonstrated a radical shift in CG and decision-making approaches in the recent business environment due to the artificial intelligence emergence which has become a central technology in data analysis and operational performance monitoring (Cui et al., 2022). AI refers to the digital systems that can simulate intelligent human behavior, such as learning, analysis, prediction, and interaction with the environment (Xu & Xu, 2022).

However, integrating AI technologies into the traditional governance framework has different challenges as it imposes new requirements on boards of directors with regard to the technological skills, and addressing privacy and ethics issues (Hameed & Sanad, 2025). Recently, scholars have shown increased attention to exploring the correlation between CG, FP, and AI. However, most of them have either concentrated on the direct relationship between CG and AI or explored AI in the context of improving FP without a clear link to the CG frameworks. For example, Shiyyab et al. (2023) performed research on the impact of AI on FP, while Cui et al. (2022) investigated the influence of AI on CG. So, empirical research assessing the moderating role of artificial intelligence remain rare, particularly in emerging markets such as Palestine, where, to the researchers' best knowledge, there are no studies that have analyzed how the interaction between CG and AI affects the FP.

From this context, we conclude an important research gap that needs to be filled by conducting a comprehensive analysis of this interaction. The significance of this study lies in its analysis of whether AI adoption is a moderating factor affecting the strength or direction of the relationship between CG mechanisms and the FP of companies listed on Palestine exchange over the period from 2015 to 2024. This topic is particularly important in the Palestinian context due to institutional fluctuations in the financial market and the growing shift toward digital transformation despite limited technological infrastructure and AI regulations.

Theoretical framework

CG mainly focuses on addressing the challenges that result from the separation of ownership and management by minimizing conflicts of interest (Al-Faryan, 2024). With the increased utilization of AI tools, the interpretation of the link between CG and FP has become more complex, necessitating a comprehensive theoretical perspective (McBride et al., 2022). Hence, this study depends on three main theories which are agency theory (Jensen & Meckling, 1976), resource-based view theory (Barney, 1991),

and resource dependence theory (Pfeffer & Salancik, 1978).

Agency theory which was proposed by Jensen and Meckling in 1976 is based on the idea that each party has its own interests and that the agent may look for maximizing their personal benefit at the cost of principal's interests, especially in the companies where the ownership is separated from management. This conflict however, leads to an agency problem (Jensen & Meckling, 1976). Resource dependence theory, introduced in 1978 by Pfeffer and Salancik underlines the importance of the interaction between company and its external environment (Alkhuzaim et al., 2022). According to this perspective, the board of directors' role is not limited to oversight but also extends to enhancing the company's ability to attract strategic resources by establishing effective external relationships and networks (Pfeffer & Salancik, 1978).

From an internal perspective, explaining the differences in firm performance requires more focus on the distinctive capabilities that each company possesses, especially those that are not easy for competitors to imitate such as technological advancement, and this was explained by the resource-based theory developed by Barney in 1991 (Helfat et al., 2023; O'Shannassy, 2008) . This theory states that firms that own rare and valuable resources are in a better position to accomplish higher performance outcomes (Barney, 1991).

Literature review

Corporate governance and firm financial performance

Recent literature suggests a fundamental relationship between various mechanisms of CG and the performance of organizations, particularly in financial terms. However, the tendency and strength of this can vary based on the governance characteristics and institutional circumstances. For instance, some studies, such as Brahma et al. (2020) and Schillemans and Bjurstrøm (2020) showed a positive impact of the size of the board and gender diversity on the company's profitability.

Another factor that can affect the corporation's performance is board independence. An increase in independent members can significantly contribute to improving FP as confirmed in the research conducted by Awad et al. (2024) about banks in the North Africa and Middle East. Contemporary research also considers the educational level of board members as an important indicator for good CG. A study of Basalat et al. (2023) determined a significant positive relationship between the qualifications of board members and both ROA and ROE in Jordanian and Palestinian listed firms. Regarding the number of board meetings, previous studies showed mixed results. Hossain and Oon (2022) indicated that frequent meetings enhance performance in Indonesia but not in Germany.

