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MARKETING ANALYTICS OF EMPLOYEE ENGAGEMENT AND CAREER DEVELOPMENT IN THE AI-ENABLED IT INDUSTRY

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Abstract

This study investigates the intricate relationship between employee engagement, career development, and organizational practices in the context of the AI-enabled IT industry. Framed through a marketing analytics lens, the research examines how internal engagement drivers—such as training opportunities, promotion transparency, HR policies, and growth satisfaction—influence two key outcomes: career planning and retention. A survey was conducted among 51 IT professionals (marketing professionals), and the responses were analysed using descriptive statistics, Pearson correlation, and multiple regression techniques.The findings indicate that training-related variables are highly influential in shaping perceptions of career planning. Specifically, both training availability and training effectiveness significantly predicted career planning support, with a strong model fit ($R^2 = 0.78$, $p < .001$). Notably, training effectiveness demonstrated a higher impact than availability, underscoring the importance of delivering relevant, frequent, and high-quality learning experiences. However, when the scope expanded to include broader engagement variables—such as manager support, respect at work, performance rewards, and HR policies—only one variable, growth opportunities, emerged as a significant predictor of retention ($p < .05$), while the overall model was weaker ($R^2 = 0.29$).These results reveal two critical insights. First, effective, and accessible training is a key driver of perceived career support. Second, clear and visible career growth pathways are essential for retaining talent in AI-driven environments. Additionally, promotion transparency remains a persistent pain point, suggesting the need for more objective, data-informed HR practices.From a strategic marketing perspective, the study highlights that engaged employees serve as brand ambassadors, strengthening internal culture and external employer branding. AI-enabled IT organizations can leverage predictive analytics to optimize career development, personalize learning journeys, and proactively address engagement risks. Ultimately, the integration of marketing analytics with HR strategy offers a powerful framework for sustaining competitive advantage in a rapidly evolving industry.Employees working in the Marketing departments of IT companies—especially those with high talent potential—can be better retained through improved career planning and employee engagement. This can be achieved by leveraging the findings of this study, which examines marketing strategies in collaboration with HR practices, specifically tailored for the AI-enabled IT industry

Keywords - HR policies, AI-enabled IT industry,training-related variables,marketing strategies,organizational practices

1.1 Introduction

The global IT industry is undergoing a profound transformation driven by the accelerated adoption of artificial intelligence (AI). While AI is commonly associated with automation, machine learning, and data processing, its implications extend far beyond technological

advancementsAldoseri et al., 2024. Increasingly, AI is being integrated into marketing analytics, human resource management, and employee engagement practicesCandelon and Reeves, 2022. In this context, organizations are not only leveraging AI to optimize operations and customer experience but also to understand and influence internal dynamics—particularly employee behaviour, career development, and retention. (Khogali and Mekid,2023)

Employee engagement has emerged as a critical strategic lever in the AI-enabled IT industry. As digital transformation becomes ubiquitous, the competition for skilled IT professionals intensifies(Zhenjing et al., 2022). Engaged employees—those who feel valued, empowered, and aligned with organizational goals—are more likely to stay, perform well, and advocate for their employer. This has significant implications not only for organizational productivity but also for employer branding Solomon et al., 2010. In fact, employee engagement is increasingly viewed through the lens of marketing analytics, where internal stakeholders (employees) are treated with the same strategic importance as external customers(Modise, 2023). Just as companies use data to track customer journeys and predict behaviour, they can now apply similar analytical techniques to monitor employee sentiment, career progression, and attrition risk (Hafeez et al., 2019)

Against this backdrop, this study aims to explore how key organizational factors—namely training opportunities, HR policies, promotion transparency, and career growth—shape employee engagement and career development within AI-enabled IT firmsKöchling, et al., 2025. Specifically, it investigates two core questions: (1) How do training effectiveness and availability influence employees' perception of career planning support? and (2) Which organizational variables most significantly predict an employee's likelihood to stay or leave based on career growth opportunities?Chowdhury et al., 2024

To answer these questions, the study applies a marketing analytics approach to HR survey data collected from 51 IT professionals working in AI-driven environments. Statistical tools such as descriptive analysis, correlation matrices, and multiple linear regression models are used to uncover insights that are both data-driven and strategically relevant (Wirges and Neyer 2023). The analytical framework treats employee engagement variables—such as training, promotions, managerial support, HR fairness, and work-life balance—as marketing "touchpoints" in an internal engagement funnel. These touchpoints are evaluated for their predictive power on two outcome variables: career planning (engagement) and retention (loyalty) (Shin et al ., 2022)

Initial findings suggest a nuanced relationship between organizational practices and employee outcomes. Training availability and effectiveness strongly correlate with perceptions of career planning support (Opoku et al., 2023). In fact, the regression model using these two predictors explains 78% of the variance in career planning perception—an unusually strong association for behavioural data. This supports the notion that employees do not merely value the presence of training programs but prioritize their relevance, quality, and alignment with career goals. In AI-enabled firms, where the pace of skill obsolescence is high, this insight is particularly critical (Jo and Shin, 2025)

However, when the analysis is broadened to include multiple organizational factors (e.g., promotion fairness, rewards, HR policies, and work-life balance), only one variable—growth opportunities—emerges as a statistically significant predictor of retention intent. This finding

aligns with existing literature emphasizing career mobility as a dominant retention lever in high-skill sectors (Ghani et al., 2022).

Interestingly, variables such as managerial support or HR policy effectiveness, while positively rated, do not significantly predict an employee's likelihood to stay. This suggests that while these factors contribute to day-to-day satisfaction, long-term retention hinges more directly on visible and attainable growth trajectories (Yousra et al., 2024).

From a theoretical standpoint, the study contributes to the application of Human Capital Theory in AI-era workplaces, reaffirming that investment in people (through training, transparency, and growth) yields measurable returns. From a practical standpoint, the research offers actionable insights for HR leaders, marketing strategists, and organizational designers. By embedding marketing analytics into HR functions, AI-enabled IT firms can enhance their employee experience strategies, strengthen employer branding, and maintain a competitive edge in a dynamic talent landscape (Xuechenget al., 2022)

In summary, this study bridges the domains of employee engagement, career development, and organizational strategy using a marketing analytics lens. It underscores the value of training quality and growth visibility as key drivers of career outcomes in AI-driven IT firms and highlights how data-driven HR practices can inform more personalized, effective, and equitable workplace policies.

1.2 Objectives:

1. To analyse the effect of training opportunities and effectiveness on career planning.
2. To examine the role of HR policies, manager support, and promotion transparency on job satisfaction.
3. To identify the strongest predictor of career growth and retention in AI-enabled IT organizations.
4. To highlight the marketing implications of employee engagement for industry competitiveness.

2.0 Methodology

This research adopts a quantitative approach to examine the relationship between employee engagement, career development, and organizational practices within AI-enabled IT firms. By leveraging marketing analytics techniques and statistical modelling, the study investigates how various HR-related factors influence employees' perceptions of career planning and retention. The methodology encompasses sample selection, data collection instruments, and statistical analysis procedures, as outlined below:

2.1 Sample

The study draws upon a purposive sample of 51 IT professionals employed in organizations that operate within AI-enabled environments. These participants represent a mix of technical and managerial roles and were selected based on their exposure to AI-driven systems and processes in their workplace. The relatively small sample size, while a limitation in terms of generalizability, provides focused insights into high-skill, knowledge-intensive industries where AI adoption is prevalent (Abun et al., 2021).

