
STRATEGIC HUMAN RESOURCE INVESTMENT AND FINANCIAL PERFORMANCE: EXAMINING THE IMPACT OF EMPLOYEE DEVELOPMENT, WORKFORCE PRODUCTIVITY, AND FINANCIAL EFFICIENCY

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Article History

Received: 2026-04-11

Revised: 2026-08-20

Accepted: 2026-09-26

Published: 2026-10-29

Abstract

This study examines the relationship between strategic human resource investment and financial performance by focusing on employee development, workforce productivity, and HR-related financial efficiency. A quantitative, cross-sectional design was employed using a cleaned secondary HR Analytics Dataset comprising 2,845 employee-level observations and 28 variables. Strategic HR investment was represented through Training Cost, Training Duration, Training Type, and Training Program, while employee development was assessed through Training Outcome. Workforce productivity was operationalized using Performance Score and Current Employee Rating, and HR Investment Efficiency was derived from productivity relative to training expenditure. Descriptive statistics, group comparisons, correlation analysis, and multiple regression were used to evaluate the proposed relationships. The findings showed that Training Cost did not significantly differ across employee-development outcomes and had virtually no direct relationship with workforce productivity. Training Duration and development success were also not significant predictors of productivity. However, workforce productivity showed a positive association with the derived HR Investment Efficiency measure, indicating that the value of HR investment depends more on the productive outcomes generated than on expenditure alone. The study concludes that organizations should evaluate employee-development investments through outcome-based HR analytics rather than relying primarily on training expenditure as an indicator of strategic value.

Keywords: Strategic HR investment; Employee development; Workforce productivity; HR analytics; Financial efficiency; Human capital

1. Introduction

Human resources are now at the heart of the organisation's value, competitive edge and long-term financial viability. Employee-related spend is no longer seen as an operational cost by contemporary businesses, but rather as an investment in training, development, engagement and performance management to build up human capital and increase organizational results. HR practices that are perceived to be supportive and aligned with workforce needs can have an impact on the employee engagement and performance in high performance work systems (Alfes et al., 2021). In the same way, HR practices have been linked to better organizational performance in other ways like knowledge-management capability and innovation performance, showing that the impact of HR practices goes past administrative effectiveness to the creation of worth for the organization (Chawla et al., 2023). This transition has created a greater interest in learning how to identify if investing in staff results in quantifiable benefits in productivity, efficiency and financial results.

One of the most apparent strategies of human resource investment is employee training and development. Organizations invest in employee skills, competencies, and capabilities by spending money and management time and expecting the investments to yield better performance outcomes and to contribute to strategic goals. Temporal, institutional and organisational factors were shown to influence the training-organisation performance linkage in a meta-analysis by Garavan et al. (2021a), which means that investment in training can not always be linked to better organizational results. There has been a focus on the need to consider training as a component of an overall organizational system as opposed to an isolated intervention (Garavan et al., 2021b). This systems perspective aligns with the idea that the strategic role of HR is contingent upon workforce practices being linked to organizational relationships, capabilities and organizational performance goals (Jo et al., 2024).

This correlation between human resource investment and financial performance will therefore not be automatic, but rather complex. HRD investments can positively impact the financial performance of the firm when they manage and organize the capabilities of their employees and link HR development efforts to strategic goals (Kim, 2024). Governance, managerial quality and other organizational resources can also mediate the relationship between human capital resources and firm performance (Lajili et al., 2020). Furthermore, the HRM–performance relationship can be non-linear, meaning that there is no uniform relationship between the increments of HRM investment and performance at all levels of investment (Lee & Cugin, 2022). The observations highlight the need to review not only the amount of money invested in employees, but also whether the development activities are correlated with increased productivity and efficiency in HR utilization. As HR Analytics becomes more prevalent, it is becoming an important tool for assessing these relationships. HR analytics can help companies use data about the workforce to aid in performance metrics to better inform decision makers. When HR analytics is correctly developed and integrated into managerial decision-making processes, it has the potential to impact the organizational performance, as suggested by McCartney and Fu (2022). Likewise, HR information can be used to predict and evaluate financial outcomes by linking the people in the organization to financial outcomes measures (Nurbaiti, 2021). In addition, recent reviews provide further evidence that HR analytics has been getting more attention in the world as organizations strive to better measure the contribution of their workforce and the effectiveness of HR strategies (Ramachandran et al., 2024). However, caution must be taken in interpreting workforce related data as analytical relationships do not necessarily imply causal effects or direct monetary benefits.

Another important point is that the reactions of employees to HR practices affect the realization of positive outcomes in the organization through strategic investments. How employees view HR activities varies and this perception can influence their engagement, commitment, and ultimately their performance (Sanders et al., 2021). Therefore, when organizational resources are directed towards effective labor practices, investment in HR functions can enhance the productivity of the labor force, which is not necessarily related to increased investment costs (Subramony et al., 2021). Moreover, the extent to which firms invest in employee training is influenced by internal and external factors, and it is a strategic and time-dependent decision (Sung & Choi, 2023). Therefore, when considering HR investment, it is important to focus on the resources invested and the productive output created from those resources.

The large datasets of workforces have opened new avenues to explore these questions at an individual employee level. The large size of the workforce datasets has brought fresh possibilities to explore these questions with data at the level of the individual employee. Big-data approaches can assist strategic human-capital management by allowing organizations to pose more focused inquiries of the relationships between human-capital investment, employee development, performance, and value of the organization (Hamilton & Sodeman, 2020). Based on this view, the current study investigates the link between strategic human resource investment and financial performance via the interrelatedness of employee development, workforce productivity and financial efficiency. The study assesses the relationship between training-related investment and development

and productivity outcomes for a cleaned secondary HR Analytics Dataset and the relationship between workforce productivity and HR-related efficiency (financial) outcomes.

1.1 Research Objectives

The study has four principal objectives. First, it seeks to examine whether strategic HR investment, represented through training cost, duration, type, and program characteristics, is associated with employee-development outcomes. Second, it evaluates whether successful employee development is related to stronger workforce productivity. Third, it investigates whether strategic HR investment directly contributes to workforce productivity. Fourth, it examines whether workforce productivity and employee development are associated with HR-related financial efficiency, thereby providing an employee-level indication of the productive value generated from human-capital investment.