With respect to the auditing systems quality, studies show a positive impact of some factors, such as audit committee existence and collaboration with the Big 4 auditing firms on companies profitability and market value (Anik et al., 2021; Mahrous & Moussa, 2025). Some literature also points out the importance of other committees, including the governance committee. A study conducted by Friede et al. (2015) demonstrated that governance committee presence is strongly correlated with better FP.

Finally, the researchers examined how the financial experience of board members can effectively improve FP. For example, Dwekat et al. (2025) and Musallam (2020) showed that diverse experiences, particularly in accounting and finance are positively linked to the organizational outcomes. Accordingly, we assume the following main and sub hypotheses:

H1: CG has a significant positive influence on FP.

H1a: The size of the board positively affects FP.

H1b: Board meetings positively impact the FP.

H1c: Board independence has a significant positive influence on FP.

H1d: Gender diversity positively impacts the FP.

H1e: Existence of the audit committee positively influences the FP.

H1f: Governance committee positively affects the FP.

H1g: Big 4 auditor has a positive influence on FP.

H1h: Educational level of the board positively affects the FP.

H1i: Board financial expertise has a positive effect on FP.

Artificial intelligence and firm financial performance

AI is witnessing a rapid growth in its function in the modern business environment as a result of the many benefits it can provide to organizations such as better decision-making and contributions to long-term financial sustainability (Xu & Xu, 2022) . Numerous studies have dealt with the benefits AI technologies can bring to different economic sectors. These studies confirm that the use of advanced AI tools such as machine learning systems and robotics has contributed significantly to the enhancement of operational efficiency by optimizing the operations flow and automating routine tasks, which has a positive effect on the FP of companies (Dias & Lauretta, 2024). Across banking and financial sectors, a study by Baker et al. (2023) found that the employment of AI in the firms various departments positively affects total deposits and net profits, thereby enhancing banks FP. Additionally, Xu and Xu (2022) argued that there is a direct relationship between AI and FP indicators including ROA and ROE.

At the emerging markets level, a study of Rao et al. (2024) on Indian banks shows that their FP improved significantly after the adoption of AI, with ROE being one of the most affected indicators. In terms of the risk management and operational efficiency, the use of AI contributes to reducing lending losses and enhancing the security of payment transactions, which directly impacts FP and institutional stability (Cherish et al., 2025; Königstorfer & Thalmann, 2020). Based on that, we hypothesize the following:

H2: AI is positively associated with FP.

Artificial intelligence as a moderator

AI tools are no longer viewed only as a supporting technological instrument, but have emerged as a powerful force that impacts organizational structure and governance mechanisms. It can also affect the decision-making processes, control systems, and financial outcomes for businesses (Mutitu, 2024). Despite the limited number of quantitative studies that have directly examined how FP is affected by the interaction between AI and CG, growing empirical evidence points out that integrating AI into CG frameworks can enhance board effectiveness, maximize risk management efficiency, and improve decision-making quality, which positively impact FP (Ahmed et al., 2024).

A study conducted by Shaban and Omoush (2025) showed that AI enhances regulatory compliance and diminishes the human errors which may occur in financial reporting. Cheng et al. (2025) explained that its role extends to improving internal governance, control, and resource management. However, the results of Gouiaa and Huang (2024) and Cui et al. (2022) illustrate that the strengthening of the positive influence of certain CG characteristics, including the size of the board, ownership

structure, and diversity on innovation and organizational performance is strongly associated with AI use. In the same context, Akhtar (2025) suggests that the interaction between AI and board size demonstrated a positive influence on FP, noting that its impact remains varied when other governance mechanisms are adopted. Accordingly, we formulate the following hypotheses:

H3: AI strengthens the association between CG and FP.

H3a: AI strengthens the association between board size and FP.

H3b: AI strengthens the association between board meetings and FP.

H3c: AI strengthens the link between board independence and FP.

H3d: AI strengthens the link between the diversity of gender and FP.

H3e: AI strengthens the relationship between the audit committee and FP.

H3f: AI strengthens the association between the governance committee and FP.

