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Strategic Workforce Development: Assessing the Impact of Formal Training on Human Capital and Firm Outcomes in Ghana

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Abstract

This article examines how formal, firm-sponsored training contributes to human capital accumulation and measurable firm outcomes in Ghana. Building on recent evidence that organizational-level training improves performance while enabling innovation through skill upgrading and knowledge transfer, the study tests whether training intensity is associated with higher productivity, innovation adoption, and internal mobility (promotions) after accounting for firm size, sector, ownership, and management experience. Findings indicate positive and economically meaningful links between training and both productivity and innovation, with stronger effects among medium and large firms and knowledge-intensive activities; heterogeneity by gender composition and export orientation is explored. A balanced view is maintained: while training often enhances organizational outcomes, randomized evaluations underscore mixed short-run employment effects, highlighting the importance of training quality and transfer. Policy and managerial implications for strategic workforce development in Ghana are discussed.

Keywords: Ghana; Formal Training; Human Capital; Productivity; Innovation; Firm Performance

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INTRODUCTION

Background and Context

A skilled and adaptable workforce is central to firm competitiveness and national growth in emerging economies. In Ghana, the policy push around skills is visible in large-scale public programmes (e.g., the Ghana Jobs and Skills Project) and in rising firm-level training efforts designed to upgrade worker capabilities and spur innovation and productivity. Recent nationally representative firm data show that about half of Ghanaian firms (49.8%) offered formal training in the last fiscal year and that roughly two-thirds of workers (66.8%) in these firms received training—figures that exceed Sub-Saharan Africa's regional averages (27.6% of firms; 47.9% of workers) (World Bank Enterprise Surveys, 2023 country profile). Uptake is strongly size-dependent: about 90% of large firms report offering formal training, compared with much lower rates among smaller establishments (World Bank Enterprise Surveys, 2023). These descriptive indicators suggest that training has become a meaningful component of firms' human capital strategies in Ghana.

Evidence from recent scholarship supports the expectation that training contributes to higher organizational performance and innovative activity. A meta-analysis at the organizational level finds a positive overall association between employer-provided training and performance, while also emphasizing the moderating role of context and implementation quality (Kim, Chang, & Bell, 2025). Complementing this, work grounded in the resource-based view (RBV) argues that human resources—and the capabilities produced through sustained development investments—can constitute valuable, rare, and difficult-to-imitate assets that underpin competitive advantage (Gerhart, 2021). In Ghana-focused studies, learning processes—including structured training and apprenticeship—have been linked to product innovativeness among enterprises, underscoring the pathway from capability building to innovation outcomes (Avenyo, 2023; Atatsi et al., 2022).

Problem Statement

Despite these encouraging trends, several gaps motivate this study. First, the returns to formal firm-sponsored training in Ghana remain insufficiently quantified across both human-capital and firm-level outcomes. While training incidence is high among medium and large firms, a substantial share of small firms (5–19 employees) do not offer formal training, raising equity and diffusion concerns for Ghana's large small-firm base (World Bank Enterprise Surveys, 2023). Second, managers rarely identify "inadequately educated workforce" as their biggest business obstacle—only 1.4% of Ghanaian manufacturing firms rank it first, far below constraints such as access to finance and tax rates (World Bank Enterprise Surveys, 2023). This perception may reflect (a) successful internal upskilling, (b) substitution toward external hiring, or (c) under-recognition of skills gaps and training transfer failures. Establishing whether training actually translates into skills gains, internal mobility (promotions), productivity, and innovation adoption is therefore a salient empirical question for Ghana.

Moreover, international evidence signals heterogeneous and sometimes mixed effects. While average performance effects are positive, short-run employment or retention impacts can depend on complementary practices and perceived reciprocity, consistent with social-exchange mechanisms; training that is poorly aligned to job demands or that fails to transfer to the workplace can yield muted returns (Kim et al., 2025; Jun, 2025; Santana-Domínguez et al., 2022). This underscores the need to test training's effects within Ghana's context and to explore moderators such as firm size, industry, export orientation, and workforce composition.

Aim and Objectives

The study examines whether formal, firm-sponsored training is associated with measurable improvements in (i) human capital (skills upgrading and internal promotions) and (ii) firm outcomes (innovation and productivity) among Ghanaian firms, controlling for confounders such as size, sector, ownership, and management experience. A secondary objective is to explore heterogeneity in training effects by firm size and knowledge intensity, given descriptive gaps between small and large firms in training provision.

Research Questions

a. Human capital: Do firms that provide formal training report higher worker skill levels and greater rates of internal mobility (promotions)?

b. Innovation: Is formal training associated with a higher likelihood of product or process innovation at the firm level?

c. Productivity: Is formal training associated with higher labour productivity or faster productivity growth?

d. Heterogeneity: Do these associations vary by firm size, sector, or export orientation?

Hypotheses

- **H_1** (Skills upgrading): Formal training is positively associated with employees' skills improvement.
- **H_2** (Internal mobility): Formal training is positively associated with promotion rates of employees.
- **H_3** (Innovation): Formal training is positively associated with innovation performance (new products/processes).
- **H_4** (Productivity): Formal training is positively associated with productivity (e.g., output per worker or growth).

These hypotheses reflect established mechanisms in the human-capital and strategic HR literatures: training investments expand employees' knowledge, skills, and abilities; create firm-specific human capital; and improve problem-solving and absorptive capacity, thereby enabling process improvements and innovation that support productivity gains (Kim et al., 2025; Gerhart, 2021; Avenyo, 2023; Atatsi et al., 2022). At the same time, social exchange logic suggests that realized benefits depend on employees' perceptions of organizational support and reciprocity, making retention and transfer critical contingencies (Jun, 2025; Santana-Domínguez et al., 2022).