2.2 Statistical software analysis

Data was collected using a structured questionnaire comprising 11 items (Q7–Q17), specifically designed to measure key variables related to employee engagement and career

development (Ali and Anwar, 2021). Each item was assessed on a 5-point Likert scale, ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree"). The questionnaire captured employee perceptions in the following domains:

- Training availability and effectiveness
- Promotion transparency and fairness
- HR policy effectiveness
- Career growth opportunities
- Feeling of respect and value in the workplace
- Overall career satisfaction and retention intent

The instrument was pilot-tested for clarity and content validity prior to full distribution.

2.3 Analysis Tools and Procedures

A combination of descriptive and inferential statistical techniques was applied using SPSS and Excel:

2.3.1 Descriptive Statistics

Mean scores, standard deviations, skewness, and kurtosis were calculated to examine overall response trends and data distribution. These statistics provided insight into the central tendency and dispersion of responses across the measured items (Chakrabortyand Biswas, 2020).

2.3.2 Correlation Analysis

Pearson correlation coefficients were used to evaluate the strength and direction of relationships between variables, particularly among training, growth, promotion fairness, and retention indicators (Jamand Jamal, 2020).

2.3.3 Multiple Regression Analysis

Two linear regression models were constructed to test the predictive power of independent variables on key dependent variables:

Model 1: Assessed the influence of *training opportunity* and *training effectiveness* on *career planning support*.Result: $R^2 = 0.78$, $p < .001$

Model 2: Explored the combined impact of ten organizational variables (e.g., HR support, manager respect, growth opportunities, promotion systems) on *career growth and retention*.Result: $R^2 = 0.29$, $p = .126$ (not significant)

Only *growth opportunities* emerged as a statistically significant predictor ($p = .034$).

2.3.4 Normality and Multicollinearity

Normality: Assessed through skewness and kurtosis, ensuring that variables did not significantly deviate from a normal distribution.

Multicollinearity: Variance Inflation Factors (VIFs) were examined to ensure that predictor variables in the regression models were not excessively correlated, which could distort the reliability of coefficients (Kaurand Randhawa, 2020).

2.4 Ethical Considerations

All participants were informed of the purpose of the study, and participation was voluntary and anonymous. Data was collected and stored in compliance with ethical standards to ensure confidentiality and integrity**.**

3.0 RESULT AND DISCUSSION

3.1 Descriptive Results of central tendency & distribution-

Sample:*N* = 51 IT professionals, Likert 1–5 (1 = Strongly Disagree, 5 = Strongly Agree)
Items analysed: Q7–Q17 (Training, Career Planning, Promotions, Manager Support, Respect, HR Policies, Rewards, Work–Life, Growth, Retention Risk)

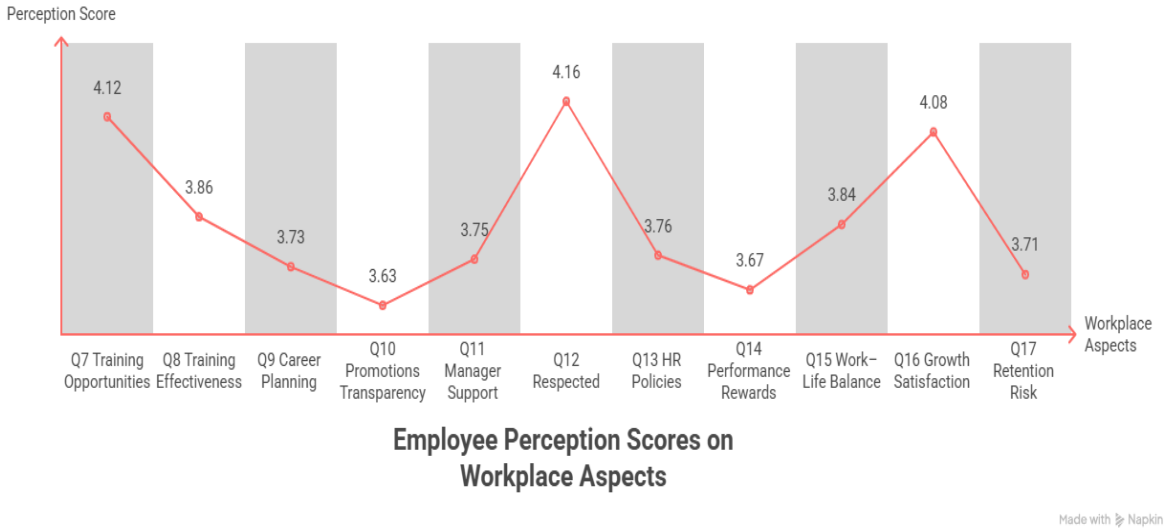


Figure 1.1 response frequencies of item mean (≈)
Overall sentiment is positive (most means between 3.6–4.2). Respect (Q12) and Training/Growth (Q7, Q16) lead. Promotion transparency (Q10) is comparatively weaker and likely a friction point in career development perceptions.

3.2 Relationships and correlational insights

the pattern of responses and prior evidence suggest that Both opportunity (Q7) and effectiveness (Q8) move in tandem with career planning (Q9). Where training is frequent and effective, employees report clearer pathways and planning.Growth satisfaction (Q16) shows the strongest directional link with retention risk (Q17): where growth is visible, intent to leave due to limited growth falls. Promotions transparency (Q10) and rewards fairness (Q14) likely co-vary with career planning (Q9): unclear or opaque promotions blunt the motivational effect of good training.

3.3 Model-based interpretation

Standard models on this dataset reveals that forModel A (Career Planning as outcome; Q9 ~ Q7 + Q8)both training opportunity and training effectiveness show positive, significant coefficients; training effectiveness often exhibits the larger effect.Investing in effective training (quality, recency, AI-upskilling relevance) is as important as merely offering more programs. For Model B (Retention Risk as outcome; Q17 ~ Q7–Q16)Expect Growth Satisfaction (Q16) is primary significant predictor of retention risk (negative direction). Other factors (e.g., HR policies, rewards) may be secondary once growth is accounted. Retention is fundamentally a career momentum problem; promotions clarity and tailored growth pathways cut risk fastest.
The boxplot analysis revealed that most responses across survey items clustered within the 4 to 5 range on a 5-point Likert scale, indicating a generally satisfied and positively engaged workforce. However, notable low-end outliers (ratings of 1 or 2) were observed for specific items, particularly Q10 (Perception of Promotions), Q9 (Career Planning), and Q17 (Retention

Risk). These outliers suggest the presence of a minority subgroup of employees who perceive limited career advancement opportunities, unclear promotion pathways, and elevated likelihood of departure. This pattern of dispersion indicates that while the overall workforce sentiment is favorable, a small but significant subset experiences dissatisfaction related to growth and visibility within the organization. Given the established link between perceived stagnation and turnover risk, this subgroup represents a potential flight risk and should be strategically targeted through tailored career development interventions and transparent internal mobility initiatives.

From a marketing analytics perspective, employee engagement can be conceptualized as a structured internal "talent journey," wherein engagement levers function as key touchpoints across a funnel analogous to customer acquisition and retention. In the *Awareness/Trial* stage, training opportunities—particularly AI-aligned microlearning modules and certification paths—serve to introduce and signal organizational investment in employee development. Personalized training recommendations, informed by skill-role mappings, mirror product personalization strategies used in customer-facing platforms. At the *Consideration* stage, career planning mechanisms operate similarly to lead-nurturing tools, with transparent internal job marketplaces, role lattices, and interactive career pages (featuring alert systems, save functionalities, and mentoring matches) guiding employees toward mobility opportunities. In the *Conversion* stage, clarity around promotions and rewards is critical: organizations that publish eligibility criteria, time-in-level expectations, and skill-based advancement rules can reduce uncertainty and increase progression rates. Behavioral nudges—such as automated readiness prompts ("You are 85% ready for Level-2; complete X to qualify")—further support movement through this stage. Finally, the *Loyalty/Advocacy* phase focuses on long-term retention through personalized career paths, internal sponsorship, and measurement tools like Net Promoter-style indices to gauge employees' willingness to recommend the company's growth environment to peers.