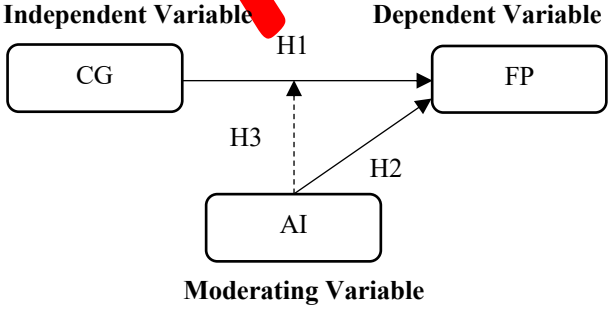
H3g: AI strengthens the association between Big 4 auditors and FP.

H3h: AI strengthens the link between board education and FP.

H3i: AI strengthens the association between board financial expertise and FP.

Based on the previous literature, the conceptual framework was formed as illustrated in Figure 1.

Figure (1): Conceptual framework



Methods

Study Design: Our study employs a quantitative explanatory design for assessing the influence of CG mechanisms on firm FP, as well as AI moderating role. A panel data approach was employed because it enables the simultaneous examination of firm specific variations and time related effects within the sample.

Study Sample: Our study covers all companies listed on Palestine exchange (PEX), which are 48 firms during the period 2015-2024. To make sure that our results are reliable, we excluded the firms listed after 2015 and those with incomplete or insufficiently disclosed data. Accordingly, a total number of 36 firms were included with 360 observations. In Table 1, we represent the study sample, which contains five major sectors to ensure sectoral diversity and representativeness.

Table (1): Sample summarization

Sectors	No. of companies	Percentage
Banks	6	17%
Insurance	7	19%
Service	5	14%
Industry	10	28%
Investment	8	22%
total	36	100%

Collecting Data: The secondary data were obtained based on annual reports disclosed by the companies and the official website of the PEX. FP data were obtained through the published annual financial statements, while CG variables were derived from the CG information included in the annual reports. By using MAXQDA 24 software, we gathered the information regarding the AI variable through the annual reports' content analysis, where the frequency of the terminologies related to AI mentioned in each report was calculated.

Variables Measurement: This study adopted the return on assets (ROA) as the dependent variable, which was measured by dividing net income after tax by total assets

(Fajriah et al., 2022). However, this variable was chosen solely because it is less sensitive to market fluctuations and accurately reflects the managerial efficiency of companies compared to other measurements (Kamruzzaman, 2019).

CG, as the independent construct was represented by nine variables, including board size (Abdelkarim & Zuriqi, 2020), board meeting frequency (Abdullah & Tursoy, 2023), board independence (Safitri & Nani, 2021), gender diversity (Chang et al., 2024), existence of an audit committee (Abdelhak & Hussainey, 2025), existence of governance committee (Grau et al., 2025), big 4 auditing firms (Handayati et al., 2025), board education level (Barakat et al., 2020), and board financial expertise (Masud et al., 2019). Artificial intelligence, measured by the number of terms associated with AI that were mentioned in each annual report was included as a moderating variable. In accordance with prior studies, such as Shiyyab et al. (2023), and Xu and Xu (2022), this indicator captures the relative intensity of AI-related disclosure without normalizing it by the length of the reports. The classification of terms associated with AI is reported in Table 2.

To control the external elements that might impact the association between CG and FP, three control variables were included: firm size (Singh et al., 2023), firm age (Shawat et al., 2024), and financial leverage (Basalat et al., 2023). Table 3 summarizes the study variables and their measurement method.

Table (2): Classification of AI-related disclosure terms

Category	Keywords
Digital orientation, transformation initiatives, and technological foundations	Digital platform, smart website, technology platform, digital infrastructure, advanced technologies, advanced technology, modern technology, digital technology, digital transformation, digital economy, and digital culture.
AI-enabled solutions, digital service offerings, and operational processes	Artificial intelligence, robotic automation, robot/robotics, financial technology (fintech), digital services, electronic services, electronic banking services, internet banking, mobile services, mobile payment, electronic wallet, mobile ATM, and mobile branch.
Information protection, cyber risk exposure, and security-related concerns	Information security, information technology security, cybersecurity, cyberattacks, cyber risks, security vulnerabilities, and information security breaches.