Theoretical Framing and Expected Contributions

The study integrates Human Capital Theory and the Resource-Based View. Human Capital Theory predicts that employer investments in training increase worker productivity by augmenting job-relevant skills; when training is partly firm-specific, the employer can capture a share of these returns (operationalized here via promotions and productivity) (Kim et al., 2025). The RBV frames well-trained workforces as valuable and hard-to-imitate capabilities that help firms differentiate and sustain performance advantages; we thus expect training to

correlate with innovation adoption and productivity improvements (Gerhart, 2021). Complementing these is a training-transfer perspective: gains materialize when learned knowledge is applied on the job, which depends on alignment of training content to task demands, supervisory support, and opportunity to use new skills (Santana-Domínguez et al., 2022).

This Ghana-focused analysis contributes in three ways. First, it provides up-to-date, country-specific evidence linking formal training to both human-capital and performance outcomes, addressing a documented need for contextualized assessments in African settings (Avenyo, 2023; Atatsi et al., 2022). Second, it quantifies heterogeneity by firm size, speaking to the diffusion challenge among smaller firms where training incidence lags. Third, it informs policy and managerial practice, aligning with national initiatives aimed at scaling high-quality training and improving job outcomes (Ghana Jobs and Skills Project).

LITERATURE REVIEW

Conceptual and Theoretical Frameworks

Formal training is an intentional investment in employees' knowledge, skills, and abilities that firms expect to convert into superior performance. Contemporary human capital research confirms that when organizations scale training at the organizational level, they realise measurable performance gains on average (meta-analytic corrected correlations in the small-to-moderate range), validating the basic human-capital logic that skill accumulation raises productivity and firm outcomes (Kim, Chang, & Bell, 2025). Within strategic management, a trained workforce is framed as part of a firm's resource base: knowledge, skills and routines that are valuable, rare, and hard to imitate contribute to advantage when they are bundled with complementary HR systems (Gerhart et al., 2021).

Two adjacent perspectives refine the mechanism. First, the knowledge-based view and dynamic capabilities emphasise learning, recombination and reconfiguration: training enriches the firm's knowledge base and strengthens routines for sensing, seizing and transforming opportunities, thereby enabling innovation under change. Second, organizational behaviour theories explain why employees translate training into effort. Employer-sponsored development signals support, which strengthens perceived organizational support and attachment; these, in turn, improve performance and reduce turnover (Ng, Yim, Chen, & Zou, 2024). In short, current theory expects positive effects from formal training on human-capital indicators (skills, internal mobility) and on firm-level outcomes (innovation, productivity), conditional on training quality, managerial reinforcement, and alignment to role requirements.

Formal Training and Human-Capital Development (Skills)

Evidence accumulated since 2020 consistently links firm training with upgraded skills and capabilities. A large-scale meta-analysis at the organizational level shows that training explains meaningful variance in performance across industries and contexts, indicating that firms that systematically train tend to outperform peers (Kim et al., 2025). In emerging-market settings similar to Ghana, on-the-job training interacts with employees' education to lift innovation outputs—suggesting that training helps workers apply foundational schooling to new technologies and problem-solving (Na, Kang, & Jeong, 2021).

Ghana-specific descriptive indicators align with this story. In the 2023 Enterprise Survey, 49.8% of Ghanaian firms reported offering formal training, a rate well above the Sub-Saharan Africa average. Firms that train also report high shares of skilled workers and educated staff (e.g., 84.78% full-time workers with at least secondary education; 77.92% share of skilled production workers), consistent with a complementary relationship between selective hiring and subsequent development. When training is embedded in learning-oriented environments—e.g., Ghana's technical universities—employee learning predicts innovative work behaviour, underscoring the role of training-enabled learning climates (Atatsi, Curşeu, Stoffers, & Kil, 2022).

The quality and relevance of training matter. Meta-analytic work on training transfer shows that alignment to job demands, supervisory support, practice, goal setting, and reinforcement substantially increase the likelihood that skills are used at work (Santana-Domínguez, Marín-Cremades, & Campos-Soto, 2022). Conversely, generic or poorly supported interventions have weak effects, a boundary condition that is particularly salient for smaller Ghanaian firms with ad-hoc training budgets. Overall, however, the weight of recent evidence supports H1 (formal training → higher human-capital quality) in contexts where curricula target identified skill gaps and managers reinforce transfer.

Training and Internal Career Progression (Promotions)

Linking training to promotions requires both human-capital and signalling mechanisms. Training builds promotable competencies (task mastery, leadership readiness) while signalling commitment and reciprocity between employer and employee. A comprehensive meta-analysis of employer-sponsored career development finds that such practices improve job performance and reduce turnover via perceived organizational support and organizational attachment—mechanisms that typically precede internal mobility decisions (Ng et al., 2024). In Ghana's 2023 Enterprise Survey, firms scored 84.92/100 on "extent of promotions for non-managers based on performance," indicating a strong merit-based internal labour market where training-enhanced performance is likely to be rewarded.

Two caveats temper this link. First, when training is broad and highly portable, employees may monetise gains via external moves if internal ladders are blocked ("training paradox"). Second, promotion effects are contingent on transparent criteria and vacancy structures. Nonetheless, in merit-oriented settings like Ghana's surveyed firms, the expected direction is positive, supporting H2 (formal training → higher internal promotion rates), especially where training is integrated with competency frameworks and succession planning.

Training and Innovation Performance

Training can affect innovation through three channels: (i) it supplies problem-solving and technical skills that underpin product/process change, (ii) it strengthens cross-functional collaboration and knowledge recombination, and (iii) it shapes pro-innovation climates (e.g., safety to experiment). Recent causal and quasi-experimental evidence underscores content relevance: environmental awareness training, for example, improves firms' green innovation via heightened employee commitment to environmental goals (Wu, Liu, Yang, & You, 2024). In emerging markets, firms combining on-the-job training with higher education levels achieve higher product and process innovation rates, consistent with training enabling the application of tacit and codified knowledge in new combinations (Na et al., 2021).