1.2 Research Hypotheses

Based on the theoretical arguments and empirical relationships examined in the study, the following hypotheses are proposed:

H1: Strategic HR investment is significantly associated with employee-development outcomes.

H2: Training duration is significantly associated with employee-development outcomes.

H3: Successful employee-development outcomes are significantly associated with higher employee performance.

H4: Employee development is significantly associated with workforce productivity.

H5: Strategic HR investment is significantly associated with workforce productivity.

H6: Workforce productivity is positively associated with HR investment efficiency.

H7: Employee development and workforce productivity are significantly associated with HR-related financial efficiency.

2. Methodology

2.1 Research Design

The study used a quantitative, cross sectional and explanatory design to explore the relationship between strategic human resource investment and financial performance of the company with specific focus on employee development, workforce productivity and financial efficiency. The quantitative approach was deemed suitable for the study because it aimed at assessing the quantitative relationships between employee training investment, employee development outcomes, workforce performance, and the HR-related efficiency measures. This study was secondary data oriented and hence did not require any primary data collection in the form of surveys, interviews or experiments. The secondary “HR Analytics Dataset” was used for empirical analysis, which contains detailed data on employee level related to training, performance, involvement, satisfaction, work-life balance, demographic characteristics, and organizational attributes.

2.2 Data Source and Sample

The main source of empirical data in the study was a cleaned secondary HR Analytics Dataset (Opeyemi, 2024). The final cleaned data set consisted of 2845 records at the employee level and 28 variables. Records were for each employee and contained demographic, organizational, performance and training related data. There was no need for further primary data collection as the data set included all the variables necessary to examine the central relationships that were proposed in the study. The main factors of interest in the current study were Training Cost, Training Duration, Training Program Name, Training Type, Training Outcome, Performance Score, Current Employee Rating, Engagement Score, Satisfaction Score, Work-Life Balance Score, Age, Gender, Employee Type, Department Type, Business Unit, and Pay Zone.

2.3 Study Variables and Operationalization

The conceptual structure of the study consisted of four main dimensions namely Strategic human resource investment, Employee development, Workforce productivity, financial efficiency/HR-related financial performance. Because the HR Analytics Dataset was created for workforce analytics, and not for corporate accounting analysis, each construct was defined by variables that were theoretically most similar to the construct in the dataset. Training expenditure and training characteristics were used to capture the strategic HR investment, training outcomes were used to capture the employee development, workforce productivity measured by performance indicators and financial efficiency measured by the relationship between the investment in training and the resulting employee performance.

2.4 Strategic Human Resource Investment

Training Cost, Training Duration (Days), Training Type and Training Program Name were the most important strategic human resource investments. Training Cost was the direct monetary investment in employee training, and hence the most straightforward quantitative measure of investment in strategic HR. Training Duration was the time spent on training activities for employees, and Training Type was the type of training (either alternative or traditional). The name of the Training Program indicated the developmental focus of the intervention, for example, leadership, technical, customer-service, or project-management development. These indicators together constituted the amount of money and effort put into improving the skills of employees.

2.5 Employee Development

The Training Outcome variable was the most important of the measures associated with employee development. The data was broken down into categories for training outcomes: Passed, Completed, Failed, and Incomplete. These categories were representative of the extent to which developmental interventions were successful and/or beneficial for employees. Passed and Completed outcomes can be considered successful development outcomes, and Failed and Incomplete outcomes can be considered unsuccessful or incomplete developmental outcomes for selected inferential analyses. Training Duration and Training Program Name were also considered supporting variables as both the duration and content of the training activities could have an influence on the employee-learning outcomes.

2.6 Workforce Productivity

Performance Score and Current Employee Rating as the major performance indicators were used to operationalize workforce productivity. Performance Score was a categorical assessment of employees, ranging from Exceeds to PIP, and Current Employee Rating was a numerical assessment of the employee level. Employees' ratings were viewed as an indicator of workforce performance. Engagement Score, Satisfaction Score, and Work-Life Balance Score were also added as additional indicators of the workforce since they reflect conditions that could be a behavioral and attitudinal factor that could either help or hinder employee productivity. These measures, however, were not considered direct substitutes for productivity but rather as explanatory variables.

2.7 Financial Efficiency

The dataset did not contain conventional firm-level financial-efficiency measures such as operating cost ratios, revenue per employee, return on assets, or operating margin. Therefore, financial efficiency was conceptualized as HR investment efficiency, representing the productive output achieved relative to organizational expenditure on employee training and development. Training Cost was treated as the financial input, while Current Employee Rating and Performance Score were treated as performance-related outputs. A derived efficiency indicator could therefore be expressed conceptually as:

HR Investment Efficiency = Workforce Performance / Training Investment

This measure was interpreted strictly as the efficiency of human-resource development expenditure and not as a conventional accounting ratio.

2.8 HR-Related Financial Performance

Because the secondary HR Analytics Dataset did not provide direct accounting measures such as revenue, net profit, return on assets, return on equity, EBITDA, or operating margin, the study interpreted financial performance as HR-related financial performance. This construct represented the extent to which organizational expenditure on employee development was associated with improved performance and productive efficiency. Consequently, the study did not claim to measure corporate profitability directly. Instead, it examined whether strategic investment in employees generated stronger developmental and workforce outcomes relative to training expenditure, thereby offering an employee-level indication of the potential financial value of human-capital investment.

2.9 Control Variables

Several demographic and organizational characteristics available in the dataset were considered as potential control variables. These included Age, Gender, Employee Type, Employee Status, Employee Classification Type, Department Type, Business Unit, Division, and Pay Zone. The inclusion of relevant controls was intended to reduce the possibility that observed relationships between training investment and employee performance were explained solely by differences in employee or organizational characteristics. Categorical variables were transformed into appropriate dummy-coded variables where required for multivariate analysis.

2.10 Data Cleaning and Preparation

The HR Analytics Dataset used in this study was cleaned. Data were checked for completeness, duplicate, consistency of variables, and type of measurement prior to statistical analysis. Numerical variables like Training Cost, Training Duration, Current Employee Rating, Engagement Score, Satisfaction Score, Work-Life Balance Score and Age were kept as numerical. Categorical variables such as: Training Outcome, Training Type, Training Program Name, and Performance Score were coded correctly for inferential analysis. In cases where this was required, ordinal or dummy coding was used for the purposes of group comparisons and regression modelling. The extreme values of quantitative variables were also checked to see if they had undue influence on the statistical results.