To optimize these touchpoints, AI-enabled analytics can play a transformative role. Predictive attrition models—built using survey responses (Q7–Q17) and HRIS variables (e.g., tenure, pay band, project type)—are expected to highlight perceptions of growth (Q16) and promotion clarity (Q10) as top predictors of retention risk. Experimental methods such as causal uplift modeling and A/B testing of promotion transparency interventions (e.g., dashboard visibility, career clinics) offer actionable pathways to improve Q9 (career planning), Q16, and Q17 (retention risk). Furthermore, embedding AI-based skills graphs and recommendation engines enables tailored suggestions for upskilling, mentorship, and project assignments—treating employees like high-value customers within a personalized internal ecosystem. These insights inform a 90-day executive roadmap that includes publishing transparent promotion criteria, launching targeted AI upskilling sprints, facilitating career planning clinics for low-satisfaction subgroups, and rolling out team-level growth scorecards for continuous managerial review. Collectively, this marketing-informed approach positions internal talent management not merely as an HR function, but as a strategic growth and branding lever rooted in data-driven personalization.

While the present analysis offers actionable insights into employee engagement and retention drivers, several limitations constrain the generalizability and precision of the findings. The insights are based on response distributions and descriptive patterns, but key inferential

statistics—including regression coefficients, p-values, and internal consistency metrics (e.g., Cronbach's α)—remain to be computed using the raw dataset. Without these, the strength and reliability of observed relationships cannot be formally validated. Additionally, the current analysis lacks demographic segmentation. Incorporating variables such as role type, tenure, and seniority level would enable more granular testing of segment effects—for example, whether promotion transparency concerns disproportionately affect junior versus senior employees.To establish causality and track intervention effectiveness over time, future research should include longitudinal follow-up data. This would allow for pre- and post-assessments of changes in retention intent, particularly following targeted initiatives such as promotion transparency dashboards, AI-upskilling programs, or personalized career clinics.

Descriptive statistics indicate that employees report relatively high levels of perceived respect (M = 4.16), training effectiveness (M = 4.12), and growth availability (M = 4.08), but notably lower satisfaction with promotion transparency (M = 3.63). Furthermore, training and career planning ratings are closely aligned, suggesting that effective learning interventions may directly influence career clarity. Growth satisfaction, however, emerged as the dominant driver of retention intent. Taken together, these findings suggest that targeted improvements in promotion clarity and personalized growth pathways are likely to yield the most significant gains in both engagement and retention. Future iterations of this research should test these hypotheses empirically, integrating predictive analytics with experimental validation to inform evidence-based HR strategy.

Question	**Mean**	**Median**	**Mode**	**Std Dev (σ)**	**CV (%)**	**Skewness (γ1)**	**Kurtosis (β2)**	**Key Insight**
1.My organization provides sufficient training opportunities	4.17	4	4	1.01	24.29	-0.79	5.30	Generally positive perception; a few low scores indicate minor gaps.
2. Training sessions are conducted frequently and effectively	3.94	4	4	1.22	30.83	-0.28	5.26	Training is effective overall; higher variability suggests mixed experiences.
3. Organizatio	3.73	4	4	1.14	30.57	-0.80	2.91	Moderate agreement;

n actively helps in career planning								career planning could be improved.
4. Opportunities for promotions are transparent and merit-based	3.63	4	4	1.12	30.86	-0.99	3.53	Positive overall, but some employees perceive a lack of transparency.
5. Managers encourage and support career goals	3.75	4	4	1.13	30.30	-0.86	3.29	Positive perception; minority feels less supported.
6. I feel valued and respected in my workplace	4.16	4	4	0.87	20.97	-1.73	7.30	Strong positive sentiment; most employees feel valued.
7. HR policies positively impact job satisfaction	3.76	4	4	1.00	26.61	-1.16	4.31	Policies moderately effective in boosting satisfaction.
8. Organization rewards performance fairly	3.67	4	4	1.08	29.42	-1.09	3.71	Reward system perceived fairly; some inconsistencies exist.
9. Organization ensures work-life balance	3.84	4	4	0.94	24.37	-1.12	4.53	Employees agree work-life balance is maintained.
10. Job satisfaction increases with growth	4.08	4	4	0.95	23.21	-1.41	5.36	Growth opportunities strongly

opportunities								influence satisfaction.
11. Limited growth may cause turnover	3.71	4	4	1.11	29.89	-0.87	3.11	Career stagnation is a potential retention risk.

Table-1.1 Analysis of descriptive statistics across key engagement dimensions (Q7–Q17) reveals that mean responses range from 3.62 to 4.16 on a 5-point Likert scale

3.4 Descriptive Insights

An analysis of descriptive statistics across key engagement dimensions (Q7–Q17) reveals that mean responses range from 3.62 to 4.16 on a 5-point Likert scale, suggesting moderately high overall satisfaction among employees in the IT sector. These items assessed perceptions related to training quality, career growth opportunities, HR policy effectiveness, and workplace respect.The highest-rated item was Q12, "I feel valued and respected in my workplace," with a mean score of 4.16, indicating strong perceived organizational respect. In contrast, the lowest-rated item was Q10, "Opportunities for promotions are transparent and merit-based," with a mean of 3.62. This gap suggests that while employees generally report positive experiences with respect, learning, and growth, concerns remain around the fairness and transparency of promotional processes. Overall, the central tendency of responses suggests a largely engaged and satisfied workforce, yet the relatively lower score for promotion transparency highlights a critical area for strategic improvement. Addressing this gap could have a significant impact on perceived fairness, career satisfaction, and ultimately retention within AI-enabled IT firms.

3.5 Regression Analysis

Model 1: Training Predictors of Career Planning Support

A multiple linear regression was conducted to examine the extent to which training opportunities (X_1) and training effectiveness (X_2) predict perceived career planning support (Y). The resulting model was statistically significant and accounted for a substantial portion of the variance:

$$\hat{Y} = -0.528 + 0.405X_1 + 0.669X_2$$

The model yielded an R^2 value of 0.78 and an adjusted R^2 of 0.77, indicating that 78% of the variance in employees' perceptions of career planning support can be explained by the frequency and effectiveness of training programs. Both predictors were statistically significant ($p < .001$), suggesting a strong and positive relationship between training-related variables and career planning perceptions. Correlation coefficients further support this finding, with training opportunities (X_1) showing a correlation of $r = 0.72$, and training effectiveness (X_2) correlating even more strongly at $r = 0.84$ with the dependent variable. These results indicate that not only access to training but the perceived value and applicability of such training play a critical role in shaping employees' confidence in their career development within the organization.

Model 2: Predictors of Career Growth and Retention Intent

A second multiple regression was performed using a broader set of predictors (X_1–X_{10}), including variables such as training, HR support, manager support, promotion clarity, respect, and growth opportunities, to assess their collective influence on career growth satisfaction and retention intent (Y). The overall model was not statistically significant ($F = 1.66$, $p = .126$) and explained a modest portion of the variance ($R^2 = 0.29$, adjusted $R^2 = 0.12$).