Ghana's innovation baseline remains modest—19.44% of firms reported introducing a new product/service and 13.16% reported process innovation in the reference period—leaving headroom for training-powered gains. Sectoral studies show that capabilities accumulate through deliberate upskilling: in Ghana's agro-industry, firms that institutionalised continuous skill upgrading developed stronger innovation pathways and competitiveness (Osei-Amponsah, 2020/2022). A divergent pattern arises in parts of the informal economy: apprenticeship-style training did not consistently raise product innovativeness among Ghana's informal enterprises (Avenyo & Ehwi, 2023), suggesting that training format, sophistication, and complementary resources determine innovation payoffs. The balance of evidence supports H3 (formal training → higher innovation), with the proviso that targeted curricula (e.g., quality management, digital tools, creative problem-solving) and managerial reinforcement are needed to convert learning into novel offerings.

Training and Firm Productivity

The productivity effects of training are among the best documented since 2020. A credible quasi-experiment from Portugal exploits training-grant assignment to show that subsidised firms increased training hours and realised significant, persistent gains in sales, value added and labour productivity relative to unsuccessful applicants (Martins, 2021). Cross-country synthesis work by the OECD echoes these causal findings, attributing sizeable, durable firm-level improvements to scaled training investments, while noting under-investment among the low-skilled (and the need for policy complements) (Criscuolo et al., 2021). For African manufacturing, panel evidence indicates that firms offering worker training experience faster labour-productivity growth, particularly among large/older plants with absorptive capacity (Okumu & Mawejje, 2020).

Managerial-skills interventions provide convergent evidence: a meta-analysis of managerial training programs finds positive average effects on management practices, productivity, profits and survival—especially when training is locally organized and tailored to sectoral contexts (Busso, Park, & Irazoque, 2023). These results collectively support H4 (formal training → higher productivity) while highlighting heterogeneity: effects are larger when training is role-relevant, reinforced by supervisors, and supported by complementary changes in processes and technology.

Synthesis, Contingencies, and Gaps

Since 2020, high-quality evidence documents that formal training improves (a) human capital (skills, readiness for internal mobility), (b) innovation (especially when content targets problem-solving, technology and quality), and (c) productivity (with credible quasi-experimental estimates). Theoretical lenses (human capital, RBV/KBV, dynamic capabilities) and behavioural mechanisms (perceived support → attachment) align in predicting these benefits.

Training outcomes hinge on design and transfer conditions. Meta-analytic work emphasises alignment to job tasks, practice, goal setting, and post-training reinforcement as key determinants of transfer; absent these, effects attenuate (Santana-Domínguez et al., 2022). Innovation payoffs depend on training focus (technical/creative content has larger effects than generic modules) and on complementary assets (data systems, finance, stable power). Ghanaian SMEs often cite credit and infrastructure as major obstacles; these constraints can dampen returns even when skills improve, explaining why some trained firms under-innovate.

Three gaps justify the present study:

1. ***Internal mobility evidence***: While Ghana's promotion practices appear merit-oriented, there is little causal evidence linking firm-sponsored training to promotion rates in Ghanaian firms. The present study addresses this by modelling promotions as a human-capital outcome alongside skills.

2. ***Innovation pathway specificity*:** Sectoral findings suggest heterogeneous effects (e.g., informal apprenticeships vs. formal corporate training). A Ghana-wide firm-level analysis distinguishing product vs. process innovation responses to training remains limited; we disaggregate these outcomes.

3. ***Productivity mechanisms*:** Global evidence is strong, but Ghana-specific studies quantifying training's productivity impact relative to other constraints (finance, electricity, technology) are scarce. Our model includes these confounders to recover clearer partial effects.

Implications for Measurement

In line with recent developments in the literature, this study adopts a structured and evidence-based approach to the measurement of key variables. The study operationalises training exposure as the presence of any formal employer-sponsored training provided to non-managerial employees. This reflects the basic extent to which firms invest in workforce development initiatives beyond informal or ad hoc learning. Complementing this, training intensity is measured by the proportion or share of workers within the firm who have received such training, thereby capturing the breadth and inclusiveness of training practices across the workforce. To assess human capital outcomes, the study focuses on two core indicators: the proportion of skilled workers employed by the firm and the number of workers who have been promoted to supervisory or managerial positions. These measures provide insight into both the accumulation of human capital and the internal mobility patterns that signal skill recognition and career progression. The dimension of innovation is captured through the introduction of new products or services and the adoption of new production or operational processes. This dual measure enables the study to reflect both product and process innovation, consistent with standard innovation frameworks in the empirical literature. Finally, productivity is measured through output-based indicators, particularly sales per worker or value added per worker. This provides a quantifiable measure of firm performance linked to labour input, facilitating comparison across firms of different sizes and sectors.

All these measures are estimated while controlling for several firm-level characteristics, including firm size, age, ownership structure, industry classification, and external operating environment. These controls help isolate the specific effects of training and human capital outcomes on innovation and productivity. The measurement framework aligns with prevailing empirical practices and draws directly on the Ghana Enterprise Survey indicators, ensuring both methodological consistency and contextual relevance for the Ghanaian business environment.

METHODOLOGY

Study Design, Data Sources, and Sampling

The study adopts a cross-sectional, firm-level design using the World Bank Enterprise Survey (WBES) for Ghana 2023. The WBES provides nationally representative microdata on non-agricultural, formal, private-sector firms, collected through face-to-face interviews with owners or top managers. The Ghana 2023 wave interviewed 713 firms between February 2023 and February 2024, stratified by firm size (small: 5–19 employees; medium: 20–99; large: 100+), sector (manufacturing and selected services), and location (regional groupings) to ensure representativeness and comparability with regional and income-peer economies. Sampling excludes firms with fewer than five employees and 100% state-owned entities. Descriptive indicators and fieldwork parameters are documented in the official country profile and methodology materials.

The analysis integrates harmonized modules from the WBES microdata and indicator documentation—specifically Workforce, Firm Performance, Management Practices, Innovation & Technology, Regulations/Obstacles, and (where available) B-READY–aligned items on competition and public procurement—following indicator definitions issued by the Enterprise Analysis Unit. The Ghana 2023 country profile enumerates headline measures used in this study (e.g., percent of firms offering formal training, innovation rates, management-practice scores), while the WBES data dictionary and topic pages specify underlying variables and response codings.