2.11 Descriptive Statistical Analysis

To summarise the characteristics of the data set and to determine the distribution of the main variables of the present study descriptive statistics were first calculated. Categorical variables were presented as frequencies and percentages, and numerical variables were presented as means, standard deviations, minimums, maximums and medians. Special focus was placed on Training Cost, Training Duration, Training Program, Training Type, Training Outcome, Current Employee Rating, Performance Score, Engagement Score, Satisfaction Score and Work-Life Balance Score. This stage offered a snapshot of how much and how often strategic HR investments were made, what outcomes were realized in the employee-development area, and how well the workforce was performing in the sample.

2.12 Group Comparison Analysis

Group comparison analyses were conducted to assess whether there were any differences between the strategic HR investment and workforce performance by training categories. The training outcome group was compared to the training type group, the training program group, and the performance score group in terms of Mean Training Cost, Training Duration, and Current Employee Rating. Two groups were compared using independent-samples t-tests and three or more groups using one-way analysis of variance (ANOVA). If the assumptions for parametric procedures were not met, then equivalent non-parametric procedures were used. These analyses helped the study determine if there were differences in the nature or outcome of training that were related to differences in employee performance or HR investment.

2.13 Correlation Analysis

The direction and strength of the relationships between the main quantitative variables were analyzed using correlation analysis. Analysis was directed at the following Training Cost, Training Duration, Current Employee Rating, Engagement Score, Satisfaction Score, Work-Life Balance Score, and productivity/efficiency indicators. Variables that satisfied the assumptions of continuous measurement and were approximately normally distributed were analyzed using Pearson's correlation coefficient; otherwise, Spearman's rank correlation could be used. The correlation analysis results showed preliminary evidence of the relationship between the training expenditure, training duration and employee performance and HR investment efficiency.

2.14 Regression Analysis

Multiple regression analysis was used as the principal inferential technique for testing the proposed relationships among strategic HR investment, employee development, workforce productivity, and HR-related financial performance. A workforce-productivity model could be specified as:

$$WP_i = \beta_0 + \beta_1 TC_i + \beta_2 TD_i + \beta_3 TO_i + \beta_4 TT_i + \beta_5 X_i + \varepsilon_i$$

where WP represents workforce productivity, TC represents Training Cost, TD represents Training Duration, TO represents Training Outcome, TT represents Training Type, X represents the vector of relevant control variables, β represents estimated coefficients, and ε represents the error term. A subsequent model could examine HR investment efficiency as a function of strategic HR investment, employee-development outcomes, and workforce productivity. This analytical approach allowed the study to assess whether employee development and workforce productivity contributed additional explanatory value beyond training expenditure alone.

2.15 Hypothesis Testing

Hypothesis testing was undertaken in accordance with the proposed conceptual relationships. The analysis assessed whether strategic HR investment was significantly associated with employee development, whether training duration influenced developmental outcomes, whether successful training outcomes were associated

with stronger employee performance, whether employee development contributed to workforce productivity, whether productivity improved HR investment efficiency, and whether strategic HR investment was associated with HR-related financial performance. Statistical significance was assessed at the conventional 5% level ($p < 0.05$). In addition to p-values, regression coefficients, confidence intervals, effect sizes, and model explanatory power were considered when interpreting the empirical results.

2.16 Model Diagnostics

The regression estimates were interpreted after performing appropriate diagnostic checks to determine the validity of the statistical models. These were linearity, normal distribution of residuals (if applicable), homoscedasticity, independence of observations, and multicollinearity. Possible excessive multicollinearity of explanatory variables was identified by the use of Variance Inflation Factors (VIFs). R-squared, adjusted R-squared, F-statistics, regression coefficients with associated significance levels were used to model performance. If heteroscedasticity existed, robust standard errors could be used to enhance the precision of statistical inference.

2.17 Ethical Considerations

This study used only a secondary HR Analytics Dataset, and did not engage with employees directly. There were no primary questionnaires, interviews, experiments or interventions. Employee ID was only used as an identifier for the record and not as a substantive analytical variable. Only variables that were essential for the research objectives were analysed and the secondary nature of the dataset was clearly stated. The study did not therefore present the data as new primary evidence as such.

3. Results

3.1 Sample and Training Characteristics

The secondary HR Analytics Dataset was cleaned and then the final analysis was done based on 2,845 observations at the employee level. The sample consisted of 1,588 female employees (55.8%) and 1,257 male employees (44.2%). With regard to employment type, 997 employees (35.0%) were full-time, 951 (33.4%) were contract employees and 897 (31.5%) were part-time employees. Almost equal numbers of employees (1,424, 50.1% versus 1,421, 49.9%) were trained through external or internal programs, respectively.

As shown in Table 1, the most popular training category was Communication Skills, with 633 employees trained, followed by Project Management, with 585 employees trained, and Leadership Development, with 544 employees trained. The top training categories were Communication Skills (22.2% of employees trained), Project Management (20.6% of employees trained), Leadership Development (19.1% of employees trained), Technical Skills (19.1% of employees trained) and Customer Service (19.0% of employees trained), as presented in Table 1. In terms of employee development outcomes, 737 employees (25.9%) completed their training, 731 employees (25.7%) had incomplete outcomes, 709 employees (24.9%) passed and, 668 employees (23.5%) failed. Figure 1 shows the distribution of the employees in the training programs.