Table (3): Variables description

Variables	Measurement
Dependent Variable	
ROA	Net income after tax / total assets
Independent Variables	
BODSIZE	The number of board members
BODMEET	Number of board meetings held per year
BODIND	Independent members number / total board members
GENDIV	1 if at least one female director sits on the board, 0 if not
AUDCOM	1 if audit committee exists, 0 if not
GOVCOM	1 if governance committee exists, 0 if not
BIG4AUDI	1 if the auditor is from the big 4, 0 if not
BODEDU	Board members holding postgraduate degrees / total board members
BODFIN	Board members with financial or accounting expertise / total board members
Moderator Variable	
AI	Frequency of terms related to AI in the annual reports
Control Variables	
FISIZE	Ln (Total Assets)
FIAGE	Ln (Firm age)

Statistical Analysis: Before estimating the study model, the Z-score method was applied to detect potential outliers in the study variables. Observations with absolute Z-scores exceeding ± 3 were considered outliers according to the recommendations of Hair et al. (2019). The examination revealed some outliers in the variables ROA, BODMEET, BODFIN, AI, and FIAGE. To diminish the effect of the extreme outliers, a winsorization

procedure at 1% and 99% levels was utilized to selected variables.

For the purpose of testing the proposed hypotheses, a panel regression approach was used. However, this methodology is suitable in the current study because it allows for controlling unobserved and time invariant characteristics for each cross-sectional unit. This can also reduce the problem of omitted variable bias and contribute to increased efficiency in statistical estimation compared to traditional regression models (Gujarati & Porter, 2009; Wooldridge, 2010). For selecting the proper panel regression model, we conducted Breusch Pagan Lagrange Multiplier (LM) and Hausman tests for choosing between pooled OLS, fixed, and random effects. According to the LM result, the pooled OLS model was rejected (LM = 312.77, p = 0.000), indicating the existence of firm-level effects. In addition, the Hausman test confirmed the preference for the fixed effects model over the random effects specification (χ^2 = 40.643, p = 0.009), proposing that the unobserved heterogeneity on firm level is associated with the explanatory variables. Explanatory power of the model is 42.4% as R^2 = 0.424. Equation 1 presents the econometric specification used in this study.

Equation (1): Panel regression model

$$ROA_{it} = \beta 0 + \beta 1\ BODSIZE_{it} + \beta 2\ BODMEET_{it} + \beta 3\ BODIND_{it} + \beta 4\ GENDIV_{it} + \beta 5\ AUDCOM_{it} + \beta 6\ GOVCOM_{it} + \beta 7\ BIG4AUDI_{it} + \beta 8\ BODEDU_{it} + \beta 9\ BODFIN_{it} + \beta 10\ AI_{it} + \beta 11\ (AI_{it} \times BODSIZE_{it}) + \beta 12\ (AI_{it} \times BODMEET_{it}) + \cdots\cdots + \beta 19\ (AI_{it} \times BODFIN_{it}) + \beta 20\ FISIZE_{it} + \beta 21\ FIAGE_{it} + \beta 22\ LEV_{it} + \alpha_i + \lambda_t + \epsilon_{it}$$

Where, β is the intercept, i expresses the firm, t represents the year, αi is firm fixed effects, λ_t captures year fixed effects, and ϵ_{it} is the error term.

Several diagnostic tests were also conducted after the model estimation as shown in Table 4. The Wooldridge test indicated the existence of serial correlation (F = 10.525, p = 0.0026), while the Modified Wald test revealed heteroskedasticity across firms (χ^2 = 7261.570, p < 0.001). In contrast, Pesaran's cross-sectional dependence assessment revealed no evidence of cross-sectional dependence (CD = −1.435, p = 0.1513). Based on these results, clustered robust standard errors at the firm level were employed to correct both serial correlation as well as heteroskedasticity in the estimated model.

Results

Descriptive Statistics: The summary statistics for all variables in our study based on 360 firm-year observations are presented in Table 5. The results denote that the mean ROA was 2.6%, with values ranging from −18.9% to 20.1%. This result however reflects a noticeable variation in FP across firms over time. Regarding CG variables, the average board size reached around 8.8 members, and this is common in the governance structures of emerging markets according to Khan et al. (2024). Descriptive statistics additionally reveal that the board of directors meets on average about six times a year, indicating a moderate level of board activity. The table also illustrates that the percentage of the independent directors is 55%. This however demonstrates a relatively balanced level of board independence. With regard to the board composition, gender diversity is observed in approximately 52.5% of the firms, while audit and governance committees exist in around 82% and 78% of the observations, respectively. However, we observed an increase in the percentage of companies audited by the Big 4 firms, reaching 70 percent. Board members holding postgraduate degrees averages 35.6%. Meanwhile, those members with financial or accounting expertise represent approximately

