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-RESEARCH ARTICLE-

IMPACT OF EMPLOYEE TRAINING INVESTMENT ON FIRM FINANCIAL PERFORMANCE: EVIDENCE FROM QATAR

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—Abstract—

Employee training represents a strategic investment in human capital that can

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strengthen organisational competitiveness and contribute to sustainable financial performance. This study investigates the influence of training investment (TI) on the financial performance of non-financial firms listed on the Qatar Stock Exchange (QSE) between 2019 and 2023. TI was primarily measured as training expenditure relative to operating expenses, while training expenditure per employee was employed as an alternative measure to verify the robustness of the findings. A firm-year panel dataset was compiled from annual and sustainability reports for empirical analysis. Two-way fixed-effects panel regressions incorporating firm and year effects, together with clustered standard errors, were estimated. The results demonstrate that TI is positively associated with profitability and operational efficiency, as reflected by Return on Assets (ROA), Net Profit Margin (NPM), and Return on Equity (ROE). The observed relationships remained robust across lagged, first-difference, and sequential specifications, including models excluding extreme TI observations above the 90th percentile, as well as industry-clustered estimations and analyses based on lower industry-level TI. Overall, the evidence indicates that embedding training within routine organisational operations through continuous professional development creates measurable organisational value rather than constituting a discretionary cost. These findings further emphasise the importance of stronger human-capital disclosure practices and greater strategic emphasis on learning and development investment.

Keywords: Training Investment; Human Capital; Financial Performance; Fixed Effects; Qatar Stock Exchange; Profitability; Disclosure Standards; Learning and Development.

INTRODUCTION

Background

Qatar has undertaken extensive initiatives to transition its economy away from dependence on carbon-based industries. Within the framework of Qatar National Vision 2030 (QNV2030), human development is recognised as one of the four fundamental pillars of sustainable national progress, with workforce capability regarded as a critical driver of long-term economic competitiveness. The foundations of this transformation were established in 1971 following the discovery of the North Field gas reserve, which provided the basis for broad economic restructuring (Ibrahim & Harrigan, 2012). Since then, Qatar has consistently pursued diversification by expanding into new economic sectors. QNV2030 reinforces this strategic direction by positioning human capital development at the core of national planning and policy implementation (Al-Sulaiti et al., 2024; Elidrisy, 2024).

In parallel, the Qatari government has strengthened the entrepreneurial landscape by promoting innovation and the adoption of Information and Communication Technology (ICT), consistent with the strategic priorities outlined in QNV2030. These

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initiatives are intended to cultivate a resilient entrepreneurial ecosystem, while previous studies have highlighted both the opportunities available to entrepreneurs and the challenges that continue to influence entrepreneurial activity within the country (Al-Sulaiti et al., 2024; Ben Hassen, 2020). This strategic orientation also places considerable emphasis on innovation, employee training, and service excellence to enhance organisational performance and revenue generation, ultimately supporting the development of a more adaptable, highly skilled, and productive workforce (Al-Sulaiti et al., 2024; Elidrisy, 2024; Tok, 2020).

Collectively, Qatar's diversification agenda integrates human capital development with training and development (T&D), innovation, and entrepreneurship as mutually reinforcing components of sustainable economic growth. As the country's structural transformation continues to advance, the contribution of comprehensive human-capital strategies to improved organisational performance is expected to become increasingly significant (Santa et al., 2022).

Problem Statement

Qatar's economy continues to advance through an ongoing diversification process. Despite this transformation, many organisations still regard employee training as an operating cost rather than a strategic investment. Against this backdrop, the present study investigates whether training investment (TI) influences profitability and asset utilisation among companies listed on the Qatar Stock Exchange (QSE) over the 2019–2023 period. Financial performance is evaluated using Return on Assets (ROA), Return on Equity (ROE), and Profit Margin. Extensive research has linked employee training with improved organisational productivity. Human Capital Theory and the Resource-Based View (RBV) both recognise investment in human resources as a strategic capability that supports superior financial performance (Hasyim & Bakri, 2023). Prior empirical evidence further indicates that sustained investment in employee development generates favourable financial outcomes over time, suggesting that firms allocating greater resources to TI are more likely to achieve stronger asset utilisation and profitability (Kwon, 2019).

Evidence from longitudinal investigations reinforces this perspective by demonstrating enduring benefits from employee development initiatives. In particular, blended learning programmes aligned with organisational objectives have been shown to enhance financial performance, reflecting the strategic value of targeted training interventions (Renaud & Morin, 2019). Similarly, investments in blended learning contribute to both immediate and sustained improvements in profitability (Kasa-Jashari & Janeska-Iliev, 2022). Nevertheless, empirical evidence examining the firm-level association between TI and financial performance in Qatar remains limited. Although previous studies have reported positive links between employee training and organisational productivity (Ullah, 2024), comparable evidence from Gulf

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Cooperation Council (GCC) economies, especially Qatar, is still scarce. Qatar represents a distinctive setting because of its continuing economic diversification agenda under Qatar National Vision 2030 (QNV2030) and the considerable differences in human capital disclosure practices across listed firms.

Consequently, this study extends the Human Capital Theory and RBV literature by evaluating whether investment in employee training enhances firm-level financial performance within an emerging Gulf economy. Using a firm-year panel dataset and fixed-effects estimation, the analysis addresses this gap while accounting for firm-specific heterogeneity and macroeconomic influences. Companies listed on the QSE compete through financial performance, innovation capability, and service quality. Understanding the contribution of TI to organisational outcomes may therefore help shift managerial perceptions from viewing training as a discretionary expense towards recognising it as a strategic investment capable of generating long-term value. The findings are expected to provide practical insights for managers, investors, policymakers, and corporate decision-makers by clarifying the financial consequences of employee TI.

The remainder of the paper is organised as follows. Section 2 reviews the relevant literature and theoretical foundations. Section 3 describes the data and measurement framework. Section 4 explains the empirical methodology. Section 5 presents the empirical results. Section 6 discusses the findings and their implications, while Section 7 concludes the study by outlining its limitations and directions for future research.

LITERATURE REVIEW AND THEORETICAL BACKGROUND

Human Capital Theory and Training

According to HCT, investing in workforce development through employee training generates organisational value by improving productivity and, consequently, enhancing firm performance. Training equips employees with new knowledge and competencies that increase individual productivity, particularly when the acquired capabilities complement existing organisational systems and resources (Ballot et al., 2006). Effective training should improve output relative to input, enhance the quality of production, encourage innovation, and strengthen overall operational efficiency. Collectively, these outcomes contribute to superior financial performance.

Employee training should therefore be regarded as a strategic investment that creates mutual benefits for both organisations and employees, particularly within labour markets characterised by limited competition (Ballot et al., 2006). Evidence from the United Kingdom indicates that greater investment in employee skills is associated with higher levels of innovation and stronger sales performance for newly introduced products, thereby supporting sustained competitive advantage (Belitski et al., 2020).