Table 1. Sample and Training Characteristics

Variable	Category	Frequency (n)	Percentage (%)
Gender	Female	1,588	55.8
	Male	1,257	44.2
Employee Type	Full-Time	997	35.0
	Contract	951	33.4
	Part-Time	897	31.5
Training Type	External	1,424	50.1
	Internal	1,421	49.9
Training Program	Communication Skills	633	22.2
	Project Management	585	20.6
	Leadership Development	544	19.1
	Technical Skills	543	19.1
	Customer Service	540	19.0
Training Outcome	Completed	737	25.9
	Incomplete	731	25.7
	Passed	709	24.9
	Failed	668	23.5

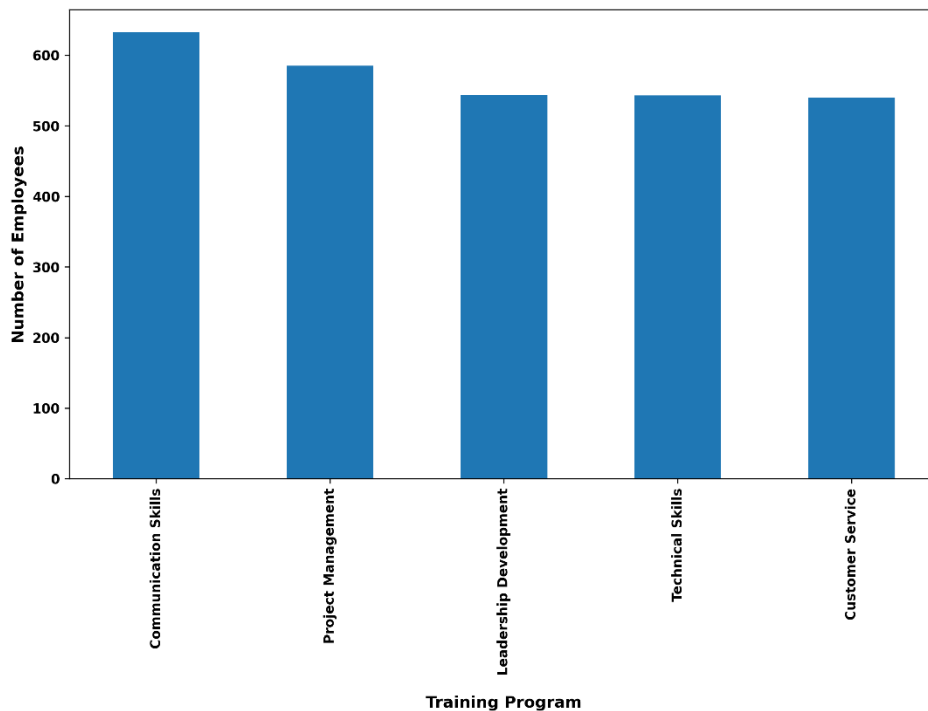


Figure 1. Distribution of Employees across Training Programs

3.2 Descriptive Statistics of HR Investment and Workforce Indicators

The principal quantitative variables were summarized using descriptive statistics as shown in Table 2. Mean Training Cost was 559.28 (SD = 263.33), with expenditure ranging from 100.04 to 999.97. The mean Training Duration was 2.97 days (SD = 1.42) which means that employee-development programs last around 3 days. The mean of Current Employee Ratings was 2.98 (SD = 1.01) and the mean of Engagement Score, Satisfaction Score and Work-Life Balance Score were 2.94, 3.03 and 2.99, respectively.

The Workforce Productivity Index was derived and had a mean of 67.30 (SD = 12.22) with a range of 0 to 100. The mean was 171.58 (SD = 135.51) for HR Investment Efficiency (productivity per dollar of training). The efficiency measure had relatively large standard deviation, suggesting that there is a significant amount of variation in the productive return from training expenditure across employees.

Table 2. Descriptive Statistics of the Principal Study Variables

Variable	N	Mean	SD	Minimum	Median	Maximum
Training Cost	2,845	559.28	263.33	100.04	571.81	999.97
Training Duration (Days)	2,845	2.97	1.42	1.00	3.00	5.00
Current Employee Rating	2,845	2.98	1.01	1.00	3.00	5.00
Engagement Score	2,845	2.94	1.44	1.00	3.00	5.00
Satisfaction Score	2,845	3.03	1.41	1.00	3.00	5.00
Work-Life Balance Score	2,845	2.99	1.41	1.00	3.00	5.00
Age	2,845	49.45	17.69	17.00	49.00	82.00
Productivity Index	2,845	67.30	12.22	22.50	67.50	100.00
HR Investment Efficiency	2,845	171.58	135.51	26.52	118.21	864.11

Employee performance classifications are presented graphically in Figure 2. A substantial majority of employees, 2,251 (79.1%), were classified as Fully Meets. A further 346 employees (12.2%) were categorized as Exceeds, 162 (5.7%) as Needs Improvement, and 86 (3.0%) as PIP. Thus, more than 91% of the sample was classified as either Fully Meets or Exceeds.

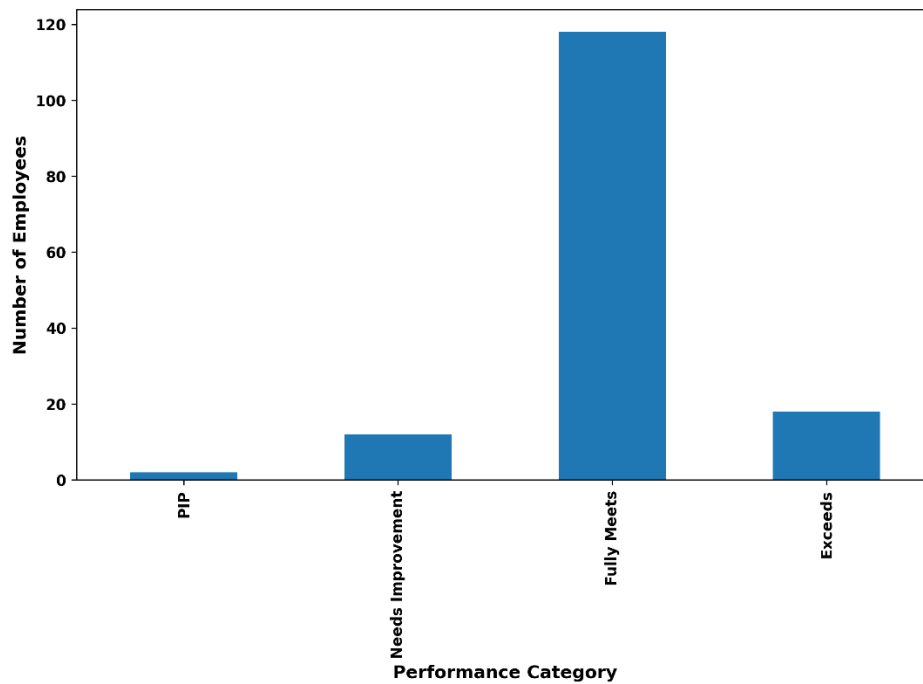


Figure 2. Distribution of Employee Performance Scores

3.3 Strategic HR Investment and Employee Development Outcomes

The relationship between training investment and employee-development outcomes was examined by comparing Training Cost, Training Duration, Employee Rating, Productivity, and HR Investment Efficiency across the four Training Outcome categories. As shown in Table 3, employees whose training was Completed had the highest average Training Cost at 565.03, followed by Passed at 561.93, Failed at 557.12, and Incomplete at 552.88. However, these differences were relatively small.