22.2% of the total members. The average of AI variable was 4.6 with considerable dispersion which suggests a heterogeneity in firms' engagement with AI-related disclosures. Finally, firm size and firm age show reasonable variation, while leverage averages 52.6%, which reveals a moderate reliance on debt financing. Overall, the descriptive statistics suggest sufficient variability across all variables, hence supporting their suitability for subsequent panel regression analysis.

Table (4): Model diagnostics

Test	Statisti	p-value	Result
Wooldridge test	10.525	0.0026	Yes
Modified Wald test	7261.57	0.0000	Yes
Pesaran's CD test	-1.435	0.1513	No

Correlation Analysis: In order to assess the direction and strength of the association between the study variables, as well as checking the problem of multicollinearity, the correlation matrix was calculated as shown in Table 6. The correlation analysis suggests that ROA is positively and significantly correlated with several CG mechanisms, including board size ($r = 0.088$, $p < 0.10$), frequency of the meetings ($r = 0.164$, $p < 0.01$), board independence ($r = 0.192$, $p < 0.01$), governance committee existence ($r = 0.225$, $p < 0.01$), and Big 4 auditor ($r = 0.094$, $p < 0.10$). In contrast, it shows a negative connection with board education ($r = -0.109$, $p < 0.05$). Regarding the control variables, only leverage presents a negative association with ROA ($r = -0.301$, $p < 0.01$), which indicates that higher financial leverage is associated with lower FP.

The correlation between both independent and control variables was also examined to check the possibility of multicollinearity. Several CG indicators exhibit moderate positive correlations, especially between board size and board meetings, board independence, Big 4 auditing firms, and firm size. However, none of the coefficients crossed the accepted value of 0.80, supporting nonexistence of a multicollinearity problem in the model (Gujarati & Porter, 2009). This finding is additionally supported by the variance inflation factor (VIF) values which are shown in the same table, all of which are less than the threshold of 10 (Hair et al., 2019). Overall, these findings preliminarily support the hypothesized relationships and justify proceeding with multivariate panel regression analysis.

Hypothesis Testing: The study hypotheses were tested through the fixed effects regression as reported in Table 7. Based on the regression estimates, the main hypothesis proposing that CG significantly affects FP is partially supported. Specifically, board size demonstrates a significant positive association with ROA at 5% significance level. Similarly, board meeting frequency positively influences the FP ($\beta = 0.015$, $t = 2.65$, $p < 0.05$). In contrast, the independence of the board does not show a statistically significant effect on ROA ($\beta = 0.034$, $t = 1.30$), thus failing to support hypothesis H1c. Likewise, gender diversity is not significantly linked to FP ($\beta = 0.000$, $t = 0.02$). Regarding board of directors committees, the presence of an audit committee shows a positive and significant association with ROA ($\beta = 0.012$, $t = 1.91$, $p < 0.10$).

The presence of a governance committee was also found to be positively linked with FP ($\beta = 0.014$, $t = 2.38$, $p < 0.05$). Audit quality which is measured by contracting with one of the Big 4 audit firms has a positive impact on return on assets at the 10% significance level ($\beta = 0.016$, $t = 1.82$). However, the education level of board members does not show any influence on FP ($\beta = 0.004$, $t = 0.15$). Board financial expertise demonstrates a positive relationship with ROA ($\beta = 0.033$, $p < 0.10$). Regarding the direct effect of AI on FP, we found that AI significantly and positively affects ROA ($\beta = 0.005$, $t = 1.92$, $p < 0.10$). Hence, we accept the

second hypothesis. In the context of the moderating role of AI in the relationship between CG and FP, the findings provide partial support for the third hypothesis. For example, the interaction between AI and the educational level of board members positively influences ROA ($\beta = 0.004$, $t = 2.09$, $p < 0.05$).