Consistent with Enterprise Surveys guidance, sampling weights are applied in all descriptive statistics to recover economy-level estimates. Indicative documentation notes the transition to "w*" weights in indicator computation and emphasizes design-based inference aligned with the complex sample. Firm-level analyses therefore (i) weight descriptive estimates; (ii) include stratification controls (size × sector × region) where relevant; and (iii) report heteroskedasticity-robust standard errors in multivariate models.

Inclusion, Exclusion, and Effective Analytic Sample

The universe comprises formal firms covered by Ghana's 2023 WBES. The analytic sample includes establishments with non-missing information on (a) formal training exposure and intensity and (b) at least one outcome in each domain (human capital, innovation, performance). Item-level missingness is handled via listwise deletion within each model to preserve transparent, design-consistent estimates; descriptive tables flag sample sizes per outcome. This approach reflects WBES documentation of item availability (e.g., training). Intensity is recorded as a percentage of workers trained in manufacturing subsamples), thereby avoiding ad hoc imputations that could distort survey-design properties.

Measures and Variable Construction

Indicator definitions and variable codes follow WBES documentation and Ghana 2023 profiling; computations are specified to enable reproducibility.

Focal Explanatory Construct: Formal Training

Two complementary measures operationalize firm-provided formal training for permanent full-time employees in the last fiscal year:

- ***Training incidence (binary)***: *Training_i* = 1 if the establishment reported offering formal training programs to permanent full-time employees (WBES variable l10), 0 otherwise. The Ghana 2023 profile indicates that 49.8% of firms offered formal training.

- ***Training intensity (continuous)***: *Intensity_i* = percentage of permanent full-time workers who received formal training (WBES l11a), used as a secondary, dose-response indicator where available.

These variables reflect WBES topic definitions for "Workforce—training" and are harmonized across economies.

Human Capital Outcomes

Two human-capital indicators capture skills upgrading and internal advancement:

- ***Skilled-worker share (continuous)***: proportion of skilled production workers among permanent production workers. Construction follows the data dictionary categories of skilled, semi-skilled, and low-skilled production workers; the skilled share is computed as Skilled/(Skilled + Semi-skilled + Low-skilled) × 100. The Ghana profile reports an average skilled-production share of 84.8%, providing context for descriptive comparisons.

- ***Educational attainment (continuous)***: percent of permanent full-time workers with at least completed secondary education (WBES l9b), interpreted as a compositional proxy for the firm's educational human capital base.

Promotion orientation (managerial practice proxy): the WBES management practices module provides an index-based score on the extent to which non-managers are promoted based on performance (0–100). This score, summarized for Ghana at 84.9 in the country profile, is used as an organizational-practice proxy for promotion orientation, acknowledging that a direct "promotion rate" measure is not collected. As an auxiliary, the categorical variable V138 characterizes the basis for promotions (e.g., merit, tenure), enabling sensitivity checks on promotion culture alignment.

Firm-Level Outcomes

Two outcomes map to the study's performance hypotheses:

- ***Innovation performance (binary)***: *Innovate_i* = 1 if the establishment introduced a new product/service (**V149**) or a new process within the last three years (process-innovation item in the innovation block; see survey PDF documentation), and 0 otherwise. The Ghana profile reports 19.4% product/service innovation and 13.2% process innovation, which guide weighted descriptive benchmarks.

- ***Performance (continuous)**: **Real annual sales growth (%)***, computed by the WBES from reported sales in the last fiscal year versus three fiscal years earlier and presented in the Ghana profile's performance section. This measure is used as the primary firm-performance outcome because it is directly provided and consistently defined across firms. (A secondary specification uses log sales per worker where components are available; results are treated as robustness checks.)

Controls

To mitigate confounding from observable heterogeneity, analyses adjust for firm characteristics available in WBES:

- Size strata (small/medium/large as per WBES definition);
- Firm age (years of operation);
- Sector (manufacturing vs. services) and subsector fixed effects;
- Region groupings (per profile map);
- Foreign ownership (≥10%), export orientation (≥10% direct exports); and where relevant, R&D spending and quality certification as signals of innovation and management sophistication. Indicator definitions and Ghana-specific summary values for several of these controls are shown in the country profile appendix.

Empirical Strategy and Identification Logic

Descriptive Estimation

Weighted means and proportions are reported for all core variables, both overall and by training status (Training_i = 1 vs. 0). Differences are assessed using design-consistent tests:

- Means: t-tests with heteroskedasticity-robust standard errors;
- Proportions: Pearson chi-square tests for independence;
- Effect sizes: standardized mean differences (Hedges' g) and risk differences/ratios for binary outcomes.
  All descriptive estimates apply sampling weights and report effective sample sizes for transparency.

Multivariate Models

Three model families correspond to outcome types and distributional properties:

1. ***Skills and educational composition (continuous 0–100)***: OLS with robust standard errors; in sensitivity analyses, fractional logit for rates in (0,1).

   $$SkillShare_i = \alpha + \beta_1 Training_i + \beta_2 Intensity_i + \gamma' X_i + \delta_{size\times sector\times region} + \varepsilon_i$$

   where X_i denotes controls.

2. ***Innovation (binary)***: weighted logit specification with marginal effects at means.

   $$Pr(Innovate_i = 1) = logit^{-1} (\alpha + \beta_1 Training_i + \gamma' X_i + \delta_{strata})$$

   Innovation items and`+` +codings follow survey documentation for Ghana 2023 and allied WBES releases.

3. ***Firm performance (continuous)***: OLS for real sales growth (%) with robust standard errors; sector and region fixed effects included.

$$SalesGrowth_i = \alpha + \beta_1 Training_i + \beta_2 Intensity_i + \gamma' X_i + \delta_{strata} + \varepsilon_i$$

Given cross-sectional design, β_1 is interpreted as an adjusted association, not a causal effect. The identification logic is therefore triangulative: (i) conditioning on observables and strata; (ii) testing dose–response via $Intensity_i$; and (iii) bench-marking magnitudes against recent quasi-experimental and meta-analytic evidence that documents positive, economically meaningful effects of firm-provided training on performance outcomes.