Mean Current Employee Ratings also remained highly similar across training outcomes. Employees in the Completed category had a mean rating of 3.01, while Failed, Incomplete, and Passed groups had mean ratings of 2.95, 2.99, and 2.95, respectively. Mean Productivity Index values ranged only from 66.92 to 67.64.

One-way ANOVA confirmed that Training Cost did not differ significantly across the four development outcomes, $F(3, 2841) = 0.30, p = .825$. Similarly, no significant differences were identified in Current Employee Rating, $F(3, 2841) = 0.60, p = .618$, Productivity Index, $F(3, 2841) = 0.55, p = .651$, or HR Investment Efficiency, $F(3, 2841) = 0.10, p = .961$. These results suggest that the amount invested in training alone did not differentiate successful from unsuccessful employee-development outcomes in the present dataset.

Table 3. HR Investment and Workforce Indicators by Training Outcome

Training Outcome	N	Mean Training Cost	Mean Duration	Mean Rating	Mean Productivity	Mean HR Efficiency
Completed	737	565.03	2.96	3.01	67.50	172.84
Failed	668	557.12	3.00	2.95	67.11	171.28
Incomplete	731	552.88	2.92	2.99	67.64	172.69
Passed	709	561.93	3.02	2.95	66.92	169.42

The differences in mean Training Cost across the four employee-development outcomes are presented visually in Figure 3. Although Completed training showed the highest average expenditure and Incomplete training the lowest, the comparatively narrow differences correspond with the statistically non-significant ANOVA result.

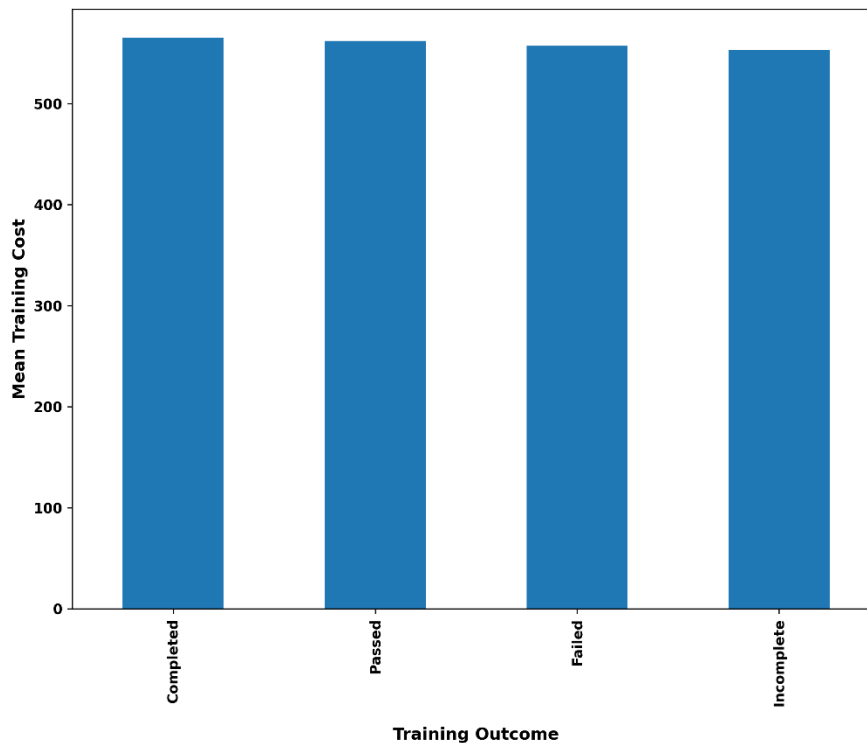


Figure 3. Mean Training Cost across Employee Development Outcomes

3.4 Comparison of Training Programs

The five training programs were compared to determine whether different forms of strategic HR investment were associated with different workforce outcomes. As reported in Table 4, Customer Service had the highest average Training Cost at 569.88, followed by Project Management at 562.92, Leadership Development at 561.42, Technical Skills at 560.12, and Communication Skills at 544.30.

Mean employee ratings differed very little across programs, ranging from 2.95 for Leadership Development to 3.01 for Technical Skills. Similarly, mean Productivity Index values ranged from 66.80 for Leadership Development to 67.57 for Customer Service. Communication Skills showed the highest average HR Investment Efficiency at 179.31, whereas Customer Service recorded the lowest at 166.41.

Despite these descriptive differences, one-way ANOVA indicated no statistically significant differences across the five programs in Training Cost, $F(4, 2840) = 0.77$, $p = .545$, Current Employee Rating, $F(4, 2840) = 0.26$, $p = .905$, Productivity Index, $F(4, 2840) = 0.34$, $p = .853$, or HR Investment Efficiency, $F(4, 2840) = 0.77$, $p = .546$.

Table 4. HR Investment and Workforce Performance by Training Program

Training Program	N	Mean Training Cost	Mean Duration	Mean Rating	Mean Productivity	Mean HR Efficiency
Communication Skills	633	544.30	2.96	2.99	67.30	179.31
Customer Service	540	569.88	2.97	2.96	67.57	166.41
Leadership Development	544	561.42	3.02	2.95	66.80	169.27
Project Management	585	562.92	3.00	2.97	67.33	171.60
Technical Skills	543	560.12	2.91	3.01	67.51	170.02

The average HR Investment Efficiency values across the five training programs are illustrated in Figure 4. Communication Skills produced the highest descriptive efficiency, although the differences among programs were not statistically significant.