Moreover, the interaction between AI and gender diversity is positive and statistically significant ($\beta = 0.001$, $t = 1.81$, $p < 0.10$). Therefore, we accept hypotheses H3d and H3h. Conversely, the interaction between AI and the frequency of board meetings negatively influences the firm's FP ($\beta = -0.001$, $t = -2.32$, $p < 0.05$). This reveals that the positive impact of board meetings on FP weakens as the intensity of AI usage increases. However, the interaction coefficients involving AI with audit committee, governance committee, board size, board independence, the Big 4 auditors, and the financial expertise of board members are not statistically significant, and therefore, hypotheses H3a, H3c, H3e, H3f, H3g and H3i are not supported.

Discussion

Our results provide important evidence on the association between CG mechanisms and the FP of Palestinian listed companies. They also highlight the evolving role of AI in affecting governance effectiveness. The study findings confirm that BODSIZE and BODMEET positively affect FP, consistent with prior evidences suggesting that larger boards enhance company value and the more frequent meetings can increase the monitoring and quality of decision making (Al-Darmi, 2023; Schillemans & Bjurstrøm, 2020). In contrast, BODIND and GENDIV have shown no effect, which aligns with studies stating that some governance tools may have a limited impact in emerging economies with constrained institutional enforcement and board authority (Alsayegh & Baqeel, 2023; Dey et al., 2023). Regarding GOVCOM, AUDCOM, and BIG4AUDI variables, we found that they positively influence FP. This is supported by previous studies such as Khalid (2020) who suggested that governance committee can enhance the internal auditing effectiveness, hence, improving overall firm performance.

Table (5): Descriptive statistic

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	360	0.0260	0.0550	-0.1890	0.2010
BODSIZE	360	8.8190	2.1930	3.0000	15.0000
BODMEET	360	5.9250	1.5520	3.0000	12.0000
BODIND	360	0.5490	0.2120	0.1000	1.0000
GENDIV	360	0.5250	0.5000	0.0000	1.0000
AUDCOM	360	0.8190	0.3850	0.0000	1.0000
GOVCOM	360	0.7750	0.4180	0.0000	1.0000
BIG4AUDI	360	0.7000	0.4590	0.0000	1.0000
BODEDU	360	0.3560	0.2400	0.0000	0.8180
BODFIN	360	0.2220	0.1700	0.0000	0.8330
AI	360	4.6140	4.2240	1.0000	26.0000
FISIZE	360	18.0100	1.9890	13.4910	22.8470
FIAGE	360	2.6970	0.4500	1.3860	3.2960
LEV	360	0.5260	0.2530	0.0040	0.9310

Table (6): Correlation matrix

Variable	ROA	BODSIZE	BODMEET	BODIND	GENDIV	AUDCOM	GOVCOM	BIG4AUDI	BODEDU	BODFIN	AI	FISIZE	FIAGE	LEV	VIF
ROA	1.000														
BODSIZE	0.088*	1.000													1.439
BODMEET	0.164***	0.367***	1.000												1.352
BODIND	0.192***	0.352***	0.232***	1.000											1.307
GENDIV	-0.026	-0.071	0.098*	0.191***	1.000										1.294
AUDCOM	-0.014	0.004	-0.176***	-0.045	-0.056	1.000									1.082
GOVCOM	0.225***	-0.032	0.120**	-0.063	0.06	-0.011	1.000								1.132
BIG4AUDI	0.094*	0.131**	-0.028	0.073	-0.101*	0.055	0.068	1.000							1.209
BODEDU	-0.109**	0.062	0.114**	-0.054	0.086	-0.028	0.158***	0.280***	1.000						1.298
BODFIN	0.085	-0.01	0.03	0.023	-0.113**	0.072	0.044	0.247***	0.250***	1.000					1.195
AI	0.049	0.120**	0.118**	0.009	0.04	-0.024	0.036	0.143***	0.277***	0.110**	1.000				1.178
FISIZE	0.049	0.205***	0.171***	0.03	0.108**	-0.031	0.257***	0.196***	0.306***	0.224***	0.321***	1.000			1.832
FIAGE	0.051	0.006	-0.128**	-0.06	0.261***	0.173***	-0.126**	-0.036	0.082	0.05	0.049	-0.052	1.000		1.273
LEV	-0.301***	0.192***	0.282***	-0.009	0.049	-0.109**	0.215***	0.196***	0.242***	0.171***	0.206***	0.598***	-0.210***	1.000	1.783

*, **, *** significance levels of 10%, 5% and 1%, respectively, using 2-tailed

Notes: *ROA* is return on assets, *BODSIZE* is board size, *BODMEET* is board meetings frequency, *BODIND* is board independence, GENDIV is gender diversity, AUDCOM is audit committee existence, GOVCOM is governance committee existence, BIG4AUDI is Big 4 auditor, BODEDU is board education, BODFIN is board financial expertise, AI is artificial intelligence, *FISIZE* is firm size, *FIAGE* is firm age, and *LEV* is leverage.