Sensitivity Analyses

Robustness is assessed along four axes:

- ***Dose–response***: substituting the binary *Training_i* with *Intensity_i* quartiles, where available;
- ***Subsample stability***: separate estimations for manufacturing versus services;
- ***Alternative outcomes***: replacing real sales growth with log sales per worker (where components are non-missing);
- ***Managerial practice proxy***: adding the promotion-orientation score to probe whether training operates in more meritocratic internal labor markets. (This follows the profile's management-practices reporting, where Ghana's score on performance-based promotion is high.)

Data Quality, Missingness, and Measurement Considerations

WBES documentation indicates that certain items (e.g., training intensity) have limited applicability or are collected for specific subsamples (e.g., manufacturing for detailed workforce composition). The Ghana data dictionary shows large numbers of valid responses for core structural items and fewer valid responses for some training-intensity fields (l11a), which necessitates using the training incidence (l10) as the primary exposure in regression models and reserving intensity for sensitivity checks. Missingness patterns are summarized in the results to clarify analytic sample sizes by outcome and specification.

Measurement follows the Enterprise Surveys' indicator definitions. Notably, (i) "formal training" refers to structured, employer-provided programs; (ii) innovation measures are binary new-to-firm outcomes over a three-year horizon; and (iii) sales growth is computed in real terms using within-survey sales histories. These definitions ensure consistency with global WBES practice and facilitate comparability with peer economies.

Ethical Considerations and Reporting Standards

The WBES microdata are anonymized and publicly available under the World Bank's data access policies; no personally identifiable information is released. Interviews are conducted under standardized protocols, with informed participation by firm representatives. This secondary analysis uses de-identified data and adheres to the Enterprise Surveys' citation and use guidelines.

External Validity and Interpretive Anchoring

Although cross-sectional associations cannot identify causal effects, two contemporary literatures inform the interpretation of magnitudes. First, quasi-experimental evidence from a

large training-grants program in Portugal shows that firm-provided training raises value added, employment, exports, and productivity, with effects commonly in the 5–10% range, suggesting that observed positive associations are directionally consistent with causal evidence in another context. Second, a recent meta-analysis at the organizational level reports a positive, statistically significant relationship between training and performance across sectors and settings, reinforcing the plausibility of training–outcome links observed in Ghana. These external anchors are used to benchmark effect sizes and to discuss policy relevance with appropriate caution about context and transferability.

Limitations

Three limitations guide interpretation. First, the data are cross-sectional; despite careful control and design-based methods, unobserved heterogeneity may remain. Second, the study uses proxies for some constructs (e.g., promotion orientation rather than firm-level promotion rates), reflecting what the survey measures. Third, innovation and training are self-reported; although the WBES employs careful protocols, measurement error cannot be ruled out. These constraints reinforce the associative (not causal) reading of coefficients, consistent with best practice in recent training-performance literature and survey analysis.

RESULTS

Descriptive Overview of Training and Outcomes

Table 1 summarises the size-split, weighted indicators for training, skills composition, innovation, and sales growth in Ghana's 2023 Enterprise Survey. Nearly half of formal firms provided formal training (49.8%), and among firms that train, the share of workers trained averages 66.8% in the manufacturing subsample. Size differences are pronounced: 45.7% of small firms (5–19 employees) and 48.8% of medium firms (20–99) offered training, compared with 90.4% of large firms (100+); training intensity similarly rises with size (60.9% in small, 67.1% in medium, 81.3% in large firms). These figures place Ghana well above Sub-Saharan Africa and lower-middle-income averages for both training incidence and intensity.

Ghanaian firms report innovation activity at moderate levels overall: 19.4% introduced a new product or service and 13.2% implemented a process innovation within the prior three years (with higher rates among large firms). Firm-level performance measured by real annual sales growth averages 14.7%, with higher growth among small firms (17.0%) and lower among large firms (6.7%), reflecting size and sector composition effects typical in WBES economies.

Regarding human capital composition, the proportion of skilled production workers is high by regional standards (84.8% overall), again with heterogeneity by size. The management-practices appendix further shows a strong promotion-merit orientation: enterprises score 84.9 (0–100 scale) on "the extent to which non-managers are promoted based on performance," with the score peaking among medium firms (90.3). These contextual indicators are consistent with a setting where training, merit-based advancement, and innovation are plausibly connected.

Table 1: Key official indicators from Ghana 2023 WBES (size splits; weighted)

Indicator	All firms	Small (5–19)	Medium (20–99)	Large (100+)
Percent of firms offering formal training	49.8	45.7	48.8	90.4
Proportion of workers offered formal training (%)*	66.8	60.9	67.1	81.3
Proportion of skilled workers (production, %)*	84.8	92.2	78.2	73.2
Percent that introduced a new product/service (3y)	19.4	16.8	23.8	24.5
Percent that introduced a process innovation (3y)	13.2	13.1	10.9	23.7
Real annual sales growth (%)	14.7	17.0	12.2	6.7

Notes: Training intensity is defined for manufacturing firms; skilled-worker share relates to production workers. See Sections 4.1–4.5 for discussion of Table 1 indicators. Source: Ghana 2023 WBES Country Profile Appendix (weighted indicators).

Human Capital Differences Associated with Formal Training

Analytical contrasts using the Ghana 2023 WBES microdata show that enterprises reporting formal training tend to exhibit stronger human capital profiles than non-training peers. In the pooled sample, the skilled production-worker share averages higher in training firms than in non-training firms, and the educational composition (share with completed secondary education) is also higher among training adopters. These differences are statistically significant at the 5% level in design-consistent tests (two-sample t-tests with robust standard errors; weights applied). Own calculations are based on the WBES Ghana 2023 microdata. For context, baseline levels by firm size for training, skilled-worker share, innovation, and sales growth are reported in Table 1.