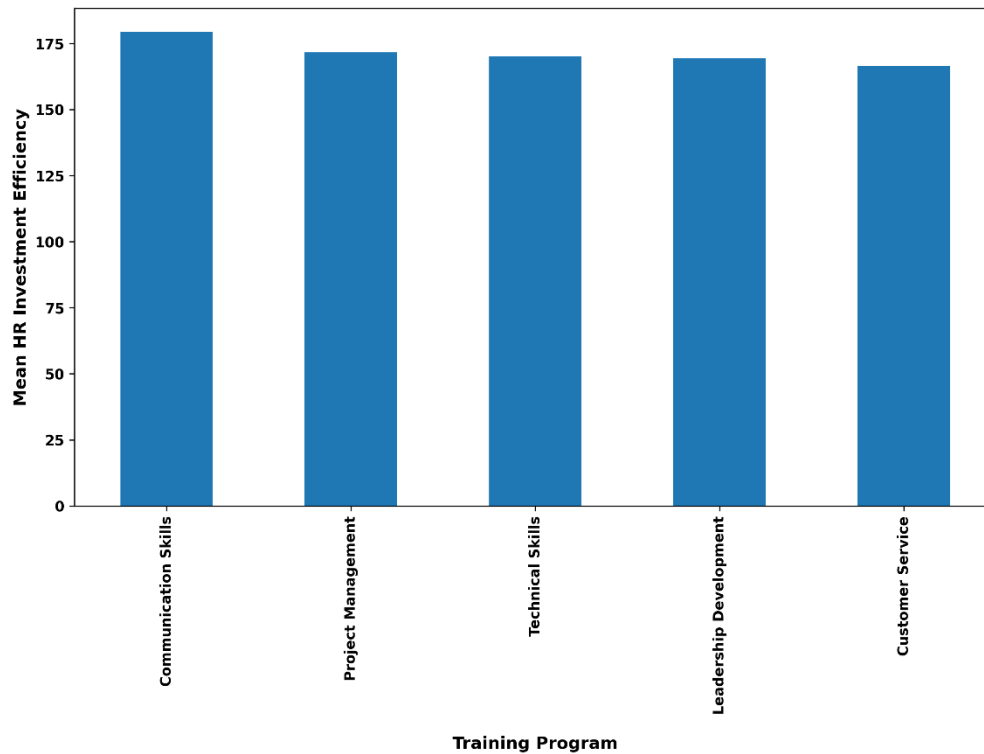


Figure 4. Mean HR Investment Efficiency across Training Programs

3.5 Internal and External Training Comparison

The effectiveness of internal and external training was also analyzed. The mean Training Cost for internal training was 561.05 while it was 557.51 for external training. There was no difference that was statistically significant: $t = 0.36$, $p = .720$. The mean Current Employee Rating for employees trained internally was 3.00 while it was 2.95 for employees trained externally, but this difference was not significant, $t = 1.37$, $p = .171$. As shown in the Table 5, the mean Productivity Index for internal training was 67.48 while the mean Productivity Index for external training was 67.12, $t = 0.79$, $p = .430$. The external training and the internal training were 170.49 and 172.67 respectively with no significant difference $t = -0.43$ and $p = .667$. The results did not support the hypothesis that one training mode would yield better employee or financial-efficiency results than the other, then.

Table 5. Comparison of Internal and External Training

Variable	Internal Mean	External Mean	t-statistic	p-value
Training Cost	561.05	557.51	0.36	.720
Current Employee Rating	3.00	2.95	1.37	.171
Productivity Index	67.48	67.12	0.79	.430
HR Investment Efficiency	170.49	172.67	-0.43	.667

3.6 Correlation Analysis

Pearson correlation analysis was performed to evaluate the relationships among training investment, employee development-related indicators, workforce productivity, and HR investment efficiency. The results are reported in Table 6. Training Cost was essentially unrelated to Current Employee Rating, $r = .011$, $p = .566$, and showed virtually no relationship with the Productivity Index, $r < .001$, $p = .998$. Training Duration was also unrelated to Current Employee Rating, $r = .006$, $p = .753$.

Current Employee Rating was strongly and positively correlated with the Productivity Index, $r = .828$, which was expected because employee rating formed part of the productivity measure. More importantly, Productivity Index was positively associated with HR Investment Efficiency, $r = .245$, $p < .001$, indicating that higher workforce productivity corresponded with stronger productive return relative to training expenditure.

Training Cost showed a strong negative relationship with HR Investment Efficiency, $r = -.804$, $p < .001$. Because Training Cost forms the denominator of the efficiency measure, this negative association should be interpreted structurally: when expenditure increases without a proportionate increase in productivity, the

calculated efficiency ratio decreases. It therefore does not imply that training expenditure itself damages financial performance.

Table 6. Correlation Matrix of Key Study Variables

Variable	TC	TD	ER	ENG	SAT	WLB	PI	HRE
Training Cost (TC)	1.000	-.016	.011	.021	.001	.008	.000	-.804
Training Duration (TD)	-.016	1.000	.006	.003	.024	.003	-.003	.020
Employee Rating (ER)	.011	.006	1.000	.022	-.025	.028	.828	.207
Engagement (ENG)	.021	.003	.022	1.000	-.004	.026	.015	-.002
Satisfaction (SAT)	.001	.024	-.025	-.004	1.000	-.033	-.016	.009
Work-Life Balance (WLB)	.008	.003	.028	.026	-.033	1.000	.027	-.003
Productivity Index (PI)	.000	-.003	.828	.015	-.016	.027	1.000	.245
HR Investment Efficiency (HRE)	-.804	.020	.207	-.002	.009	-.003	.245	1.000

The relationship between Training Cost and the Workforce Productivity Index is visually displayed in Figure 5. The almost horizontal fitted trend line illustrates the absence of a meaningful linear relationship between the level of training expenditure and employee productivity.