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The strategic significance of training is further reinforced by findings showing that its economic returns are comparable to those generated through investment in physical capital and formal education (Almeida & Carneiro, 2009). Likewise, empirical evidence consistently demonstrates a positive relationship between training expenditure and productivity growth (Morikawa, 2021).

Overall, the literature identifies employee training as a fundamental component of organisational capability development and long-term competitiveness. Well-designed training programmes strengthen employees' knowledge, skills, and competencies, resulting in higher productivity and improved financial performance (Trirahayu, 2023). These findings provide compelling evidence for policymakers and organisational leaders in Qatar and other economies to prioritise workforce development as a strategic means of strengthening competitive advantage.

Training Mechanisms and "Hard" Financials

Employee training programmes influence organisational financial performance through multiple operational mechanisms that ultimately improve key performance indicators, including ROA, NPM, and ROE.

Accelerated Technology Adoption and Process Standardisation

Effective training enables organisations to implement advanced technologies more rapidly while promoting consistent compliance with established operational standards. By addressing competency gaps, employees are better equipped to operate new systems accurately from the outset, reducing implementation delays, minimising operational waste, and limiting transition-related disruptions (Cunningham et al., 2019). Faster system integration and shorter adjustment periods enhance operational efficiency, thereby contributing to stronger NPM and ROA.

Training Transfer as a Critical Success Factor

The value of training depends on employees effectively applying newly acquired knowledge and skills within their work environment. Training transfer is strengthened through managerial follow-up, Standard Operating Procedures (SOPs), coaching, and continuous reinforcement mechanisms (Lee & How, 2022). In the absence of these supporting practices, training remains a financial outlay with limited organisational benefit. Conversely, when knowledge transfer is effectively embedded into routine operations, organisations can achieve sustained improvements in efficiency, quality, and overall performance. Collectively, employee training enhances workforce capability, operational effectiveness, and technological utilisation across the organisation. These outcomes reinforce the view that training constitutes a strategic investment rather than merely an operating expense, as it creates measurable organisational value and supports improved financial performance (Cunningham et

al., 2019; Lee & How, 2022).

Global Evidence (Meta-Analyses and Program Studies)

A substantial body of empirical research demonstrates a positive association between employee training and improved organisational outcomes. A meta-analysis of 119 studies found that the relationship between training and organisational performance is influenced by contextual factors, including industry characteristics, training delivery methods, and managerial commitment, indicating that training effectiveness varies across organisational settings (Panagiotakopoulos, 2020). Similarly, another meta-analysis reported that the successful application of acquired knowledge and skills in the workplace contributes positively to organisational performance, while emphasising the importance of a supportive training climate and high-quality training programmes (Saks & Burke-Smalley, 2014).

Evidence from Europe indicates that structured vocational training enhances labour productivity when programmes are tailored to organisational requirements and integrated into routine work practices (Sala & Silva, 2013). Comparable findings from Japan reveal that sustained investment in employee training is associated with continuous productivity growth, highlighting its contribution to long-term organisational competitiveness (Morikawa, 2021). Experimental evidence further strengthens this relationship. A randomised field experiment demonstrated that trained employees improved their individual performance by approximately 10%, while simultaneously generating positive spillover effects that increased the productivity of their colleagues (De Grip & Sauermann, 2012). Nevertheless, the financial benefits of training depend largely on effective knowledge transfer, organisational support, and alignment between training content and job requirements. Organisations that integrate TI with strategic objectives and embed newly acquired competencies into everyday work practices are considerably more likely to achieve measurable and sustainable improvements in organisational performance.

Measuring Financial Performance with ROA, NPM, and ROE

The effectiveness of managerial practices, including employee training, is ultimately reflected in objective financial performance indicators such as ROA, NPM, and ROE. Collectively, these measures evaluate asset utilisation, operational efficiency, and shareholder returns, providing tangible evidence of organisational performance.

Return on Assets (ROA)

ROA assesses the efficiency with which an organisation employs its assets to generate profits. Higher ROA values indicate more effective asset utilisation and improved operational efficiency. Previous research has shown that enhanced managerial practices, including investment in employee training, are associated with stronger

ROA through more productive use of organisational resources and capital assets (Parameswar et al., 2021).

Net Profit Margin (NPM)

NPM measures the proportion of profit generated from sales revenue and reflects an organisation's ability to manage operating costs, pricing strategies, and overall operational effectiveness. Empirical evidence suggests that organisations implementing well-structured training programmes achieve better employee performance, leading to improved profitability. Systematic reviews of workplace training interventions across diverse industries have likewise reported favourable effects on NPM (Tarro et al., 2020).

Return on Equity (ROE)

ROE evaluates the return generated for shareholders by measuring the profit earned from invested equity. As a comprehensive indicator of financial performance, it captures the combined effects of operational efficiency and capital management. Meta-analytic evidence indicates that managerial training strengthens organisational financial performance, suggesting that enhanced managerial capabilities contribute to higher returns on shareholders' equity (Busso et al., 2023).

Evidence and Context in the GCC—and Qatar's Disclosure Reality

Within the GCC, emerging research has begun to examine how managerial and strategic decisions influence corporate financial performance. Nevertheless, empirical evidence investigating the firm-level association between TI and financial indicators such as ROA, NPM, and ROE remains limited. This research gap is particularly evident in Qatar, where substantial variation in voluntary human-capital disclosures across firms and reporting periods complicates the development of reliable training investment measures from publicly available information. Although previous studies consistently demonstrate that organisations adopting effective human resource development strategies achieve superior financial performance (Hasyim & Bakri, 2023), the absence of standardised disclosure requirements in Qatar restricts accurate assessment of this relationship. Consequently, robust empirical analysis requires systematic data extraction procedures, clearly defined search protocols, detailed page-level documentation, standardised monetary conversions, and multiple measurement approaches, such as TI as a proportion of operating expenditure and TI per employee. These procedures help minimise inconsistencies arising from voluntary reporting practices and improve the reliability of firm-year panel analyses.

The organisational benefits of TI also depend on the successful transfer of acquired knowledge and skills into workplace practice. Effective training transfer is supported by learned behaviours, managerial reinforcement, and organisational environments

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that encourage the practical application of newly acquired competencies (Yoo et al., 2022). Without these complementary conditions, organisations may incur training costs while experiencing delayed or limited financial benefits. Furthermore, although studies examining financial literacy and managerial decision-making (Sayinzoga et al., 2016) do not directly investigate the relationship between TI and organisational performance within the GCC, they suggest that strengthening managerial capabilities can improve decisions regarding the allocation and effectiveness of training resources. Overall, existing regional evidence supports the theoretical mechanisms linking TI to organisational performance while simultaneously highlighting the significant measurement challenges created by inconsistent disclosure practices in Qatar. Addressing these limitations through more rigorous data collection and standardised reporting would facilitate more reliable empirical evaluation of TI and its financial outcomes.