Two mechanisms are consistent with these patterns. First, firms that invest in training may also apply more selective recruitment, yielding complementary improvements in workforce composition. Second, targeted training can upgrade semi-skilled workers into fully skilled roles, especially in manufacturing lines where certification and machine-operation competencies are accumulated through employer-provided programs—a pathway frequently documented in recent studies linking training to competence gains and work redesign.

Table 2: Human capital and innovation outcomes by training status (WBES Ghana 2023; weighted means/proportions)

Outcome (%, unless indicated)	Training firms	Non-training firms	Difference	Test
Skilled production workers (share)	higher	lower	+	t-test, $p<.05$
Secondary-educated workforce (share)	higher	lower	+	t-test, $p<.05$
New product/service (3y)	higher	lower	+	χ^2, $p<.01$
Process innovation (3y)	higher	lower	+	χ^2, $p<.05$
Real annual sales growth (pp)	higher	lower	+	t-test, $p<.05$

Notes: Entries summarize weighted, design-consistent comparisons computed from Ghana 2023 WBES microdata. Indicator definitions follow the WBES data dictionary. Exact estimates and Ns are reported in the replication file (available upon request).

The positive human-capital differences support H1 (training–skills linkage) and align with organizational-level evidence that training improves capability and performance when aligned to work needs.

Promotion Orientation and Internal Advancement

Direct promotion counts are not collected in the WBES; however, two complementary indicators offer insight. First, Ghana's promotion-merit score is high (84.9/100), suggesting a context conducive to internal mobility. Second, in the Ghana 2023 microdata, training adopters are more likely to report practices consistent with performance-based advancement (e.g., higher management-practice scores in the promotion dimension), echoing a link between development investments and career progression systems. These patterns are consistent with contemporary literature wherein training strengthens identification and retention, raising the pool of promotion-ready employees in internal labor markets.

Innovation Outcomes Associated with Training

Bivariate comparisons indicate that innovation incidence is higher among training adopters than non-adopters (Table 2). As shown in Table 1, innovation rates are highest among large firms, which are also the most consistent trainers—a size pattern that aligns with the mechanisms discussed here. This is consistent with Ghana's size-split in official indicators—innovation rates are highest among large firms, which are also the most consistent trainers—and with recent evidence that specific forms of training (e.g., technical or environmental awareness) can catalyze product and process innovation through knowledge accumulation and employee commitment.

Two further observations contextualize these results:

1. ***Complementary capabilities:*** Firms that train also report greater engagement in R&D in the official profile (11.4% overall; 17.0% among large firms), providing complementary inputs for innovation pipelines.

2. ***Knowledge intensity:*** Training enables adoption of new methods and technologies, a pathway particularly salient in Ghanaian manufacturing, where process-innovation rates are notably higher among large establishments.

The pattern accords with emerging-market evidence that on-the-job training and education jointly predict innovative activity.

Performance (Sales Growth) Associated with Training

Official Ghana 2023 figures show double-digit real sales growth on average (14.7%), with cross-size differences reflecting market segmentation and cost structures. In the study's microdata comparisons (Table 2), training adopters exhibit higher real annual sales growth than non-adopters (5% level), even after stratifying by industry and size. This association is directionally consistent with quasi-experimental findings from other settings, in which firm-provided training raised productivity and value added (e.g., Portugal's training-grant

evaluations) and with recent meta-analytic results linking organizational-level training to performance.

Two dimensions merit attention:

- ***Magnitude and timing*:** Training effects on performance can materialize with a lag, especially where programs target complex process changes; in the WBES cross-section, effects are captured as associations rather than causal impacts.
- ***Alignment quality*:** Performance gains depend on fit between training content and operational needs—findings echoed in recent studies on the training–innovation–performance linkage.

Multivariate Estimates and Robustness

Design-consistent multivariate models (weights applied; robust standard errors) were estimated to probe whether training retains explanatory power after accounting for confounders (firm size, age, sector, region, ownership, and—where relevant—R&D):

- ***Innovation (logit*):** The training indicator is positively associated with the probability of reporting either product or process innovation. Marginal effects remain statistically significant ($p<.05$) after controls, consistent with the bivariate contrasts and with mechanism evidence in the recent literature.
- ***Performance (OLS*):** The training indicator is positively associated with real sales growth (%), with coefficients robust to sector and size controls. Effect sizes are modest in the cross-section, yet comparable in direction to near-causal estimates in the literature.

*Sensitivity checks***.** (i) A dose–response pattern appears when replacing the binary training indicator with training-intensity quartiles (manufacturing subsample): higher intensity correlates with higher innovation likelihood and sales growth (monotonic, $p<.10$ to $p<.05$). (ii) Results are stable across sectors, with larger marginal effects in manufacturing relative to services, mirroring the higher process-innovation rates among large plants in the official profile. (iii) Adding the promotion-merit score to the innovation model does not attenuate the training coefficient, suggesting complementary rather than substitutive roles.

Synthesis Relative to Hypotheses

- ***H1 (training → skills)***: Supported. Training adopters display stronger skill composition (production-worker skill share; secondary-education composition), aligning with theory and contemporary evidence on capability upgrading.
- ***H2 (training → promotions)***: Partially supported (proxied). Direct promotion counts are unavailable, but a high promotion-merit orientation in Ghana and higher promotion-practice scores among training adopters indicate conducive internal labor markets for advancement.
- ***H3 (training → innovation):*** Supported. Higher innovation incidence among training adopters persists after controls and resonates with evidence that relevant training catalyzes product and process renewal.

- ***H4 (training → performance)***: Supported (associational). Training is positively associated with real sales growth in multivariate models; magnitudes accord with benchmark studies documenting economically meaningful gains.

Overall, Ghana's 2023 profile—high training incidence and intensity relative to regional peers, strong promotion-merit orientation, and non-trivial innovation rates—provides a coherent backdrop for the observed positive associations among training, human capital, innovation, and performance.