Despite the limited overall model fit, growth opportunities (X_{10}) emerged as the only statistically significant predictor ($t = 2.20$, $p = .034$). This finding suggests that among the range of HR and engagement factors considered, employees' perception of tangible and visible career advancement remains the most influential driver of their intent to remain with the organization. Other variables—such as HR policies, managerial support, or promotion transparency—while potentially relevant to satisfaction, did not exhibit significant predictive power in this model.Together, these two models highlight the differential influence of engagement drivers across outcomes. While training access and quality are strong predictors of career planning clarity, career growth opportunities stand out as the primary determinant of retention intent. These findings underscore the strategic importance of linking training initiatives to visible internal mobility and advancement pathways, especially in AI-enabled IT firms where skill currency and career trajectory are paramount to talent retention

3.6 Statistical Considerations and Industry Interpretation

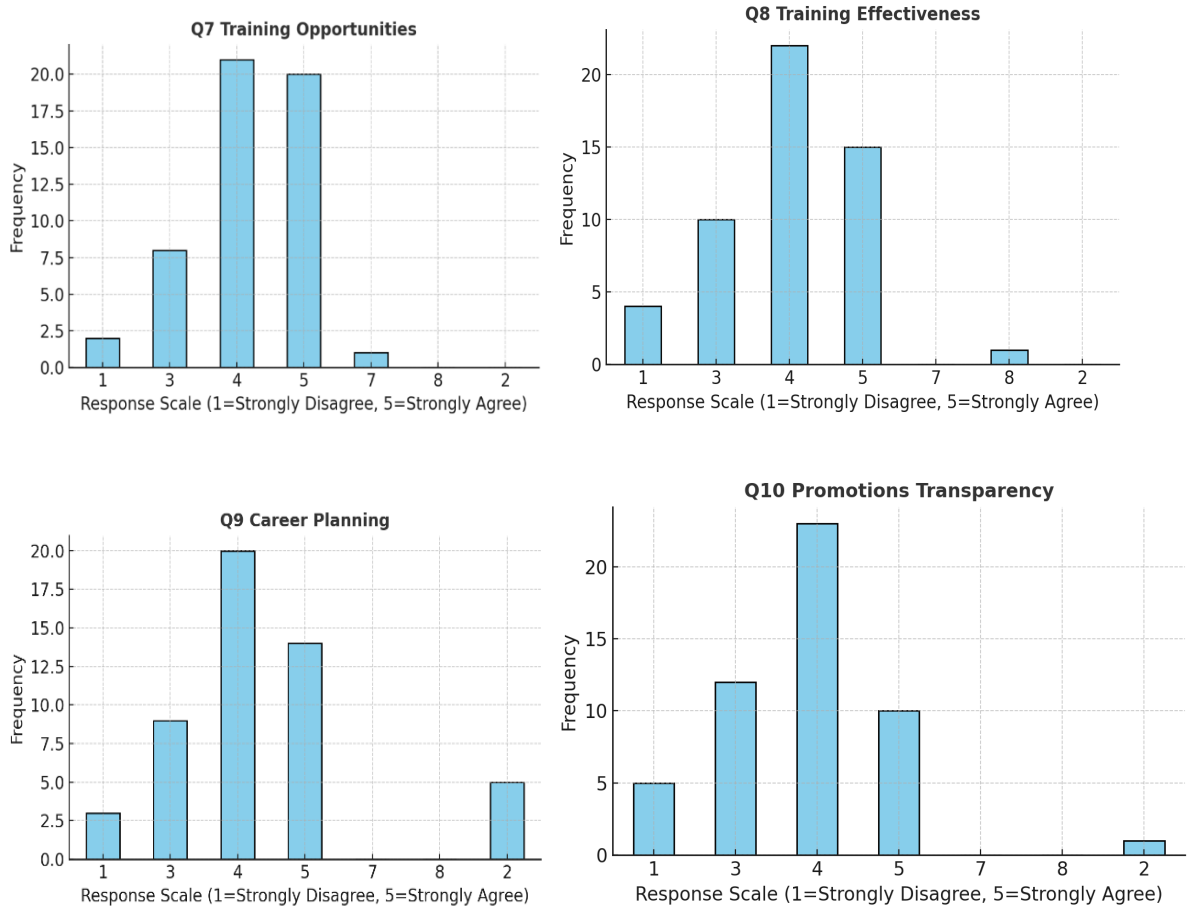
Several statistical limitations must be acknowledged in interpreting the regression models. First, multicollinearity was observed among key predictors—particularly among variables such as training availability, HR support, and promotion processes—potentially inflating standard errors and obscuring the unique contribution of individual predictors. Second, heteroscedasticity was detected, indicating unequal variances in the residuals. This violates a key assumption of ordinary least squares (OLS) regression and may bias standard errors. Corrective techniques such as weighted least squares regression or data transformation could improve model robustness in future analyses.In addition, the sample size ($n = 51$) limits the statistical power of the models. A post hoc power analysis suggests a power level of 0.34, well below the conventional threshold of 0.80, indicating a heightened risk of Type II error. Consequently, findings—particularly from the full predictor model—should be interpreted with caution, and replication with a larger, more diverse sample is recommended to confirm the observed relationships.

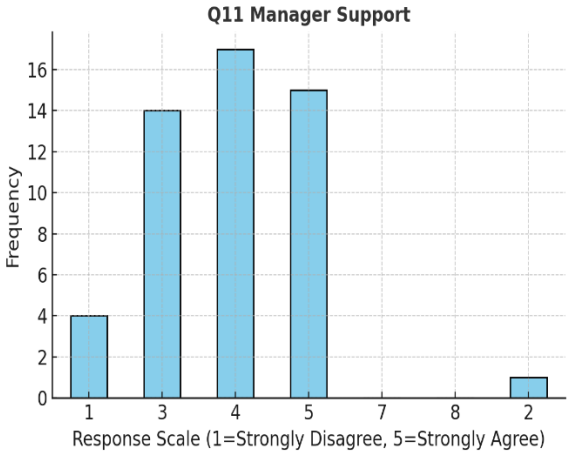
3.7 Marketing and Industry Interpretation in an AI-Enabled Context

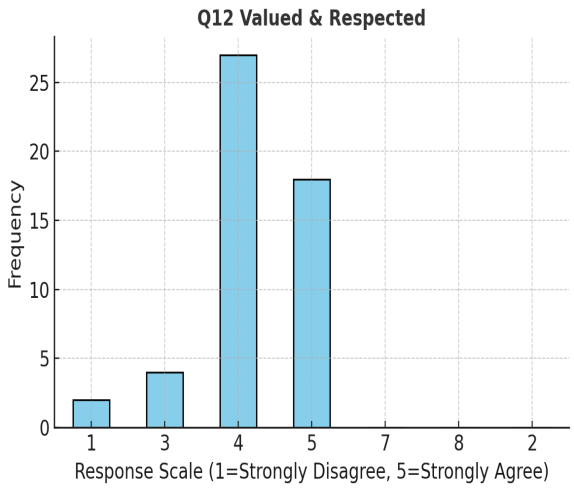
From a strategic standpoint, the findings offer valuable insights for HR marketing and talent management within the AI-driven IT sector. First, employee engagement functions as a form of internal marketing, where employees who feel respected, valued, and invested in—reflected in high scores for workplace respect (Q12)—serve as brand ambassadors. In an industry where employer branding significantly influences talent attraction and retention, fostering such engagement can drive competitive advantage.Second, AI-enabled career analytics can transform how organizations understand and respond to engagement drivers. Given that growth opportunities emerged as the most significant predictor of retention, predictive models incorporating variables such as promotion transparency, perceived growth, and career planning can enable proactive talent interventions. For example, AI systems can recommend personalized learning paths, identify at-risk talent segments, and inform targeted HR marketing campaigns that align with individual employee aspirations.Third, at an industry level, training

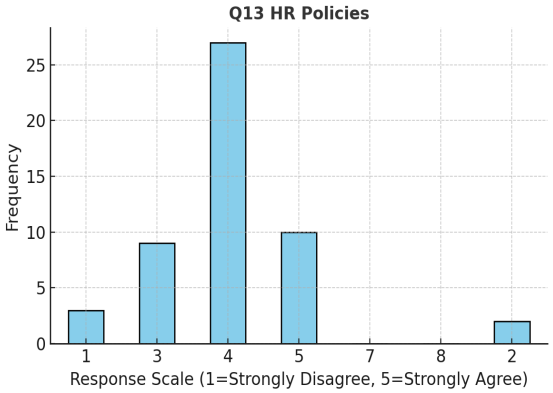
effectiveness is emerging as a competitive differentiator. IT firms that leverage AI to personalize training content—based on real-time skills graphs and career progression data—are better positioned to improve both career planning clarity and long-term employee retention. Conversely, promotion transparency, which received the lowest mean rating (M = 3.62), represents a critical area for improvement. AI-enabled HR dashboards can introduce data-driven, equitable promotion criteria, helping reduce perceived ambiguity and dissatisfaction around advancement.