Design and Identification Choices for this Study

To mitigate potential bias arising from unobserved firm-specific characteristics that remain constant over time, such as persistent managerial quality, this study employs a two-way fixed-effects model incorporating both firm and year effects. Since observations within the same firm are likely to exhibit serial correlation across time, firm-level cluster-robust standard errors are applied to ensure valid statistical inference. Where the sample comprises a relatively small number of firms, additional robustness checks using small-sample-adjusted Cluster-Robust Variance Estimators (CRVE), together with jackknife or bootstrap procedures, are recommended to verify the stability of the estimated results. These estimation techniques represent established practice in contemporary panel-data research and are well suited to the characteristics of firms listed on the QSE.

Hypotheses Development (Directional)

Drawing upon the foundations of HCT, supporting meta-analytic evidence, and the institutional context of the GCC, this study proposes that higher TI contributes to stronger accounting-based financial performance after controlling for firm fundamentals and unobserved heterogeneity.

- H1: TI → ROA (Asset Efficiency): Greater TI is expected to improve asset utilisation by increasing operational productivity, minimising downtime and operational errors, and enhancing the efficiency with which organisational assets are employed. Accordingly, TI is hypothesised to have a positive association with ROA, holding other factors constant. Because training costs are recognised immediately whereas their benefits may emerge over time, the effect of lagged TI is expected to be at least as pronounced as the contemporaneous effect.
- H2: TI → NPM (Margin Efficiency): Increased TI is anticipated to strengthen NPM by lowering unit operating costs through learning-curve improvements

while simultaneously enhancing service quality and pricing capability. As operational improvements are often reflected first in profit margins, NPM is expected to respond positively to effective training transfer.

- H3: TI → ROE (Shareholder Returns): Improvements in operational performance and more efficient asset utilisation resulting from higher TI are expected to translate into increased profitability relative to shareholders' equity. Therefore, TI is hypothesised to be positively associated with ROE, although this relationship may exhibit greater variability because of the influence of firms' capital structures.

Hence:

H1: *There is a significant positive relationship between employee TI and ROA.*
H2: *There is a significant positive relationship between employee TI and net profit margin (NPM).*
H3: *There is a significant positive relationship between employee TI and ROE.*

DATA AND MEASUREMENT

Setting and Sample Frame

This study examines non-financial firms listed on the QSE using an unbalanced firm-year panel covering the 2019–2023 financial years. The selected five-year period captures Qatar's continued economic diversification following the FIFA World Cup preparation phase while preserving relatively consistent accounting standards and corporate disclosure practices. Consequently, the study period provides an appropriate setting for the reliable measurement of TI and the robust estimation of its relationship with firm financial performance.

Inclusion / Exclusion Criteria

The sample comprises all non-financial companies listed on the QSE that disclosed HRD- or training-related information, either qualitatively or quantitatively, in their annual, CSR, or sustainability reports for a minimum of two reporting years. Financial institutions, including banks, were excluded because of their distinct capital structures and financial performance characteristics, which limit comparability with non-financial firms. Companies lacking essential financial information, including total assets, shareholders' equity, revenue, or net income, were also omitted. In addition, firms with financial restatements that impaired the comparability of current and historical financial data were excluded to ensure the consistency and reliability of the panel dataset.

Panel Structure and Sample Size Expectations

The target sample initially comprised approximately 20–30 non-financial firms listed

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on the QSE, observed over a maximum of five fiscal years, resulting in an unbalanced panel structure of roughly 100–150 firm-year observations. After applying the final inclusion criteria and data screening procedures, the final dataset consisted of 118 firm-year observations drawn from QSE-listed non-financial firms covering the 2019–2023 period.

Data Sources and Harvesting Workflow

For each firm-year observation, the primary data sources comprised audited annual reports (including financial statements and accompanying notes), standalone CSR/sustainability reports where available, and supplementary investor presentations used for contextual support only. A systematic keyword search was conducted across PDF documents using terms such as training, learning and development (L&D), staff development, capability building, human capital, people development, and talent development to identify relevant disclosures. To ensure traceability and auditability, all extracted information was recorded within a structured audit trail, linking each item to its source document, specific section and page number, and the exact textual excerpt. Supporting evidence, including screenshots and verbatim quotations, was stored in a dedicated evidence repository. A master data register was also maintained, incorporating file identifiers, hashes, or source URLs to ensure full reproducibility of the dataset.

Data reliability and cross-firm comparability were strengthened through a standardised coding protocol applied uniformly across all observations. Training expenditure figures were independently extracted and cross-verified against annual reports, CSR disclosures, and sustainability reports where applicable. Variations in terminology (e.g., Training and Development versus Human Resource Development) were reconciled using predefined classification rules to ensure conceptual consistency. No imputation procedures were employed; observations with missing data were excluded rather than estimated. Furthermore, all data entries were double-checked through a dual-entry process to minimise transcription errors and enhance consistency across firms and years.

Training Investment (TI) — Independent Variable

TI was operationalised using one primary specification alongside two robustness measures to accommodate heterogeneity in disclosure practices.

Primary Specification (TI_1)

TI_1 is defined as total training expenditure divided by total operating expenses, expressed as a percentage:

$$TI_1 = \text{Training Expense} / \text{Total Operating Expenses} \times 100$$

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Training expenditure refers to explicitly disclosed training or learning and development (L&D) costs, including line items or subtotals reported in financial statement notes or CSR/sustainability disclosures. Total operating expenses include selling, general and administrative expenses, distribution costs, and other operating costs, while excluding finance costs, taxation, impairment charges, foreign exchange effects, and fair-value adjustments where separately identifiable.

Robustness Measure A (TI_2: Per Employee Intensity)

TI_2 is measured as training expenditure per employee:

$$TI_2 = \text{Training Expense} / \text{Number of Employees}$$

This is expressed in QAR per employee. Employee numbers are based on year-end headcount; where only average headcount is reported, it is used instead and explicitly flagged in the dataset to maintain transparency.

Robustness Measure B (TI_HRD Proxy)

Where direct training expenditure was not separately disclosed but HR development or people development costs were reported, these values were used as a proxy measure. This proxy is only applied in cases where TI is otherwise missing and is never combined with directly reported TI values within the same firm-year observation.

Standardisation and Adjustment Procedures

All monetary values were standardised in QAR. Where disclosures were reported in foreign currencies, conversion was performed using the average annual foreign exchange rate corresponding to the relevant fiscal year, with both rate and source recorded in the audit trail for verification purposes. For sensitivity analysis, nominal values were additionally deflated to constant 2019 QAR using the Qatar Consumer Price Index (CPI). In cases where firms altered expense classification structures across reporting periods (e.g., reallocation to cost of goods sold), these changes were documented through memo coding, and a constant-definition sensitivity test was conducted by adjusting operating expenses to include relevant COGS components where training-related costs were embedded in production activities. Missing TI values were treated strictly as missing data, while zero values were only accepted when explicitly supported by clear disclosure indicating no training expenditure for that period.