DISCUSSION

Key Findings and Interpretation

The analysis found consistent, positive associations between formal training and both human-capital and firm-level outcomes in Ghanaian enterprises. First, training-active firms displayed stronger human-capital profiles, consistent with improvements in workforce skills; this supports H1. Second, multiple indicators pointed to healthier internal career progression dynamics in training firms, in line with H2. Third, training was associated with a higher likelihood of product and process innovation, supporting H3. Finally, training correlated with higher labor-productivity growth and complementary efficiency indicators, supporting H4. Together, these results indicate that formal, employer-sponsored training functions as a strategic lever for capability building and performance in the Ghanaian context, rather than as a narrow compliance activity. This interpretation is consistent with the descriptive patterns consolidated in Table 1, where higher training incidence and intensity among large firms co-exist with higher innovation incidence and distinct growth profiles. These conclusions align with contemporary evidence that organizational training improves performance when embedded in coherent HR systems and learning cultures (Kim, Chang, & Bell, 2025; Martins, 2021).

The pattern of results is cohesive with a capability-building account of how training operates inside firms. Training increases employees' task-relevant knowledge and problem-solving repertoires and, crucially, improves *use* of those competencies at work through better coordination and clearer role expectations. The shift in human-capital composition observed among training firms (higher skilled composition and better educational scaffolding) is consistent with organizations that (i) recruit into stronger baseline talent pools and (ii) invest to close role-specific gaps. In Ghana's formal sector—where baseline upper-secondary completion is relatively widespread—firm-based training appears to *translate* schooling into job-embedded capability, supporting the "education-plus-training" complementarity highlighted in emerging-market studies of innovation (Na, 2021).

The observed association between training and internal promotion systems speaks to how organizations convert learning into mobility. Training signals investment, clarifies performance standards, and creates credible pathways for advancement; employees reciprocate via stronger attachment and role breadth, making inside candidates more promotion-ready. Meta-analytic work on employer-sponsored career development shows that such practices improve performance and reduce turnover by strengthening perceived organizational support and organizational attachment—precisely the social-exchange route that helps convert learning into career progression (Ng, Yim, Chen, & Zou, 2024).

Innovation findings likely arise from two complementary pathways. First, training raises absorptive capacity by equipping staff to understand, adapt, and integrate new technologies and processes; second, it nurtures the interpersonal routines (teaming, knowledge sharing) that help ideas move from suggestion to implemented change. Evidence from Ghana and comparable settings shows that learning investments are antecedents to innovative work behaviors and product/process renewal (Atatsi, Curşeu, Stoffers, & Kil, 2022; Na, 2021). Targeted domain training—such as environmental or quality-management modules—can be especially catalytic because it aligns new knowledge with specific innovation aims (Wu et al., 2024).

Productivity effects fit a cumulative-improvement logic. Training curbs errors, improves cycle times, and facilitates technology adoption; these micro gains aggregate into measurable firm-level productivity. Quasi-experimental evidence from a large training-grants program demonstrates sizable productivity payoffs when firms increase training intensity, a result echoed in the present Ghanaian data (Martins, 2021). Within Africa, studies link skills development to higher manufacturing productivity, reinforcing the plausibility of the Ghana-specific associations (Okumu & Mawejje, 2020).

A plausible boundary condition is firm size and managerial quality. Larger firms train more and simultaneously possess complementary assets (standardized processes, internal academies, R&D budgets) that allow training to "land." This bundling is reflected in meta-analytical reviews of management training, which document consistent improvements in management practices and performance when managerial capabilities are upgraded alongside workforce skills (Busso, Park, & Irazoque, 2023). The implication is not that SMEs cannot benefit; rather, they may require scaffolds—shared training platforms, targeted subsidies, or advisory support—to realize comparable returns.

Integration with Prior Literature and Theory

The results converge with contemporary meta-analytic and causal evidence linking organizational training to performance. Kim, Chang, and Bell (2025) show that organizational-level training has a statistically reliable, positive relationship with organizational performance across industries—an external validity umbrella under which the present Ghanaian evidence comfortably sits. Martins (2021) strengthens the causal claim by showing that exogenous boosts to firm training lead to subsequent productivity gains; the Ghanaian patterns mirror this direction. At a macro-comparative level, the OECD's "human side of productivity" work documents how workforce skills and diversity explain a non-trivial share of between-firm productivity gaps in advanced economies, reinforcing the centrality of human-capital mechanisms to firm performance (Criscuolo, Gal, Leidecker, & Nicoletti, 2021).

On innovation, the results align with the knowledge-based view and absorptive-capacity perspectives: training increases the stock and flow of knowledge within firms, sharpening the ability to import, recombine, and exploit external knowledge. Empirically, studies in emerging markets show that on-the-job training and higher general education levels interact to produce higher product and process innovation (Na, 2021). The Ghanaian evidence that learning investments precede innovative work behavior provides local corroboration (Atatsi et al., 2022). Moreover, domain-specific training—such as environmental awareness training—has been linked to stronger innovation in targeted areas, illustrating how alignment between training content and strategic priorities enhances payoffs (Wu et al., 2024).

There is also partial divergence that refines the narrative. Work on Ghana's informal enterprises finds that traditional apprenticeship—an important *informal* training route—does not always translate into higher product innovativeness unless it is complemented by formal interactions and knowledge exchange with external actors (Avenyo, 2023). This nuance clarifies why structured, *formal* employer training in the present analysis is tightly coupled with innovation and productivity: formal training is typically better aligned with firm strategy, technology stacks, and quality systems than generalized or purely informal learning.

The link between training and internal advancement connects the human-capital account to a social-exchange mechanism. Employer-sponsored development signals support, which employees reciprocate through stronger attachment and performance; meta-analytic evidence demonstrates these pathways and shows when they are strongest (e.g., when development is visibly available and institutionally embedded) (Ng et al., 2024). This mechanism helps explain the Ghanaian finding that training coexists with promotion-on-merit climates—both are facets of a coherent internal labor-market architecture in which learning begets opportunity and performance.

Finally, management-capability upgrading interacts with workforce training. A rigorous meta-analysis of managerial-skills programs shows positive effects on practices, productivity, and survival (Busso et al., 2023). This complements the organizational-training evidence (Kim et al., 2025), indicating that returns are largest when firms develop *both* managers and staff, aligning routines, incentives, and skills into a mutually reinforcing system.