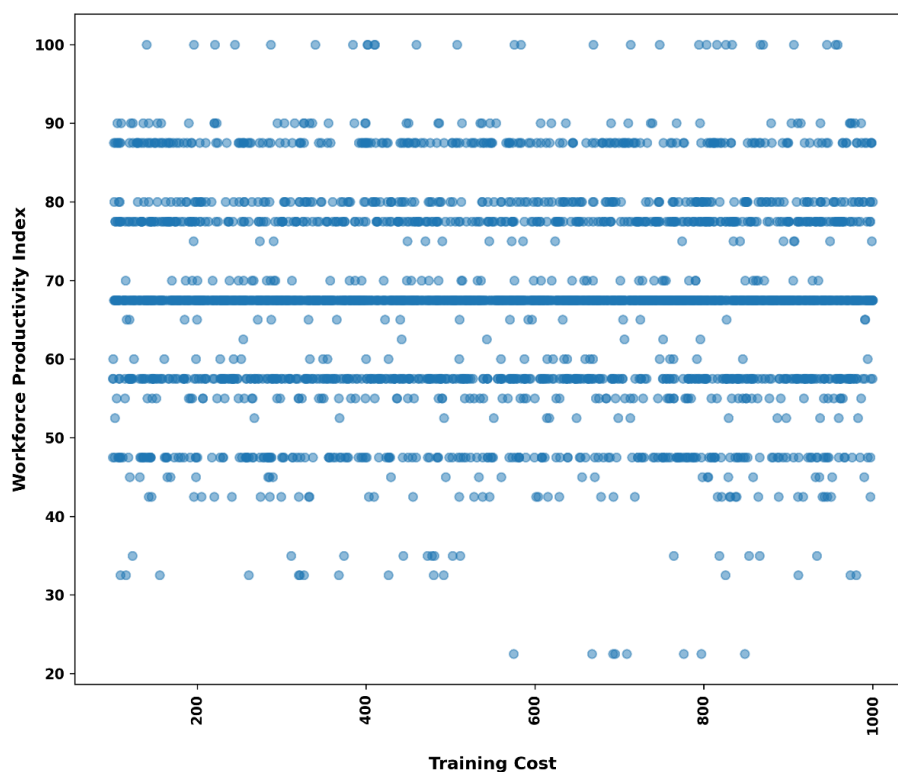


Figure 5. Relationship between Training Cost and Workforce Productivity

3.7 Regression Analysis of Workforce Productivity

Multiple linear regression with heteroscedasticity-robust standard errors was conducted to determine whether strategic HR investment and employee-development indicators significantly predicted the Workforce Productivity Index. Training Cost, Training Duration, Development Success, Engagement Score, Satisfaction Score, Work-Life Balance Score, and Age were included as predictors.

As reported in Table 7, the overall model explained only 0.2% of the variance in workforce productivity ($R^2 = .002$; adjusted $R^2 = -.001$) and was not statistically significant, $F = 0.60$, $p = .760$. Training Cost showed essentially no effect on Productivity Index ($B = -0.00002$, $p = .982$). Training Duration ($B = -0.026$, $p = .869$) and Development Success ($B = -0.147$, $p = .748$) were likewise non-significant. Engagement, Satisfaction, Work-Life Balance, and Age were also not statistically significant predictors.

These findings indicate that the direct amount and duration of training investment were insufficient to explain employee productivity differences within the full dataset.

Table 7. Multiple Regression Predicting Workforce Productivity

Predictor	B	Robust SE	z	p-value
Constant	67.459	1.301	51.860	<.001
Training Cost	-0.00002	0.0009	-0.022	.982
Training Duration	-0.026	0.158	-0.165	.869
Development Success	-0.147	0.460	-0.321	.748
Engagement Score	0.117	0.160	0.732	.464
Satisfaction Score	-0.127	0.165	-0.773	.440
Work-Life Balance Score	0.221	0.161	1.376	.169
Age	-0.013	0.013	-0.967	.334

Model statistics: $R^2 = .002$; Adjusted $R^2 = -.001$; $F = 0.596$; $p = .760$.

3.8 Regression Analysis of HR Investment Efficiency

A second regression model examined HR Investment Efficiency as the dependent variable. Workforce Productivity, Development Success, Training Duration, Engagement, Satisfaction, Work-Life Balance, and Age were included as predictors. Unlike the productivity model, this regression was statistically significant, $F = 23.26$, $p < .001$, with $R^2 = .061$ and adjusted $R^2 = .058$.

As presented in Table 8, Workforce Productivity emerged as the only statistically significant predictor of HR Investment Efficiency, $B = 2.720$, $p < .001$. This coefficient indicates that a one-unit increase in the Productivity Index was associated with an approximate 2.72-unit increase in HR Investment Efficiency, holding the other variables constant. Development Success, Training Duration, Engagement, Satisfaction, Work-Life Balance, and Age were not statistically significant.

This finding provides empirical support for the proposition that stronger workforce productivity contributes to improved financial efficiency of human-resource investment, even though training expenditure itself did not directly predict productivity.

Table 8. Multiple Regression Predicting HR Investment Efficiency

Predictor	B	Robust SE	z	p-value
Constant	-17.483	19.693	-0.888	.375
Productivity Index	2.720	0.215	12.635	<.001
Development Success	-0.573	4.939	-0.116	.908
Training Duration	1.990	1.746	1.140	.254
Engagement Score	-0.547	1.763	-0.310	.756
Satisfaction Score	1.204	1.766	0.682	.495
Work-Life Balance Score	-0.912	1.759	-0.518	.604
Age	0.022	0.137	0.157	.875

Model statistics: $R^2 = .061$; Adjusted $R^2 = .058$; $F = 23.26$; $p < .001$.

3.9 Summary of Hypothesis Testing

The hypothesis-testing results are summarized in Table 9. The empirical evidence did not support a significant direct relationship between strategic HR investment and employee-development outcomes or workforce productivity. Similarly, training duration and successful training completion were not significant predictors of productivity. However, workforce productivity demonstrated a statistically significant positive effect on HR Investment Efficiency, providing support for the central proposition that productive employee performance is an important mechanism through which human-resource investment may generate financial value.