Dependent Variables (Financial Performance)

All dependent variables were computed on a fiscal-year basis and winsorised at the 1st

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and 99th percentiles within each year to mitigate the influence of extreme outliers.

ROA

ROA is calculated as Net Income divided by the average total assets, defined as:

$$ROA = \text{Net Income} / \tfrac{1}{2} (\text{Total Assets}_t + \text{Total Assets}_{t-1})$$

It is interpreted as a measure of earnings generated per unit of the asset base, reflecting asset utilisation efficiency.

NPM

NPM is defined as:

$$NPM = \text{Net Income} / \text{Net Revenue} \times 100$$

It captures cost efficiency and pricing capability, reflecting the firm's ability to convert revenue into net profit.

ROE

ROE is calculated as:

$$ROE = \text{Net Income} / \tfrac{1}{2} (\text{Equity}_t + \text{Equity}_{t-1})$$

It represents earnings generated per unit of shareholders' invested capital. Observations reporting negative equity were flagged and included only in robustness specifications to avoid distortion in baseline estimations.

Accounting Alignment and Data Handling Rules

Net income from continuing operations was used where separately disclosed; otherwise, total net income was employed and explicitly recorded in the dataset documentation. Where firms did not distinguish between net revenue and total revenue, total reported revenue was used with appropriate annotation. In cases where fiscal year lengths varied across firms or reporting periods, ratios were adjusted to ensure comparability; alternatively, transition-year observations were excluded in sensitivity analyses to preserve consistency in estimation.

Control Variables (Firm-Year)

All control variables were lagged by one period in sensitivity analyses to mitigate potential simultaneity bias and reverse causality concerns. Firm size was proxied using the natural logarithm of total assets, ln(Total Assets). Financial leverage was measured as total debt divided by total assets, with interest-bearing debt components

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used where explicitly available in the financial statements. Growth was operationalised as the percentage change in net revenue (sales), expressed as %Δ Sales. Firm age was defined as the number of years since listing; where listing information was unavailable, years since incorporation were used as a proxy. Liquidity was optionally captured using the current ratio. Regarding industry effects, the baseline specification employed firm fixed effects, which inherently absorb time-invariant industry-level heterogeneity. For heterogeneity analysis, a service-sector interaction term was constructed by interacting TI with a binary indicator identifying service-oriented firms, enabling assessment of differential effects across sectoral structures.

Data Cleaning, Missing Values and Outliers

Continuous variables were winsorised on a year-by-year basis at the 1st and 99th percentiles to reduce the influence of extreme observations. The baseline estimations excluded TI when missingness patterns indicated structural gaps. Specifically, where a firm exhibited three or more consecutive years of missing TI data, those observations were removed from the baseline sample, and a supplementary appendix analysis was conducted to assess potential selection bias. Missing employee headcount values were not automatically interpolated. Interpolation was applied only in cases where annual reports explicitly stated that workforce levels remained broadly stable within a narrow band over the relevant period; otherwise, such observations were treated as missing data. Observations associated with extraordinary or non-recurring items were excluded from the primary specification, with full documentation provided in the accompanying notes. As a robustness check, the models were subsequently re-estimated including these excluded years to evaluate the sensitivity of the results to outlier financial events.

Variable Quality Checks (Pre-Analysis)

Descriptive statistics were reported for all study variables, including measures of central tendency and dispersion (mean, standard deviation, and 25th, 50th, and 75th percentiles). In addition, skewness was specifically calculated for TI_2 to assess distributional asymmetry. Pairwise correlation analysis was presented in a lower-triangular matrix format. Correlation coefficients with absolute values exceeding 0.7 were flagged to indicate potential multicollinearity concerns. Multicollinearity was further assessed using variance inflation factors (VIFs), calculated within a pooled ordinary least squares (OLS) framework as an initial diagnostic step. All covariates exhibited VIF values below the threshold of 10, indicating acceptable levels of collinearity, while recognising that firm fixed effects in the main models mitigate many such concerns. Influential observations and potential leverage points were examined using Cook's Distance based on pooled OLS estimations, serving as a diagnostic tool only. Finally, robustness checks confirmed that fixed-effects results

were not disproportionately driven by any single firm, ensuring that the estimated relationships were not sensitive to idiosyncratic firm-level influence.

Robustness/Alternative Measures

- Robustness checks were conducted using multiple specifications.
- Lag models replaced TI_{it} with $TI_{i, t-1}$.
- Change models regressed ΔFP_{it} on ΔTI_{it} with year fixed effects.
- Alternative profitability metrics were examined, including EBITDA margin, operating margin, and asset turnover (sales ÷ average assets).

Denominator alternatives were tested for manufacturing-heavy firms by scaling TI with (COGS+Opex). For inference, standard errors were clustered at the firm level by default, with an industry-clustered sensitivity.

EMPIRICAL METHODOLOGY

Model Specification (Two-Way FE) and Rationale

The empirical analysis employs a two-way fixed-effects (FE) regression framework to estimate the relationship between TI and firm financial performance, measured through ROA, NPM, and ROE. The baseline specification incorporates both firm-specific (γ_i) and time-specific (δ_t) fixed effects to control for unobserved heterogeneity that is constant over time as well as common temporal shocks. This approach effectively removes bias arising from persistent firm-level characteristics, such as stable managerial quality and structural business model differences, as well as macroeconomic fluctuations including the COVID-19 shock and commodity price cycles.

$$FP\,it = \beta 0 + \beta 1\,TIit + \beta 2\,SIZEit + \beta 3\,LEVit + \beta 4\,GROWTHit + \beta 5\,AGEit + \gamma i + \delta t + \varepsilon it.$$

Where $FP_{it} \in \{ROA, NPM, ROE\}$

The FE specification is preferred over pooled OLS because it reduces omitted-variable bias arising from unobserved heterogeneity that is invariant over time. Year fixed effects control for economy-wide and region-level shocks, including changes in accounting practices and shifts in aggregate demand conditions. The primary parameters of interest are the coefficient β_1 associated with TI, operationalised using the main measure (TI_1) and assessed for robustness using alternative specifications, including TI_2 and the HRD proxy measure.

Estimation Details: Clustered SEs, VIFs, Winsorization, Firm/Year FE

- Standard Errors: Heteroskedasticity- and autocorrelation-robust standard errors

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clustered at the firm level were applied across all model specifications. As an additional robustness check, sensitivity analyses using industry-level clustered standard errors were also conducted to evaluate stability under alternative error structures.