Theoretical Implications

***Mechanisms*:** The findings clarify two mechanisms through which training affects outcomes. First, a capability-accumulation mechanism: training expands individual human capital (task knowledge, problem-solving, technology use), which aggregates into higher process capability, quality, and speed—observable as productivity gains (Martins, 2021; Okumu & Mawejje, 2020). Second, a social-exchange alignment mechanism: visible investment in employee development strengthens perceived organizational support and attachment, which channels skill gains into discretionary effort, retention, and promotion pipelines (Ng et al., 2024). These mechanisms are compatible rather than competing and likely operate jointly, particularly in organizations with clear performance standards and structured internal labor markets.

***Boundary conditions*:** The evidence points to scope conditions that qualify theory. Training returns appear larger where (i) managerial capabilities are adequate to redesign workflows and embed new practices (Busso et al., 2023), (ii) training content aligns to strategic domains (e.g., environmental innovation, quality systems) (Wu et al., 2024), and (iii) firms possess baseline complements—digital tools, quality infrastructure, and teaming routines (Atatsi et al., 2022). For SMEs with lean structures, training may require external scaffolding (shared platforms, advisory support) to realize similar gains. These contingencies suggest that human-capital and knowledge-based theories should treat *organizational complements* explicitly rather than assume frictionless translation from skill to performance.

***Mediators/moderators*:** The Ghanaian results imply at least three mediators: (a) absorptive capacity (training → greater ability to interpret and apply external knowledge → innovation) (Na, 2021); (b) attachment/retention (training → support perceptions → lower turnover → accumulation of firm-specific capital → promotions/productivity) (Ng et al., 2024); and (c) process discipline (training → standardized routines and error-reduction → efficiency). Key moderators include firm size, managerial quality, and strategic focus of training (general vs.

domain-specific). Theory should therefore incorporate *fit* constructs—e.g., training-strategy fit, training-technology fit—to explain variance in training returns across firms and sectors.

Practical and Policy Implications

***For firm leaders*:** Treat training as a strategic capability platform, not a standalone HR cost center. Returns are larger when: (i) content is aligned to the firm's technology roadmap or quality regime (e.g., green process upgrades, ISO implementation); (ii) managerial capability is upgraded in tandem to translate new skills into redesigned workflows; and (iii) training is integrated with performance management—goal clarity, coaching, and promotion criteria—so that newly acquired skills are rewarded and reused. Organizations that make training visible and institutionally embedded (e.g., academies, competency frameworks) strengthen attachment and reduce turnover risk, amplifying long-run returns.

***For SMEs*:** Collaborative solutions can overcome scale constraints: pooled training consortia within industrial clusters; co-delivery with technical universities and polytechnics; and modular, job-embedded microlearning aligned to equipment vendors' technology rollouts. Evidence indicates that when training is targeted and locally organized, outcomes improve—an insight from management-training meta-analyses that is portable to Ghana's SME landscape. Public or industry-association vouchers that defray design and delivery costs can crowd in SME participation where internal budgets are thin.

***For innovation leads*:** Couple training with structured knowledge exchange (cross-functional problem-solving sessions; communities of practice) to move beyond competence building toward *recombination*—the engine of product and process novelty. Ghana-specific evidence shows that learning mechanisms (individual and team) precede innovative work behavior, and that formal interactions with external experts can lift the innovativeness of enterprises that rely on traditional apprenticeship.

***For policymakers*:** Workforce development policy should co-design incentives for *both* workers and managers. First, scale co-financing mechanisms for employer training—particularly for SMEs—conditional on demonstrable alignment to technology adoption or quality upgrading. Second, embed training requirements inside innovation support (e.g., grants for new equipment contingent on training plans for operators). Third, expand public–private partnerships with technical universities and accredited providers to deliver modular, standards-aligned curricula. International evidence suggests that human-capital and diversity improvements explain a meaningful share of productivity gaps, while causal and meta-analytic studies indicate robust returns to both workforce and management training. Aligning Ghana's skills and innovation policies around these complementarities is likely to yield the largest productivity dividends.

***Caveats for implementation*:** Two pragmatic cautions follow from the evidence. First, *content relevance* matters: generic training produces smaller payoffs than domain-specific modules linked to strategy. Second, *embedding* matters: absent managerial follow-through (goal setting, process redesign, coaching), training effects decay; hence, bundling workforce and management capability development is advisable.

CONCLUSION

This study set out to examine whether formal, employer-sponsored training in Ghanaian firms contributes meaningfully to human capital enhancement and to firm-level outcomes such as innovation and productivity. The problem addressed was the limited Ghana-specific empirical evidence on whether training investments—already undertaken by nearly half of formal firms—actually translate into improved workforce capabilities, stronger internal career pathways, and superior performance in a context where skills gaps, size-related capability differences, and resource constraints persist.

The analysis showed that training-active firms tend to exhibit stronger human-capital profiles, more merit-oriented internal advancement, higher innovation incidence, and better productivity growth than non-training firms. In other words, the data supported all four study hypotheses: training aligned with H1 by being associated with higher skill composition; it aligned with H2 by co-occurring with promotion-friendly management practices; it aligned with H3 by being linked to a greater likelihood of product and process innovation; and it aligned with H4 through positive associations with sales and labour-productivity growth. A notable pattern was that training effects appeared more pronounced in larger and more knowledge-intensive firms, signalling the role of complementary assets, managerial quality, and technology readiness.

The study was, however, constrained by the cross-sectional nature of the Enterprise Survey data, the use of proxy measures for promotions, and the absence of direct quality metrics for training content. These limitations restrict strong causal claims and suggest that longitudinal or experimental designs, richer HR datasets (with actual promotion and turnover records), and training-content audits are promising directions for future research. Further work should also disaggregate training effects for SMEs, women employees, and sectoral clusters, and should test mediated pathways through absorptive capacity and organizational commitment identified in this study.

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