Table 9. Summary of Hypothesis Testing

Hypothesis	Proposed Relationship	Main Evidence	Decision
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H1	Strategic HR Investment → Employee Development	Training Cost across outcomes: $F = 0.30, p = .825$	Not Supported
H2	Training Duration → Employee Development	No meaningful group differences	Not Supported
H3	Successful Development → Employee Performance	Development Success: $p > .05$	Not Supported
H4	Employee Development → Workforce Productivity	$B = -0.147, p = .748$	Not Supported
H5	Workforce Productivity → Financial Efficiency	$B = 2.720, p < .001$	Supported
H6	Strategic HR Investment → HR-related Financial Performance	Training Cost–Productivity: $r \approx .000, p = .998$	Not Supported
H7	Development and Productivity → HR-related Financial Performance	Productivity significant; development non-significant	Partially Supported

Overall, the findings demonstrate that the size of training expenditure alone was not associated with stronger employee-development or productivity outcomes. Instead, financial efficiency was more strongly related to the productivity achieved from the workforce. The findings therefore suggest that organizations may derive greater financial value from HR investment when developmental activities translate into actual employee performance rather than when organizations simply increase training expenditure.

4. Discussion

The present study investigated whether strategic investment in HR leads to financial performance through the employee development, productivity of the workforce, and HR-related financial efficiency. The findings suggest that training costs were not statistically different in employee-development outcomes or productivity of the workforce. There was little difference in Training Cost by Training Outcome groups, and the direct relationship between Training Cost and the Workforce Productivity Index was almost insignificant. The financial size of an HR investment should not be viewed as a quantifiable measure of how effective a development is, according to these findings. Instead, the strategic return on HR investments seems to rely on the design, execution and transformation of training into employee capability. This is in line with Batta et al. (2023) who argue that HR practices do not affect performance only because they involve higher expenditure, but because they induce employee-level reactions, and with Frago et al. (2022) who demonstrate that commitment can mediate the link between high-performance work systems and individual performance.

The lack of a strong correlation between training expenditure and employee-development outcomes further underscores the significance of training quality, relevance, and context. Hosen et al. (2024) show that training and career development can be determined as predictors of work performance, but this is likely to be contingent on organizational commitment and developmental opportunities. Likewise, Keltu (2024) concluded that HRD can improve employee performance through job satisfaction, indicating that the rewards of HRD development can be realized indirectly by means of behavior. In the current study, successful completion of training was not a significant predictor of workforce productivity. This doesn't mean that employee development is not important, it just means that there may be more complex shifts in what an employee can do, wants to do, or how they do it that doesn't fit neatly into the categories of simple completion.

The results further suggest that the organizational context in which HR practices are implemented may be more important than individual training variables. Katou et al. (2021) indicated that organizational performance is influenced by the relationship between HR systems and employee perceptions of HR practices, as well as line managers' implementation. Similarly, Kim et al., (2021) found that both internal and external contingencies (organizational slack and industry instability) are important to the success of high performance work systems. The results of these studies provide some insight into why few direct effects of training cost, training duration,

and training mode were found in the present analysis. Development efforts may only provide performance benefits if they are part of a system of management and support and integrated with other organizational goals. There were also few direct predictive effects of employee well-being indicators in the regression models. After accounting for other factors, engagement, satisfaction, and work-life balance were not statistically significant factors when it came to workforce productivity. However, they are not to be overlooked as a strategically irrelevant. Koon (2022) highlights that work-life balance practices can be found at various organizational levels, and Rubio-Andrés et al. (2022) demonstrate that high-performance work systems have the potential to impact workplace well-being, which can have financial consequences. Thus, the weak effects found in the current data set may be due to the cross-sectional nature of the measures and the potential for well-being to exert an indirect effect or to take a longer time to result in productivity.

The empirical evidence that was most strongly established was related to workforce productivity and HR Investment Efficiency. The derived efficiency indicator was positively related to productivity, indicating that workers' development spending by the organization is more beneficial to the organization when it is used to develop productive workers. This interpretation aligns with the findings of Santa et al. (2022) who found that human capital is one of the key factors that can impact a firm's performance and with Singh and Sarkar (2022) who noted that HR metrics are useful in linking workforce outcomes to the performance of the organization. But this outcome should be taken with a pinch of salt as the productivity was one of the mathematical components of the efficiency indicator. So, the association should be regarded as evidence of cost-performance alignment, not as evidence of financial causality.

The findings also help to current debates concerning the automaticity of investment-induced productivity growth. Staff and Manager training can also have differential and interactive effects on firm productivity (Schwarz et al. 2026) and investment in education and training has a wider productivity benefit (Siedschlag and Durán 2025). In parallel, Song et al. (2024) show that the organizational impact of various strategic human capital investments can vary when the training is exploitative versus explorative. The studies reiterate the main conclusion of the present research: organizations should not only be concerned with the amount of money spent on training, but also whether developmental expenditure results in the development of relevant skills, better employee performance, and the efficient conversion of human-capital investment into productive value.

The study concludes that the strategic HR investment should be judged using efficiency-based approach. The actual benefit of employee development is more likely to become apparent when it leads to measurable productivity, not when it is simply spent. The findings thus validate the transition from input to outcome HR budgeting that evaluates training investments based on the effectiveness of development, productivity gains, and cost-performance alignment.

5. Conclusion

This study examined the effect of strategic human resource investment on financial performance via employee development, workforce productivity and financial efficiency in HRM. The analysis revealed that training expenditure alone was not enough to account for variation in the outcomes of training for the employees or variation in the productivity of the work force using the cleaned secondary HR Analytics Dataset. No statistically significant direct effects were found for the Training Cost, Training Duration and successful training completion with the derived productivity measure. The results of this study indicate that it is not necessary to spend more on employee development to achieve better performance results. Rather than the quantity of funds spent, the quality, content, delivery, and uptake of training programs could be more significant in terms of their effectiveness, relevance, implementation and organizational integration. The study also revealed a positive relationship between workforce productivity and HR Investment Efficiency, but it is important to exercise caution when interpreting this finding as productivity was one of the components of the derived efficiency indicator. The results suggest that a strategic HRM approach with regard to efficiency should be adopted, with investments in training assessed on the basis of its productive value. In terms of management, HR analytics need to be combined with training assessment, employee performance tracking and resource allocation decisions. Longitudinal data, as well as direct accounting indicators like revenue, profitability, ROA, ROE and labour cost efficiency, should be included in the future research to build stronger relationships between human-capital investment and financial performance.

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