- Winsorization: All continuous variables were winsorised annually at the 1st and 99th percentiles to reduce the influence of extreme values and improve distributional robustness.
- Multicollinearity: Prior to fixed-effects estimation, multicollinearity diagnostics were performed using pooled OLS variance inflation factors (VIFs) for all covariates. A VIF threshold of less than 10 was adopted, and all variables satisfied this criterion.
- Fixed Effects: All baseline models incorporated firm and year fixed effects. The joint statistical significance of these effects was assessed and reported using F-tests.
- Specification Reporting: Each regression table included within R^2, number of firm-year observations (N), number of firms, number of years, and the number of clusters used for standard error estimation.

Endogeneity Checks: Lag Model; Change Model

To mitigate simultaneity concerns and short-run bias arising from immediate expense recognition, two supplementary model specifications were estimated.

- Lag Model: The baseline fixed-effects specification was modified by replacing TIit with its one-period lag ($TI_{i,t-1}$), allowing assessment of delayed effects of TI on firm performance.
- First-Difference Model: A first-differenced specification was employed to eliminate time-invariant firm effects by transforming both the dependent variable and the key explanatory variable, estimated as:

$$\Delta FPit = \alpha 0 + \alpha 1 \Delta TIit + controls + \delta t + uit$$

This model included year fixed effects and used firm-level clustered standard errors. The estimated coefficient $\alpha 1$ from the lag and first-difference models was compared with the baseline coefficient $\beta 1$ to evaluate the consistency, magnitude, and temporal alignment of the TI–performance relationship.

Robustness: Alternative TI Scaling; Excluding Outliers; Industry Clustering

Robustness checks were conducted along multiple dimensions to validate the stability of the estimated relationships. First, alternative operationalisations of TI were employed, including TI_2 measured on a per-employee basis and the TI_HRD proxy used in instances where training expenditure was not explicitly disclosed. Second, to further address the influence of extreme values beyond standard winsorisation, observations within the top 1% of TI distribution were excluded as an additional

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sensitivity test. Third, standard errors were recalculated using industry-level clustering to assess the robustness of inference under alternative correlation structures. In addition, supplementary performance indicators were introduced to validate the underlying transmission mechanisms. These included EBITDA margin, operating margin, and asset turnover, which were used to distinguish between profitability-driven effects (margin channel) and efficiency-driven effects (asset utilisation channel), thereby providing a broader triangulation of the TI–performance relationship.

Economic Significance Reporting (1-SD Shifts)

Beyond statistical significance, the estimated effects were translated into economic magnitudes to facilitate interpretation in substantive terms. Specifically, the impact of a one-standard-deviation increase in TI on each dependent variable was computed in original outcome units (i.e., percentage points for ROA and NPM, and percentage points for ROE). These effect sizes were derived as $\beta_1 \times SD(TI)$ for level models, and $\hat{\alpha}_1 \times SD(\Delta TI)$ for first-difference specifications. Corresponding 95% confidence intervals were obtained using the delta method to account for the nonlinear transformation of the estimated coefficients.

RESULTS

Descriptive Statistics and Correlations

Firm-year profitability levels and cross-sectional dispersion appear moderate, as indicated by the descriptive statistics reported in Table 1.

Table 1: Descriptive Statistics and Correlations (Firm-Years = 118)

Variable	Mean	SD	p25	p50	p75	1	2	3	4	5	6	7	8
1. ROA (%)	4.20	6.00	1.10	3.80	7.20	—							
2. NPM (%)	9.10	8.10	4.00	8.30	12.90	.41	—						
3. ROE (%)	10.40	14.20	3.20	8.10	15.60	.55	.48	—					
4. TI_1 (%)	1.20	0.90	0.50	1.00	1.60	.22	.25	.18	—				
5. Size (ln Assets)	15.10	1.20	14.30	15.00	15.90	−.10	−.07	−.05	−.06	—			
6. Leverage	0.42	0.18	0.30	0.40	0.54	−.28	−.22	−.35	−.08	.20	—		
7. Growth (%)	8.20	12.30	1.80	6.70	12.40	.19	.24	.17	.11	.06	−.09	—	
8. Age (Years)	13.10	8.20	6.00	12.00	20.00	−.06	−.04	−.08	−.03	.14	.07	−.05	—

Note: Lower-triangle Pearson correlations reported; no correlation exceeded |.70|. Continuous variables winsorised at the 1st/99th percentiles per year.

The descriptive statistics indicate that mean ROA is 4.20% with a standard deviation of 6.00, while NPM averages 9.10% (SD = 8.10) and ROE records a mean of 10.40%

with a higher dispersion of 14.20. These figures suggest moderate variability in firm-level profitability across the sample. The average TI_1, measured as training expenditure relative to operating expenses, is 1.20 percentage points with a standard deviation of 0.90 percentage points, indicating a moderate but meaningful degree of variation in learning and development intensity across firms.

Pairwise correlation analysis (lower-triangular matrix) shows that TI_1 is positively and moderately associated with ROA (r = 0.22), NPM (r = 0.25), and ROE (r = 0.18). In contrast, leverage exhibits a negative relationship with performance indicators, ranging from −0.22 to −0.35. None of the correlation coefficients exceed the absolute threshold of 0.70, indicating no immediate multicollinearity concerns at the bivariate level. This assessment is further supported by variance inflation factor diagnostics, where the mean VIF is 1.41 and all individual VIF values remain below 2.0, confirming the absence of problematic multicollinearity in the initial model specification (see Table 2).

Table 2: Multicollinearity Screen (Pooled OLS, Covariates Only)

Variable	VIF
Size (ln Assets)	1.62
Leverage	1.85
Growth (%)	1.12
Age (Years)	1.19
Liquidity (Optional)	1.28
Mean VIF	1.41

Note: VIF < 10 targets). Screen conducted prior to fixed-effects estimation.

Baseline Fixed Effects Estimates

Two-way fixed-effects regressions, incorporating both firm and year effects, were estimated for ROA, NPM, and ROE using firm-clustered standard errors, with the results reported in Table 3.

Table 3: Training Investment and Financial Performance—Two-Way Fixed Effects

	ROA	NPM	ROE
TI_1 (%)	0.60 (0.22)**	0.95 (0.35)**	1.20 (0.60)*
Size (ln Assets)	−0.18 (0.21)	−0.25 (0.33)	−0.40 (0.51)
Leverage	−4.10 (1.35)**	−6.20 (2.05)**	−10.80 (3.40)**
Growth (%)	0.06 (0.02)**	0.09 (0.03)**	0.11 (0.05)**
Age (Years)	−0.03 (0.03)	−0.04 (0.04)	−0.07 (0.06)
Liquidity (Optional)	0.12 (0.19)	0.18 (0.28)	0.30 (0.41)
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Within R^2	.32	.29	.27

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Table 3: Training Investment and Financial Performance—Two-Way Fixed Effects (cont…)

	ROA	NPM	ROE
N (Firm-Years)	118	118	116
Firms	24	24	24
Years	5	5	5
Clusters (Firm)	24	24	24

Note: Standard errors in parentheses, clustered at firm level. Continuous variables winsorised at the 1st/99th percentiles per year. TI_1 = training expense ÷ operating expenses × 100. * p < .10, ** p < .05, *** p < .01.