Table (7): Regression analysis

Dependent variable: ROA						
	Pooled OLS		**RE**		**FE**	
	Coef.	t-value	Coef.	t-value	Coef.	t-value
BODSIZE	0.000	0.090	0.005	1.490	0.007**	2.070
BODMEET	0.013***	4.020	0.015***	2.660	0.015**	2.650
BODIND	0.032	1.600	0.032	1.210	0.034	1.300
GENDIV	-1.600	-1.600	-0.002	-0.220	0.000	0.020
AUDCOM	-0.003	-0.300	0.010	1.590	0.012*	1.910
GOVCOM	0.040***	4.830	0.018***	3.030	0.014**	2.380
BIG4AUDI	0.030***	3.090	0.016*	1.790	0.016*	1.820
BODEDU	-0.080***	-4.760	-0.018	-0.720	0.004	0.150
BODFIN	0.014	0.580	0.031*	1.720	0.033*	1.960
AI	0.004	0.820	0.005	1.570	0.005*	1.920
FISIZE	0.008***	5.100	0.003	0.850	-0.009	-0.490
FIAGE	0.005	0.860	0.007	0.640	0.015	0.800
LEV	-0.130***	-10.590	-0.096***	-5.020	-0.063**	-2.430
AI*BODSIZE	0.000	-0.330	0.000	-0.040	0.000	0.030
AI*BODMEET	-0.001	-1.320	-0.001**	-2.170	-0.001**	-2.320
AI*BODIND	0.001	0.220	0.000	0.010	0.000	-0.070
AI*AUDCOM	0.000	-0.300	0.000	0.220	0.000	0.140
AI*GOVCOM	-0.001	-0.430	0.000	0.630	0.000	0.790
AI*BIG4AUDI	-0.003	-1.390	-0.001	-0.490	-0.001	-0.480
AI*BODEDU	0.007**	2.320	0.004**	2.280	0.004**	2.090
AI* BODFIN	0.005	1.020	-0.002	-0.690	-0.002	-0.700
AI*GENDIV	0.002	1.260	0.002**	2.210	0.001*	1.810
Constant	-0.180***	-4.830	-0.185***	-2.590	-0.035	-0.140
Observations	360		360		360	
R- squared	0.398		0.412		0.424	
F-test	9.118				18.862	
Prob > F	0.000				0.000	
Prob > chi2			0.000			
Breusch–Pagan LM	LM = 312.77, p = 0.000					
Hausman test	χ^2 = 40.643, p = 0.009					

*, **, *** significance levels of 10%, 5% and 1%, respectively

Stephen et al. (2022) reported that audit committee and contracting with Big 4 auditing firms have a significant effect on ROA. In the context of BODFIN and BODEDU, only board financial expertise had a positive and significant impact. According to Lee et al. (2024), board members with accounting expertise contribute to more stable profits. Statistical analysis also shows that AI positively influences FP, as it significantly enhances the operational efficiency and improves workflows, which in turn positively affect firms' financial outcomes. This result is pointed out by Dias and Lauretta (2024).

Our study additionally assessed the effect of the interaction between AI and CG on FP. The statistical analysis suggests that AI moderates the effect of certain board characteristics on FP, either positively or negatively. On one hand, AI strengthens the impact of gender diversity and education level of board members. The research conducted by Hameed and Sanad

(2025) described that AI significantly strengthens the positive effect of female directors in improving FP. Furthermore, the increase in the education level and knowledge among board members enhances their understanding of AI tools, which positively impacts the business's performance (Colina-Morales et al., 2026). On the other hand, the effect of board meetings on FP decreased when interacting with AI. According to Black (2025), the influence of traditional CG mechanisms such as monitoring and board meetings may decline as AI tools provide faster strategic information and more accurate analyses, which can lead to a redistribution of board roles.