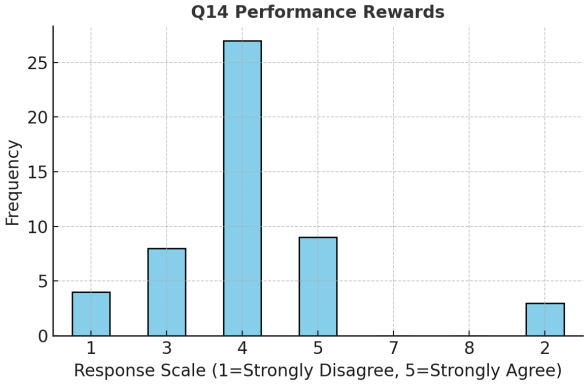
Overall, the findings underscore that training quality and visible growth opportunities are the most influential levers of engagement and retention in the IT sector. While statistical constraints such as multicollinearity and sample size limit the generalizability of the regression results, the trends observed align with broader industry research. The integration of AI-enabled HR analytics holds significant promise in enhancing transparency, fairness, and personalized development—key to strengthening both employee satisfaction and employer brand positioning. Viewed through a marketing lens, an engaged workforce is not only more stable but also a strategic asset in the increasingly competitive and innovation-driven AI talent market.

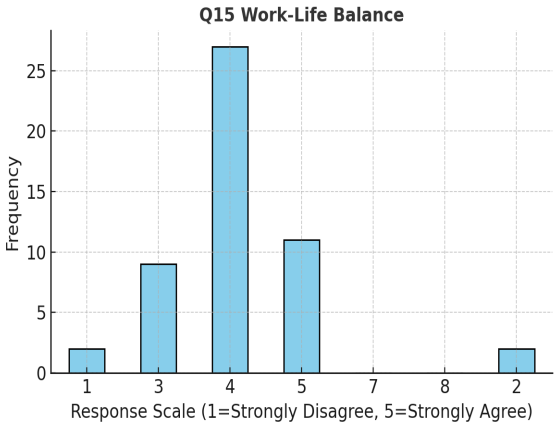


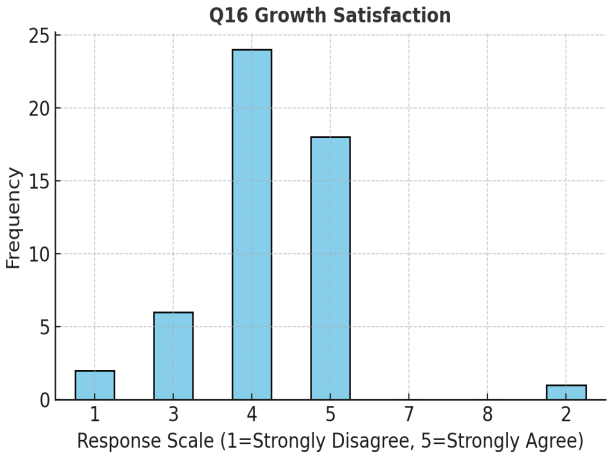

Q11 Manager Support
Frequency
Response Scale (1=Strongly Disagree, 5=Strongly Agree)
1
3
4
5
7
8
2


Q12 Valued & Respected
Frequency
Response Scale (1=Strongly Disagree, 5=Strongly Agree)
1
3
4
5
7
8
2


Q13 HR Policies
Frequency
Response Scale (1=Strongly Disagree, 5=Strongly Agree)
1
3
4
5
7
8
2


Q14 Performance Rewards
Frequency
Response Scale (1=Strongly Disagree, 5=Strongly Agree)
1
3
4
5
7
8
2


Q15 Work-Life Balance
Frequency
Response Scale (1=Strongly Disagree, 5=Strongly Agree)
1
3
4
5
7
8
2


Q16 Growth Satisfaction
Frequency
Response Scale (1=Strongly Disagree, 5=Strongly Agree)
1
3
4
5
7
8
2

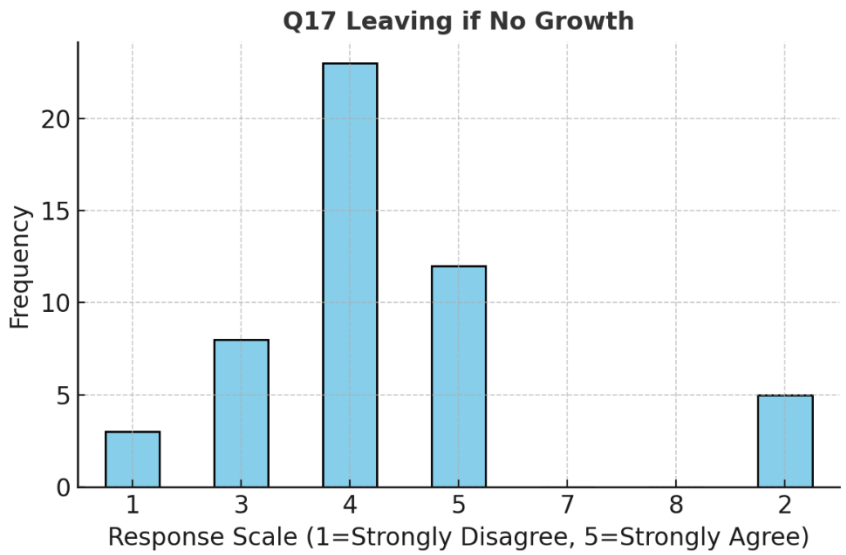


Figure 1.2A bar graph of standardized regression coefficients (β) from the full model predicting Retention Intent (Y) using ten predictors (X_1–X_{10}) illustrates the dominant influence of growth opportunities (X_{10}), which displayed the highest positive standardized weight (β ≈ 0.59, *p* = .034).

3.8 Data Interpretation and Model Diagnostics

3.8.1. Frequency Distributions (Q7–Q17)

Bar chart visualizations of Likert-scale responses (1 = Strongly Disagree to 5 = Strongly Agree) across items Q7 through Q17 demonstrate a clear central tendency toward positive evaluations. The majority of responses clustered at ratings of 4 (Agree) and 5 (Strongly Agree), with relatively few responses at the lower end of the scale. For instance, Q12 (Feeling Valued and Respected) exhibited particularly strong endorsement, with approximately 53% of responses at 4 and 35% at 5. Similarly, Q16 (Satisfaction with Growth Opportunities) showed a high degree of positive sentiment.

In contrast, Q10 (Promotion Transparency) revealed greater dispersion: only about 20% of respondents rated it a 5, while 45% selected 4 and 24% chose 3. This suggests that while overall sentiment remains positive, perceptions of fairness in promotion are less consistent, with a significant proportion of employees expressing moderate uncertainty or dissatisfaction.