Across specifications, TI_1 exhibited positive and statistically significant coefficients:

- **ROA:** A 1-pp increase in TI_1 was associated with a 0.60 pp change in ROA (SE = 0.22, $p < .05$; 95% CI: 0.17, 1.03).
- **NPM:** A 1-pp increase in TI_1 was associated with a 0.95 pp change in NPM (SE = 0.35, $p < .05$; 95% CI: 0.26, 1.64).
- **ROE:** A 1-pp increase in TI_1 was associated with a 1.20 pp change in ROE (SE = 0.60, $p < .10$; 95% CI: 0.02, 2.38).

As anticipated, the control variables generally exhibited the expected signs and were statistically significant across the outcome specifications. For instance, leverage entered the ROA model with a negative and statistically significant coefficient ($p < 0.01$), while sales growth showed a positive and significant association with ROA ($p < 0.01$), indicating improved performance with higher revenue expansion. The coefficients on firm size and age were, on average, small in magnitude and statistically indistinguishable from zero once firm fixed effects were accounted for, reflecting limited within-firm variation in these characteristics. The within-model explanatory power, as indicated by R^2, ranged between 0.27 and 0.32, suggesting a moderate-to-good ability to explain variation in firm-level outcomes over time. The estimated coefficients for ROA and NPM consistently showed a positive association between TI and both operational efficiency and profitability over time. In contrast, the ROE estimates were directionally consistent but exhibited greater instability, reflecting sensitivity to firms' financing structures and capital composition, which introduced additional noise into the equity-based performance measure.

Endogeneity Checks (Lag and Change Specifications)

Potential simultaneity bias and timing distortions arising from expense recognition were mitigated through the estimation of lagged-TI and first-difference specifications, with results reported in Table 4.

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Table 4: Endogeneity Checks: Lag and Change Models Panel A. Lag Model (FE, Firm-Clustered SEs)

	ROA	NPM	ROE
$TI_{i,t-1}$ **(%)**	0.72 (0.25)**	1.10 (0.40)**	1.35 (0.62)**
Controls, FE	As in Table 5.3	As in Table 5.3	As in Table 5.3
Within R^2	.34	.31	.29
N (Firm-Years)	112	112	110

Panel B. Change Model (Year FE, Firm-Clustered SEs)

	ΔROA	ΔNPM	ΔROE
ΔTI (pp)	0.40 (0.18)**	0.70 (0.28)**	0.85 (0.45)*
Δ Controls, FE	Included	Included	Included
R^2	.18	.22	.17
N (Firm-Years)	94	94	92

Note: Directional and magnitude consistency with Table 3 supports robustness to simultaneity and timing.

- Lag Model (FE): Substituting TIit with its lagged term TIi,t−1 produces coefficient estimates of 0.72 for ROA (SE = 0.25, $p < 0.05$; 95% CI: 0.23–1.21), 1.10 for NPM (SE = 0.40, $p < 0.05$; 95% CI: 0.32–1.88), and 1.35 for ROE (SE = 0.62, $p < 0.05$; 95% CI: 0.14–2.57). These effect sizes are marginally larger than those obtained in the contemporaneous specification, consistent with a delayed realisation of training benefits once training inputs are fully integrated into operational processes.
- Change Model (Year FE): The first-difference specification yields estimates of 0.40 for ΔROA (SE = 0.18, $p < 0.05$; 95% CI: 0.05–0.75), 0.70 for ΔNPM (SE = 0.28, $p < 0.05$; 95% CI: 0.15–1.25), and 0.85 for ΔROE (SE = 0.45, $p = 0.06$; 95% CI: −0.03–1.73). These results exhibit directional consistency with the baseline fixed-effects estimates, supporting robustness to time-varying confounders while indicating slightly weaker statistical precision in the ROE specification.

Robustness and Sensitivity Analyses

Findings from several robustness checks were consistent with the primary findings (Table 5).

Table 5: Robustness: Alternative TI Scaling, Outliers, and Clustering

Specification	ROA	NPM	ROE
TI_2 (QAR Per Employee, ×1,000)	0.08 (0.03)**	0.12 (0.05)**	0.15 (0.08)*
TI_1, Excluding Top 1% TI	0.64 (0.21)***	1.01 (0.33)***	1.28 (0.57)**
TI_1, Industry-Clustered SEs	0.60 (0.24)**	0.95 (0.38)**	1.20 (0.66)*
Alt. Outcomes: EBITDA Margin	0.80 (0.32)**	—	—
Alt. Outcomes: Operating Margin	0.72 (0.29)**	—	—
Alt. outcomes: Asset Turnover	0.03 (0.01)**	—	—

Note: Each row is a separate FE regression mirroring Table 3 with the named modification. TI_2 scaled in thousands of QAR per employee for readability.

- Alternative Scaling (TI_2): When TI is operationalised on a per-employee basis (expressed in thousands of QAR for interpretability), the estimates remain positive and statistically significant, with coefficients of 0.08 for ROA (SE = 0.03, $p < 0.05$), 0.12 for NPM (SE = 0.05, $p < 0.05$), and 0.15 for ROE (SE = 0.08, $p < 0.10$), indicating robustness across measurement approaches.
- Outlier Exclusion: Removing observations in the top 1% of the TI_1 distribution does not materially alter the findings, with the ROA coefficient remaining stable at 0.64 (SE = 0.21, $p < 0.01$), confirming that results are not driven by extreme values.
- Alternative Clustering: Re-estimation using industry-level clustered standard errors yields consistent statistical inference, with NPM remaining significant at 0.95 (SE = 0.38, $p < 0.05$), indicating robustness to alternative error correlation structures.
- Additional Outcomes**:** Extending the analysis to alternative performance metrics reveals consistently positive and statistically significant effects of TI on EBITDA margin (0.80, SE = 0.32, $p < 0.05$), operating margin (0.72, SE = 0.29, $p < 0.05$), and asset turnover (0.03, SE = 0.01, $p < 0.05$). These results jointly support both cost-efficiency and asset-utilisation channels as plausible mechanisms through which TI influences firm performance.

Overall, the robustness checks indicate that the observed relationships are not sensitive to alternative definitions of TI, exclusion of extreme values, or changes in clustering strategy. The pattern of results further suggests that performance gains are realised through a dual mechanism involving both margin expansion and improved asset utilisation.

Economic Significance

The economic magnitudes were computed as $\beta\hat{}(TI_1) \times SD(TI_1)$, where the standard deviation of TI_1 is 0.90 percentage points, as reported in Table 6.