However, the interaction between other governance mechanisms and AI showed no effect on the FP. The absence of this impact can be justified by several factors. First, in developing economies, structural and procedural governance mechanisms tend to be less responsive to digital interventions, as their effectiveness relies more on formal rules and regulatory enforcement than on technological capabilities (Mutitu, 2024). Second, Palestine is still in the early stages of AI adoption, facing challenges such as weak regulations, limited expertise, algorithmic biases, and privacy concerns, all of which reduce the effectiveness of digital initiatives (Dudin, 2025). Finally, the Palestinian market is characterized by weak regulatory enforcement, constrained board authority, and fragile governing bodies, which further limit the responsiveness of traditional oversight mechanisms, as highlighted in both the Fragile States Index report (Pal-Think, 2023) and the OECD review on rule of law and governance in Palestine (OECD, 2022).

Conclusion

The current study intends to examine the effect of CG on the FP of companies listed on PEX, as well as the moderating role of AI in this relationship for the period of 2015 to 2024. For the purpose of statistical analysis, we used panel data regression analysis, particularly the fixed effects regression. The study results demonstrate that board size, meeting frequency, audit and governance committees, Big 4 auditors, and board financial expertise positively affect ROA. In contrast, board education level, board independence, and gender diversity did not show any impact. The findings also demonstrate that AI has a positive influence on FP and selectively moderates governance mechanisms by enhancing the influence of board member education and gender diversity, while weakening the role of board meetings. However, other interactive effects remain insignificant. The findings of our study contribute theoretically to the existing literature by filling a gap regarding the moderating role of AI in the relationship between CG and FP in the Palestinian context. It can also extend prior research by integrating agency theory, resource dependence theory, and the resource-based view theory through the conceptualization of AI as a dynamic tool that reconfigures governance effectiveness by enhancing specific board human capital resources while partially substituting procedural monitoring mechanisms. In the practical aspects, this study offers valuable insights for key stakeholders, including regulators, boards of directors, and policymakers. For example, it highlights the need to improve the existing regulatory frameworks related to AI oversight, data governance, and digital risk management, in line with institutional conditions and digital maturity levels in emerging markets. The results can also guide the boards to the importance of strengthening digital literacy and AI-related competencies through continuous training. Furthermore, the study directs policymakers in the Palestinian market towards adopting AI tools more effectively by emphasizing the need to invest in digital

infrastructure and managerial capabilities, supported by a context-aware approach that reflects the level of institutional maturity.

When explaining the outcomes of this study, various limitations should be taken into account. First, the size of the sample was limited to companies listed on PEX, which restricts the generalizability of the results to unlisted companies or other developing countries with different organizational and regulatory environments. Second, the time of the analysis was limited to the period of 2015-2024. Therefore, using longer time periods might give a deeper and more stable understanding of the link between CG mechanisms and FP. Third, the analysis was based on a single measure of FP, which is ROA without taking into consideration other financial ratios including ROE or market-based performance measures, which may make the performance measurement less comprehensive. Finally, the study concentrated on a specific set of CG mechanisms available in published annual reports and did not cover other potential mechanisms, such as the quality of disclosure and transparency as well as ownership structure. Therefore, future studies would have the potential to broaden the scope of research through larger samples, various performance measures, different governance mechanisms, and longer time spans, toward a better understanding of this relationship both in theory and practice. Furthermore, future research may extend the present study by employing alternative measures of AI that capture actual implementation rather than disclosure intensity.

Disclosure Statement

– **Thesis Statement:** This paper is partially derived from the PhD dissertation (in progress) of the corresponding author at Andhra University.

– **Ethical approval and consent to participate:** This paper was conducted based on disclosed data and it does not involve any ethical concerns.

– **Availability of data and materials:** The data that support the conclusions of this study are accessible from the corresponding author upon reasonable inquiry.

– **Author contribution:** All listed authors made significant contributions to the conception, execution and finalization of this study, and have reviewed and approved the final manuscript

– **Conflict of interest:** The authors declare the absence of any conflict of interest.

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