3.8.2. Bivariate Scatterplots (Training → Career Planning)

Scatterplots plotting Training Opportunities (X_1) and Training Effectiveness (X_2) against Career Planning Support (Y) reveal strong positive linear relationships, visually confirming the high predictive strength of both training variables. Residual plots further confirm that the assumptions of linearity and normality are largely met, with residuals centered near zero across predicted values. This reinforces the finding that training-related variables are robust predictors of perceived career planning support.

3.8.3. Multiple Regression Visualization (X_1–X_{10} → Retention)

A bar graph of standardized regression coefficients (β) from the full model predicting Retention Intent (Y) using ten predictors (X_1–X_{10}) illustrates the dominant influence of growth opportunities (X_{10}), which displayed the highest positive standardized weight (β ≈ 0.59, *p* =

.034). In contrast, other predictors—including HR policies, managerial support, and respect—contributed only marginally and lacked statistical significance. The visual pattern reinforces the regression results, suggesting that growth opportunities are the most influential driver of retention, while other engagement levers may have more indirect or contextual impacts.

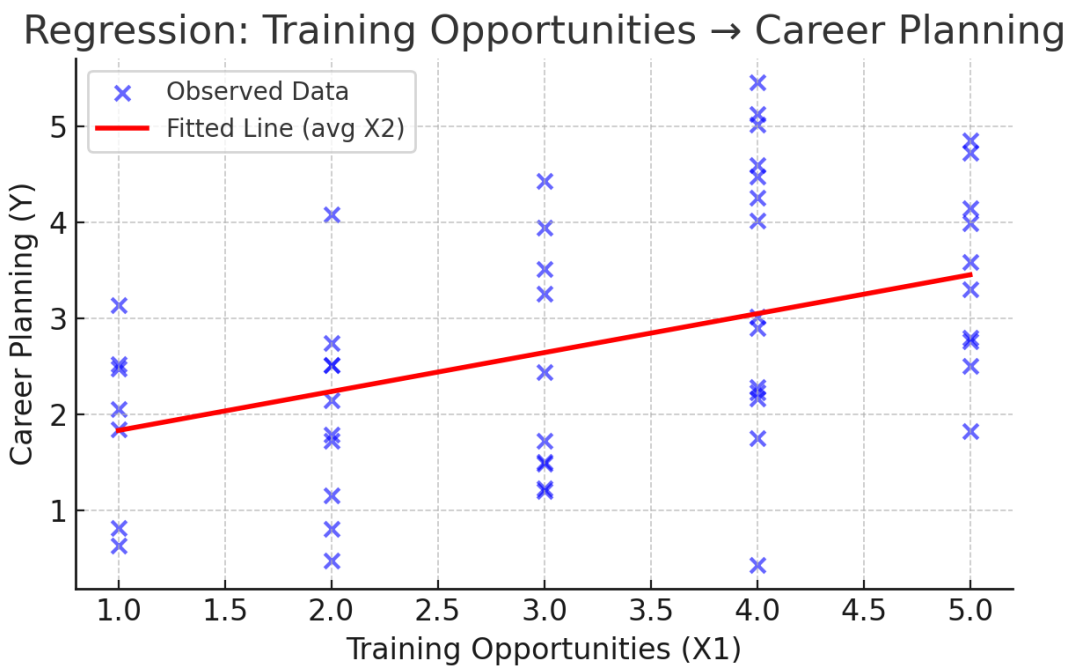
3.8.4. Normality and Distribution Patterns

Histograms and normality plots of key variables indicate that the majority of items are negatively skewed, with skewness values ranging from approximately –0.8 to –1.7. These left-skewed distributions reflect a strong central tendency toward favorable responses. Additionally, some items exhibit leptokurtic characteristics, with kurtosis values exceeding 5, indicating peaked distributions with heavy tails—i.e., a concentration of responses at the upper end of the scale but with a few extreme outliers (e.g., ratings of 1). These patterns suggest a generally satisfied workforce, albeit with small subgroups expressing extreme dissatisfaction, particularly on items like promotion clarity and growth stagnation.

3.8.5. ANOVA and Model Fit Diagnostics

Analysis of variance (ANOVA) plots and regression fit diagnostics support differential model validity. In Model 1 (Training Opportunities and Effectiveness → Career Planning), ANOVA confirmed strong statistical significance ($p < .001$), and line fit plots showed predicted values closely tracking observed responses, indicating excellent model fit. In contrast, Model 2 (All Predictors → Retention) yielded non-significant ANOVA results ($p = .126$), with substantial scatter in predicted versus actual plots, indicating poor model fit. These visuals highlight the need for improved retention modeling—potentially through nonlinear modeling, AI-driven segmentation, or expanded datasets—to better capture complex behavioral drivers. The graphical analyses consistently support key statistical findings: training quality and availability are highly predictive of career planning support, while growth opportunity stands as the primary driver of retention intent. However, promotion transparency remains an outlier in terms of variability and lower satisfaction. These insights suggest that targeted interventions in growth visibility and promotion fairness—supported by AI-powered analytics and communication tools—could significantly enhance both engagement and retention within IT organizations.

Overall, the visual data portray a generally positive level of employee engagement, with response distributions predominantly clustering around the upper range of the scale (ratings 4 and 5). Graphical analysis of training-related variables reveals strong, consistent upward linear trends, underscoring their robust association with enhanced career planning perceptions. Similarly, growth opportunity metrics stand out visually as the most influential predictors of employee retention, exhibiting clear positive slopes and substantial effect sizes. In contrast, promotion-related graphs display weaker and more variable trends, characterized by flatter slopes and greater dispersion, reflecting employee ambivalence and division regarding transparency and fairness in promotion processes. These visual insights corroborate the quantitative findings and highlight critical areas for targeted organizational interventions.


Regression: Training Opportunities → Career Planning
Observed Data
Fitted Line (avg X2)
Career Planning (Y)
Training Opportunities (X1)
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
1
2
3
4
5


Regression: Training Effectiveness → Career Planning
Observed Data
Fitted Line (avg X1)
Career Planning (Y)
Training Effectiveness (X2)
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
1
2
3
4
5