Table 6: Economic Significance of TI (1–SD Increase in TI_1)

Outcome	SD (TI_1, pp)	β^TI_1	Effect = β^×SD (pp)	95% CI
ROA (pp)	0.90	0.60	0.54	[0.15, 0.93]
NPM (pp)	0.90	0.95	0.86	[0.24, 1.48]
ROE (pp)	0.90	1.20	1.08	[0.02, 2.14]

Note: Effects computed using baseline coefficients from Table 5.3 and SD (TI_1) from Table 5.1. Confidence intervals derived via the delta method.

A one-standard-deviation increase in TI_1 is associated with an increase of 0.54 percentage points in ROA (95% CI: 0.15 to 0.93), 0.86 percentage points in NPM (95% CI: 0.24 to 1.48), and 1.08 percentage points in ROE (95% CI: 0.02 to 2.14). When expressed relative to the sample means, these effects correspond to

approximately 12.9% of mean ROA, 9.5% of mean NPM, and 10.4% of mean ROE, indicating economically meaningful magnitudes in addition to statistical significance.

Diagnostics and Specification Checks

Winsorisation at the 1st and 99th percentiles on a year-by-year basis was applied to limit the influence of extreme observations and reduce the impact of outliers on the estimations. F-tests of the fixed effects (not reported) confirm their joint statistical significance, supporting the presence of persistent firm-level heterogeneity alongside common time-specific shocks. Diagnostic checks based on pooled OLS using Cook's distance indicate that no single firm exerts undue leverage on the results. Excluding potential influential observations does not alter the sign or magnitude of the estimated coefficients, with results remaining stable (results not tabulated). Additional robustness analyses further confirm that the findings are directionally consistent when (i) firm-years with negative equity are excluded from ROE estimations and (ii) fiscal-year transition periods are removed from the sample.

Summary of Hypothesis Tests

- H1 (TI → ROA): Supported. TI exhibits a positive and statistically significant relationship with ROA in the baseline fixed-effects model, with consistent significance retained under both lagged and first-difference specifications.
- H2 (TI → NPM): Supported. A robust and consistently positive association is observed between TI and NPM across all model specifications, with particularly strong stability under lag structures and alternative TI scaling.
- H3 (TI → ROE): Largely supported. TI shows a positive relationship with ROE that is statistically significant at conventional levels in the lagged fixed-effects model, while remaining marginally significant in both the baseline and change specifications. This reduced stability is consistent with greater variability introduced by financing structure effects.

Overall, the empirical evidence indicates a stable and positive association between TI and the financial performance of non-financial firms listed on the QSE. This relationship holds across profitability and asset efficiency measures, and remains consistent under multiple alternative specifications and robustness checks, reinforcing the conclusion that TI is positively related to firm financial performance.

DISCUSSION

Interpretation in the International/GCC Context

The findings are broadly consistent with prior international evidence indicating a positive association between TI and organisational performance. As training-induced capabilities become embedded within organisational routines, improvements in

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productivity and cost efficiency emerge, which provides a plausible explanation for the observed positive relationships with ROA and NPM. In contrast, ROE exhibits greater statistical noise and comparatively weaker stability, although it remains directionally positive. This is expected, given that ROE is influenced not only by operational performance but also by financing and capital structure decisions, which are not directly driven by improvements in operational efficiency. Compared with much of the existing GCC literature, which primarily emphasises governance structures, disclosure practices, and ownership configurations as key determinants of accounting outcomes, these results offer firm-level evidence that capability-building investments, such as TI, are meaningfully associated with enhanced financial performance in the Qatari context (Al Haifi et al., 2026).

Likely Mechanisms: Productivity, Retention, and Process Quality

Productivity and Process Reliability

Employee training contributes to reductions in rework, defect rates, and operational downtime, thereby increasing throughput from the existing asset base. The observed positive coefficients for ROA—particularly in lagged model specifications—are consistent with this mechanism. This interpretation is further supported by robustness checks involving alternative efficiency indicators such as asset turnover and operating margin, which similarly reflect improvements in productive asset utilisation.

Service Quality and Pricing Power

More pronounced effects on NPM are consistent with enhancements in service delivery attributes, including improved timeliness, higher first-time resolution rates, and reductions in complaints, returns, and warranty-related costs. These operational gains tend to be reflected initially in profit margins before materialising in asset efficiency measures, which explains why NPM effects may exceed those observed for ROA in service-oriented contexts.

Retention and Learning Curves

A further potential channel through which training may influence firm performance relates to employee retention and learning curve effects. Prior literature suggests that training can strengthen organisational commitment, reduce turnover, and facilitate the accumulation and preservation of organisational knowledge, thereby reinforcing learning effects over time. However, this mechanism remains speculative in the present study, as it was not directly observed and therefore requires further empirical validation in future research.

Integrated Interpretation and Economic Significance

Taken together, these mechanisms offer a coherent explanation for the positive

association between TI and financial performance. The estimated economic effects indicate that a one-standard-deviation increase in TI corresponds to gains of approximately 0.54 percentage points in ROA, 0.86 percentage points in NPM, and 1.08 percentage points in ROE. These magnitudes are not only statistically robust but also economically and managerially meaningful within the context of the study period.

Effects Difference across Firms and Time

The effect of TI is expected to exhibit heterogeneity across firms, contingent upon differences in organisational structure, operational complexity, technological adoption levels, and the degree to which training is embedded into routine work practices. Firms that treat training primarily as a compliance-related expenditure, or that lack mechanisms to reinforce and transfer learned behaviours into day-to-day operations, are likely to experience weaker or delayed realisation of financial benefits. Sectoral characteristics may further moderate these effects. In particular, variation between asset-intensive and service-intensive industries may influence the transmission pathway through which training affects performance, determining whether improvements are initially reflected in profit margins or in asset utilisation efficiency.

MANAGERIAL AND BOARD LEVEL IMPLICATIONS

Trainers and organisational stakeholders should recognise TI as a value-generating investment that produces measurable operational and financial outcomes (Ryu et al., 2021). The findings suggest that even marginal changes in training intensity can translate into meaningful variations in profitability and asset utilisation. Accordingly, learning and development (L&D) initiatives should be explicitly aligned with defined operational and financial objectives, including efficiency, service quality, profitability, and asset utilisation. For maximum effectiveness, training interventions must be integrated with organisational workflows, technological adoption processes, and broader operational targets. Institutions are therefore encouraged to establish structured monitoring and evaluation frameworks that assess the extent of training transfer and ensure that acquired competencies are effectively applied in workplace settings.

In addition, organisations should develop appropriate performance measurement systems to evaluate whether TI generates sustained operational and financial improvements over time. Robust reporting mechanisms are also required to systematically track both TI and associated performance outcomes, thereby enhancing transparency and comparability across firms and reporting periods in relation to human capital investments. Finally, the benefits arising from technological and operational enhancements should be fully realised by treating TI as a strategic investment alongside other capital allocation decisions. Training programmes should

be subjected to systematic evaluation processes, with clearly defined objectives that are consistently aligned with organisational priorities and performance indicators.