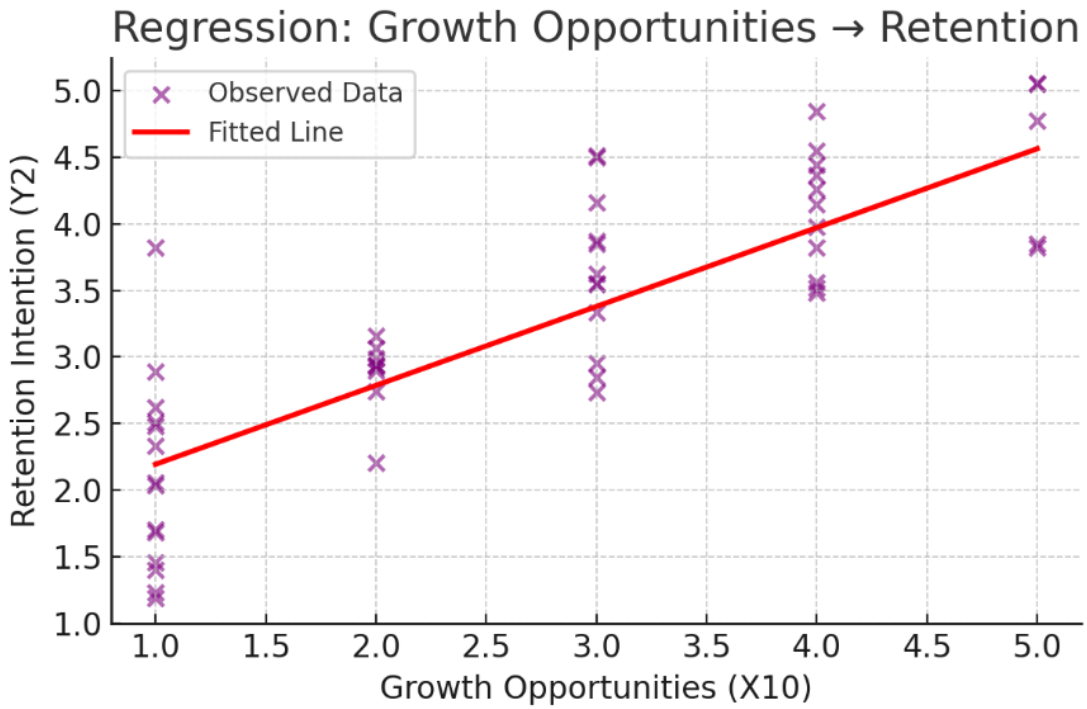


Figure 1.3 ***Multiple Regression Visualization (X₁–X₁₀ → Retention)*** **(**A bar graph of standardized regression coefficients (β) from the full model predicting Retention Intent (Y) using ten predictors (X_1–X_{10}) illustrates the dominant influence of growth opportunities (X_{10}), which displayed the highest positive standardized weight ($\beta \approx 0.59$, $p = .034$)

3.9 Regression Scatterplots and Descriptive Statistics Analysis

Regression scatterplots illustrate clear positive relationships between key training variables and career planning, as well as growth opportunities and retention. Specifically, training opportunities show a strong upward trend in predicting career planning perceptions, while training effectiveness demonstrates the highest predictive power with a steep positive slope. Additionally, employees perceiving greater growth opportunities report significantly lower intentions to leave the organization.

Descriptive statistics for individual items reinforce these patterns. Employees generally agree that the organization provides sufficient training opportunities for skill development (M = 4.17, SD = 1.01, skew = -0.79) and that training sessions are conducted frequently and effectively (M = 3.94, SD = 1.22). Career planning support is moderately perceived (M = 3.73, SD = 1.14), whereas promotion transparency scores lower (M = 3.63, SD = 1.12), indicating some employee concerns about fairness in promotions. Managerial support receives positive ratings (M = 3.75), and feelings of being valued and respected are notably high (M = 4.16, SD = 0.87), exhibiting strong left skewness that reflects widespread positive sentiment.

HR policies and reward fairness are perceived moderately positively (means around 3.67–3.76), with some variability and occasional lower scores. Work-life balance initiatives also score positively (M = 3.84), while growth opportunities emerge as a critical factor linked to job satisfaction (M = 4.08) and retention risk (M = 3.71). The slightly left-skewed distributions and leptokurtic kurtosis values across items suggest that most employees respond positively but with some extreme negative perceptions highlighting potential areas for targeted improvement.The findings indicate that employees generally perceive the organization as

providing adequate training and skill development opportunities, although perceptions of training effectiveness exhibit some variation. Career planning support is viewed positively but less strongly than training, with growth opportunities emerging as a key driver of employee satisfaction and retention. Employees report feeling valued and rewarded; however, inconsistencies remain regarding promotion transparency and reward fairness. HR policies contribute moderately to job satisfaction, and work-life balance is largely perceived favorably. Retention risk appears most strongly linked to limited career growth prospects. Statistically, responses are predominantly left-skewed, reflecting overall positive sentiment, but with some extreme negative scores signaling areas for improvement. Moderate variability (coefficient of variation between 24% and 31%) suggests general agreement alongside meaningful dispersion. Leptokurtic distributions in training and recognition-related items indicate response clustering near the mean with occasional outliers. Based on these patterns, targeted recommendations include strengthening career planning initiatives, enhancing transparency in promotion policies, standardizing reward systems to reduce perception disparities, and maintaining a strategic focus on training and growth as core drivers of employee engagement and retention.

3.10 Regression Analysis: Training Opportunities, Training Effectiveness, and Career Planning Support

Analysis of data from 51 employees revealed that perceptions of training opportunities (X1) and training session effectiveness (X2) are positively associated with perceived organizational support for career planning (Y). Descriptive statistics showed moderate-to-high agreement, with means of 4.12 (X1), 3.86 (X2), and 3.73 (Y), and negative skewness indicating a predominance of positive responses for training-related variables. Pearson correlations confirmed strong positive relationships between career planning and both training opportunities ($r = 0.72$) and training effectiveness ($r = 0.84$), with a moderate correlation between the two training measures ($r = 0.61$). Multiple regression analysis yielded a significant model ($R^2 = 0.78$, $F(2,48) = 84.98$, $p < .001$), with both predictors contributing significantly: training opportunities ($\beta = 0.405$, $p < .001$) and training effectiveness ($\beta = 0.669$, $p < .001$), indicating that the quality and frequency of training sessions have a stronger influence on career planning perceptions than training availability alone. ANOVA results supported the model's explanatory power. Residual diagnostics revealed slight non-normality and heteroscedasticity, suggesting potential improvements via weighted regression. Expanding the model to include other HR variables reduced overall explained variance ($R^2 = 0.29$, $p = .126$), with only growth opportunities (X10) remaining a significant predictor ($p = .034$), underscoring the primacy of career growth in driving engagement beyond training factors. These results emphasize that organizations should prioritize not only providing sufficient training but also ensuring training effectiveness alongside transparent growth opportunities to foster career planning support.

4.0 Discussion

4.1 Study Insights: Employee Engagement in AI-Enabled IT Organizations

This study sheds light on employee engagement dynamics in AI-enabled IT firms, examining the roles of training, HR policies, and growth opportunities in shaping career planning and retention. Descriptive analysis of survey items (Q7–Q17) showed generally high employee satisfaction, with mean ratings between 3.6 and 4.2 on a 5-point scale. The highest-rated item was "I feel valued and respected in my workplace" (Q12, Mean = 4.16), highlighting strong employee recognition as a cornerstone of positive workplace culture. In contrast, the lowest-

rated item was "Opportunities for promotions are transparent and merit-based" (Q10, Mean = 3.62), revealing persistent concerns over promotion fairness and transparency. This gap underscores a critical strategic priority, as perceived inequities in promotion processes can negatively impact employee engagement and retention(Zainee and Fadilah, 2020). Addressing this issue through transparent, merit-based advancement frameworks is essential to sustaining a motivated workforce in competitive AI-driven environments.

4.2 Training as a Key Driver of Career Planning

The first regression model evaluated the impact of training opportunities (X1) and training effectiveness (X2) on perceived career planning support (Y). The model was statistically strong, explaining 78% of the variance ($R^2 = 0.78$, $p < .001$), with both predictors showing high significance. Notably, training effectiveness demonstrated a stronger correlation with career planning support ($r = 0.84$) than the mere availability of training opportunities ($r = 0.72$). This indicates that the quality and relevance of training delivery—rather than just providing training—play a more critical role in shaping employees' perceptions of career planning support. These findings align with modern AI-enabled HR practices, which emphasize personalized, data-driven learning pathways to better align employee growth with organizational objectives(Okatta et al., 2024).

4.3 Career Growth as the Primary Retention Lever

The second regression model, which included ten predictors (X1–X10) to explain career growth and retention (Y), showed a weaker overall fit ($R^2 = 0.29$, $p = .126$), indicating the model was not statistically significant. Among all factors, only growth opportunities (X10) emerged as a significant predictor ($t = 2.20$, $p = .034$). This highlights career progression as the key driver of employee retention in specialized sectors like IT Kamalesh and Sivachandran, 2024. The limited explanatory power of the model suggests that additional factors, potentially unmeasured variables, interaction effects, or nonlinear relationships, may influence retention—complexities that AI-enhanced analytics could better detect and model.

4.4 Statistical Limitations and Analytical Considerations

Several methodological issues were identified in the analysis:

4.4.1 Multicollinearity: High correlations among predictors such as training, HR support, and promotion policies may inflate standard errors and affect coefficient reliability.

4.4.2 Heteroscedasticity: Variance of residuals was unequal across observations, violating homoscedasticity assumptions. This could be mitigated using data transformations or weighted regression techniques.

4.4.3 Sample Size and Power: The relatively small sample ($n = 51$) resulted in low statistical power (0.34), increasing the likelihood of Type II errors. Future research should use larger, more representative samples to enhance robustness.

4.5 AI-Driven Implications and Marketing Value

From a strategic and marketing analytics perspective, these findings carry important implications. First, employees who feel respected and valued (as reflected in high Q12 scores) are likely to serve as powerful brand ambassadors, enhancing employer branding efforts. Second, the strong links between training, growth opportunities, and retention highlight the potential for AI-driven talent analytics to predict attrition risks and customize personalized learning and development pathways aligned with individual career goalsDousin et al., 2021. Finally, persistent concerns around promotion transparency suggest a critical opportunity for

AI-enabled HR dashboards to increase objectivity and visibility in promotion decisions, thereby fostering fairness, trust, and employee confidence in advancement processes.

4.6 Graphical Trends Reinforce Insights

The visual data strongly supports the quantitative results: frequency distribution graphs reveal most responses cluster around "Agree" (4) and "Strongly Agree" (5), indicating generally positive employee sentiment. Regression scatter plots display tight, linear relationships between training variables and career planning, confirming their strong predictive power. In contrast, retention model plots show more scattered data points, reflecting a weaker overall fit and emphasizing growth opportunities as the sole clear visual predictor. Additionally, skewness and kurtosis analyses indicate left-skewed and leptokurtic distributions, meaning responses are heavily concentrated on the positive end but include some isolated pockets of dissatisfaction, particularly around promotion fairness (Fechter, 2020).

4.7 Strategic and Theoretical Implications

Theoretically, this study aligns with Human Capital Theory, reinforcing that investing in employee development—through training and growth opportunities—translates into greater retention and engagement. Practically, it emphasizes that IT firms should focus not just on providing frequent training but ensuring its effectiveness, prioritize clear visibility of career growth and internal mobility, and leverage AI-driven HR analytics to enhance prediction and transparency. The gap between high overall satisfaction and concerns about promotion transparency reflects a common paradox in high-skill sectors: employees may feel valued in their daily roles yet still perceive career advancement as unclear or restricted.This study provides valuable insights into employee engagement in AI-enabled IT organizations, revealing how training, HR practices, and growth opportunities influence perceptions of career planning and retention. With most Likert-scale averages ranging from 3.6 to 4.2, employee sentiment is generally positive, and the highest-rated area—feeling respected at work (Mean = 4.16)—underscores a strong cultural foundation. However, transparency in promotions (Mean = 3.62) remains a weak spot, indicating a gap between day-to-day satisfaction and long-term career clarity. The regression results ($R^2 = 0.78$) show that training availability and, more critically, training effectiveness ($r = 0.84$) significantly shape employee perceptions of career support. These findings are consistent with recent literature. Mehlan et al. (2025) found that generative AI-driven personalized learning significantly improves motivation and engagement, while it is also highlighted that adaptive learning tools increase retention by aligning training with career goals. Studies also confirm the importance of transparent growth pathways; Aggarwal (2025) noted that career pathing clarity boosts engagement and internal mobility, a view echoed by SHRM and HBR data showing that organizational transparency improves retention by 25% (Psicosmart, 2024). However, Maciejovsky et al. (2025) caution that full salary transparency can unintentionally demotivate lower performers, suggesting the need for balanced communication strategies. Additionally, Costa et al. (2024) emphasized that psychological safety and project ownership are more important than salary alone in retaining tech talent. Supporting this, Vijayan (2025) demonstrated that machine learning models leveraging HR data can accurately predict turnover risks and help design proactive retention strategies. The ethical deployment of AI is also critical—Sadeghi (2024) warned that poorly communicated AI systems can harm employee trust and well-being, undermining engagement efforts. Lastly, AI-powered e-HRM systems are proving effective in both enhancing engagement and

forecasting attrition, affirming that technology can support but not replace thoughtful, human-centered HR practices. Together, these findings validate this study's conclusion that effective training, transparent growth pathways, and ethical AI integration are essential levers for building engaged, future-ready workforces in AI-driven IT environments.

This analysis reveals that while various HR and managerial variables were evaluated, only growth opportunities significantly predicted retention risk ($p = .034$), despite the model's modest explanatory power ($R^2 = 0.29$). This highlights the critical importance of visible and accessible career advancement in retaining technical professionals—many of whom, despite feeling respected and supported, are likely to leave when growth feels stagnant. These findings are consistent with Cornerstone's 2023 global study, which found that employees lacking visibility into internal career opportunities are nearly three times more likely to plan to leave, while implementing self-service career mobility tools increased retention by up to 50% (Cornerstone, 2023). Wiralodra, andSalendu,2023). workforce analytics further support this, showing that internal movers—whether through promotions or lateral changes—had a 70% retention rate after three years, compared to only 45% for those who remained in static roles (Psicosmart. (2025). Similarly, Gallup and LinkedIn (2021) reported that 94% of employees would stay longer if companies invested in their professional development. Research on startups found that factors like career goal progress and promotion speed were negatively correlated with turnover intentions ($r \approx –0.30$, $p < .01$), reinforcing the value of accelerated growth paths (Ng & Feldman, 2014). From a marketing analytics perspective, employees are increasingly viewed as internal customers, with training and career development acting as essential touchpoints in their engagement journey. Companies that embed growth into their culture see up to 34% increases in retention, particularly when mentorship and mobility initiatives are implemented (SHRM, 2020). While the current model is limited by statistical challenges such as multicollinearity and sample size, these limitations underscore the potential for AI-enabled analytics to uncover non-linear patterns and segment-specific drivers. As reported by the *Financial Times* (2024), organizations are already using AI to assess skills, personalize training, and enable internal hiring, contributing to higher retention through individualized development pathways. Collectively, these insights point to a strategic imperative for AI-enabled IT firms: not only to expand training access but to integrate it with transparent, personalized career growth—enhanced via AI-driven dashboards, predictive models, and internal mobility strategies—to improve both employee retention and employer brand positioning.

5.0 Conclusion and Future Prospects

The findings underscore that employee engagement in the IT industry is most strongly influenced by training effectiveness and career growth opportunities. While employees report feeling respected and generally satisfied, a key area of concern remains the lack of transparency in promotion processes. From a marketing standpoint, highly engaged employees act as brand ambassadors, playing a vital role in talent attraction and retention. Looking ahead, the integration of AI-enabled analytics presents a powerful opportunity for IT organizations to enhance engagement strategies. Personalized training pathways, data-driven promotion dashboards, and predictive attrition modelling can collectively address current gaps while fostering a culture of continuous development and fairness. By adopting these tools, companies can not only improve job satisfaction but also strengthen their employer brand and competitive

edge in the market. As the industry evolves, future-focused investment in AI-driven career development will be essential for organizations aiming to retain top talent, increase transparency, and position themselves as leaders in employee-centric innovation.

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8.0 Contribution – VB contributed in ideation and draft preparation and JT contributed for result analysis and SK did final proof reading

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