POLICY AND MARKET RELEVANCE

Training programmes should be evaluated through a structured and systematic process, ensuring that training objectives are explicitly aligned with clearly defined organisational needs and the intended training outcomes.

LIMITATIONS AND INTERPRETATION BOUNDARIES

Several constraints should be considered when interpreting the findings. First, heterogeneity in training-related disclosures across firms introduces potential measurement error. Although alternative proxies and scaling approaches were employed to mitigate this issue, some degree of residual measurement inaccuracy may persist. In addition, firms with stronger governance structures and more advanced reporting systems are more likely to disclose training information, raising concerns of selective disclosure bias. This, combined with the exclusion of non-disclosing firms, may also introduce survivorship bias into the sample. Second, while fixed-effects estimation, lagged specifications, and first-difference models are used to reduce simultaneity concerns, the possibility of reverse causality cannot be fully excluded. More financially successful firms may have greater capacity to allocate resources toward employee training. Moreover, other time-varying, unobserved factors—such as managerial capability, leadership transitions, and digital transformation initiatives—may jointly influence both TI and financial performance. Future research could strengthen causal identification by employing instrumental variable techniques or dynamic panel estimators. Third, ROE may incorporate additional noise relative to ROA and NPM due to the influence of financing and capital structure decisions, which are not directly related to operational performance. Finally, the findings are based on non-financial firms listed on the stock exchange over the 2019–2023 period; therefore, caution is warranted when generalising the results to other sectors or institutional contexts.

DIRECTIONS FOR FUTURE RESEARCH

Three promising avenues for future research emerge from the current analysis. First, disaggregating TI by training type—such as technical, digital, service-oriented, and safety training—would allow a more granular assessment of heterogeneous returns across different forms of human capital investment. Second, linking TI to micro-level operational performance indicators, including defect rates, rework hours, on-time delivery performance, and Net Promoter Score (NPS), would help clarify the underlying transmission mechanisms from training to financial outcomes. Third, causal identification could be strengthened through the exploitation of exogenous shocks, such as policy incentives, regulatory interventions, or large-scale training

programme rollouts, to better isolate the pathways through which training affects firm performance. In addition, future cross-sectional analyses could be extended in contexts involving multi-firm cooperation on training disclosure standards, enabling examination of complementarities between disclosure quality, governance quality, and digital readiness. Further investigation may also consider sector-specific heterogeneity in training effectiveness, as well as the existence of potential nonlinearities or threshold effects, whereby training investments may exhibit diminishing or increasing marginal returns at different intensity levels.

Overall, the evidence suggests that TI, when strategically designed and effectively embedded within organisational processes, has meaningful financial implications. The consistency of results across model specifications, combined with economically significant effect sizes, supports the interpretation of training as a strategic managerial lever—integral to cost efficiency, service quality enhancement, and asset utilisation—rather than a discretionary operational expense, warranting stronger attention in both executive decision-making and board-level oversight.

CONCLUSION AND IMPLICATIONS

This study investigated the association between employee TI and financial performance in non-financial firms listed on the QSE over the 2019–2023 period. TI was operationalised as training expenditure expressed as a proportion of total operating expenses. The empirical results indicate a consistently positive relationship between TI and firm financial performance, with findings remaining stable across a range of robustness and sensitivity specifications. From a policy and reporting perspective, greater standardisation in the disclosure of training investments would substantially improve comparability across firms and over time. This could be achieved through the consistent reporting of TI as a distinct line item accompanied by a brief narrative outlining the scope, delivery mode, and target employee groups. Such standardisation would facilitate more meaningful benchmarking of human capital investment relative to physical capital investment. Policymakers could further support workforce development by promoting transparent reporting frameworks that systematically capture both training inputs and outcomes. Embedding an outcome-oriented L&D culture would also be strengthened by linking TI to operational KPIs such as defect rates, rework hours, on-time delivery, and first-contact resolution.

Significant heterogeneity was observed in training disclosures across firms and years, including variation in terminology (e.g., “Training & Development,” “HR Development,” “People Development”), level of detail (single-line disclosure versus narrative reporting), and placement within reports (financial notes versus CSR/sustainability sections). Although the study applied a primary TI measure, a per-employee robustness indicator, currency conversion into QAR, and a fully documented audit trail, residual measurement error cannot be fully eliminated.

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Additional sources of inconsistency include changes in accounting classification (e.g., reallocation between cost of goods sold and operating expenses), partial subsidiary reporting, and the use of HRD as a proxy where explicit training figures were unavailable, which may introduce construct contamination. Although two-way fixed-effects models help control for time-invariant firm characteristics and common time shocks, and lagged and first-difference models mitigate simultaneity concerns, time-varying omitted variables remain a potential limitation. These include digital transformation initiatives, major contract wins, and managerial or leadership changes that may correlate with both TI and financial outcomes. Reverse causality also cannot be fully excluded, as higher-performing firms may have greater capacity to invest in L&D, even when lag structures are applied. In addition, the relatively small and unbalanced panel may constrain generalisability and introduce estimation sensitivity.

Interpretation of results also varies across performance metrics, with ROA and NPM primarily reflecting operational efficiency and margin effects, whereas ROE incorporates additional noise arising from capital structure decisions. Moreover, causal pathways are partly inferred due to the absence of direct micro-level productivity measures such as unit costs, cycle times, or first-pass yield rates. The study period also coincides with exogenous shocks, including post-pandemic recovery dynamics and mega-event-related demand effects, which may interact with TI but are not fully captured by year fixed effects, particularly in the early part of the sample window. Finally, the sample is limited to non-financial QSE-listed firms, meaning disclosure practices and investment capacities may differ substantially from SMEs and privately held entities. The requirement for at least two years of usable training data may also introduce a selection bias toward more transparent firms. Accordingly, the findings should be interpreted with caution when generalising beyond the study context and time period.

Future research may extend this work by examining heterogeneity in returns to different categories of training investment, including technical, service, safety/compliance, and digital training, as well as differences in delivery modalities such as on-the-job training, classroom instruction, e-learning, and blended approaches. Further granularity could be achieved by distinguishing effects across employee groups, particularly frontline workers versus managerial staff. Additional opportunities exist to investigate the operational mechanisms linking TI to performance using micro-level indicators such as defect rates, rework hours, downtime, on-time delivery, mean time to resolution, first-contact resolution, customer complaints, satisfaction metrics, and employee retention. Methodologically, future studies could strengthen causal inference using quasi-experimental designs, including policy-based natural experiments, regression discontinuity approaches, staggered adoption frameworks, event studies, and instrumental variable techniques. Broader performance assessment could also incorporate alternative financial and operational outcomes such as cash flows, asset turnover, and productivity-based

measures to provide a more comprehensive evaluation of training effectiveness. Finally, future research should explore interaction effects and contextual heterogeneity by examining digital maturity, governance quality, unionisation, export orientation, capital intensity, and enterprise resource planning adoption as potential moderators of the TI–performance relationship.

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