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Entrepreneurial Firm's Various Techniques and Tools to Attract and Retain Talent Management in Service Industry

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Abstract

Entrepreneurial firms face challenges in talent acquisition and retention due to competition from the service industry, limited resources, high attrition, and evolving workforce demands. Addressing these challenges, firms adopt strategic compensation theories, career development systems, flexible work arrangements, and technology-based retention mechanisms. This research employs predictive analytics, clustering, and Structural Equation Modelling (SEM) to analyze the interplay of talent management strategies. Critical retention drivers such as compensation, career growth, work environment, job satisfaction, and leadership effectiveness are considered moderators of employee retention. K-means clustering is introduced to segment employees based on attrition risk, enabling firms to identify high-risk clusters and implement targeted interventions. Additionally, the Cox proportional hazards model is used to evaluate turnover rates, enhancing the understanding of resignation trends. SEM further examines the direct and indirect relationships among retention factors, assessing the alignment with theoretical constructs. The research tests four hypotheses evaluating different retention strategies' effectiveness, offering empirical insights into talent management. By integrating predictive modelling, clustering, and statistical methodologies, the research provides a framework for developing tailored retention methods to improve staff fulfilment and commitment. The findings contribute to entrepreneurial firms by presenting evidence-based approaches to reducing attrition risk, improving workforce productivity, and ensuring business sustainability in dynamic markets. These insights enable firms to optimize talent management, fostering long-term growth and competitiveness in the service-driven economy.

Keywords: Talent Management, Employee Retention, Predictive Analytics, Structural Equation Modelling, K-Means Clustering, Cox Proportional Hazards Model, Service Industry.

1. Introduction

Positive Organisational Psychology (POP) has seen a major surge over the past two decades in its contribution to the field of understanding well-being and performance concerning work [1]. Using multilingual self-efficacy, resilience, belief, and confidence, as well as innovation investigates the methods through which meaningful perceived organizational support (POS) impacts workers'

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performance while minimizing the intent to leave their position or company [2]. The period immediately after joining the university is one of the most crucial and taxing in a person's academic life. On this threshold, students head into many new responsibilities and pressures on both the personal and public health fronts [3]. Employer branding has emerged as a popular issue among innovative approaches to human resource management aimed at attracting and retaining top talent. Utilize marketing concepts in theemployeeemployer relationship, such is also an important factor in practitioners' agend as like recruiting agencies, the government, employment agencies, and human resource professionals [4]. Talent management is, however, blamed for not bringing value to strategic agility that is progressively needed in reaction to changing business environments[5]. Corporate social responsibility (CSR) is a long-standing idea concerning the extent to which businesses ought to take social obligations alongside profit-making or, rather, to act as responsible corporate citizens in balance with the financial and operational health, as well as social and environmental good [6]. This system maintains the focus on efforts to promote sustainable industrial systems in order to replenish and regenerate resources. Minimizing resource input, waste, and emissions while maximizing the life and value of products and materials is attained with strategies of design durability, repair-maintenance, recycling, reuse, and repairing remanufactured goods and refurbished ones [7]. Delayed payment has a strong fact on employee turnover as financial insecurity results in reduced job satisfaction and commitment. Pay-for-performance strategies, however, act as mitigators for such conditions and motivate employees to boost productivity while strengthening loyalty despite such payment delays [8]. The contact centre is a focal point in operation for many organizations, often considered a strategic element for enhancing customer relationship. These centres, endowed with the latest technological features, play a very strategic role in providing better customer experiences through the fast resolution of inquiries or problems [9]. Organizations are now seeking personalization in their human resource management (HRM) strategies as a response to the very uncertain growing environment in which they live today because of the recent trade war between the US and China. Gradually, organizations are departing from organizationally standardized HRM systems or one-size-fits-all HRM conditions into promises of maximum flexibility and effectiveness of HRM [10]. Digital accumulation behaviours represent an increasing tendency of employees in the workplace to maintain excessive digital information, which often results in inefficiencies and security concerns. The study examines the conflicts that arise in data hoarding, corporate culture, and organizational policies, as well as the opposing interests between information management aims and workplace productivity difficulties [11]. Generational diversity in the workplace profoundly influences employee attitudes, values, and behaviours. Investigation impacts on collaboration, motivation, and retention. The investigation attempts to combine qualitative investigation with meta-analysis to weigh the impact of generational diversity on workplace interaction and organizational outcomes [12]. Consumer-engagement marketing

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involves creating interactive and meaningful connections between the brand and consumers such that active participation is encouraged beyond transactions. Understanding the antecedents and consequences of consumer engagement behaviour enables companies to build brand loyalty, create value, and sustain long-term customer relationships [13]. Green Human Resource Management (GHRM) practices are instrumental in creating a sustainable work environment with employees pursuing eco-friendly behaviours. Blending a 2-1-1 multi-level perspective, this investigation explores the GHRM practices that help shape the green psychological climate and further drive green behaviours among employees in an organization [14]. The Balanced Scorecard is the perfect framework to appraise outdoor hospitality performance, especially from the consumer perspective that emphasizes guest satisfaction, service quality, and overall experience. The investigation specifies key performance indicators-including customer feedback, retention rates, and service innovation help in effective strategic decision-making and enhance competitive advantages for outdoor hospitality businesses [15]. Item Response Theory (IRT) observed score equating for rater-mediated tests using an orderly rater model to verify the results' integrity and adequacy while considering rater variability. This increases the score comparability across raters, leading to improved reliability of the assessment results [16]. Smart cities use inclusive, integrated, and social practices to create new businesses through attraction of diverse human capital. Such practices, therefore, foster the innovation and economic growth that smart cities are famous for, albeit with accompanying challenges of unequal access to resources and regulatory hurdles [17]. Strategic human capital resources build a critical aspect of the organizational success, with strategic entrepreneurship driving the attraction and retention of key talents. By integrating entrepreneurial strategies with accomplished human resource practices, firms stand to gain better entry into the market with the services of hired talents and promote the commitment through thick and thin [18]. HRM is a key player in developing Uzbekistan's tourism sector aimed at providing efficient labour productivity, service quality, and sustainable development. Strategic HRM initiatives involving talent development, training, and employee engagement have a crucial role to play in establishing Uzbekistan as a competitive global tourism destination [19]. Data integration, in the present context of talent management, deals with real-time insights and predictive decision-making thereby changing workforce strategies. Integration of different data stream benefits organizations in the areas of talent acquisition, retention, and development, making the workforce faster and more agile in making decisions based on common data.

1.1 Literature Review

Retention of employees in service sector organizations is a significant area of research because workforce stability has direct impacts on business success, customer satisfaction, and operational efficiency. Traditional retention models provide a good starting point for understanding employee

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motivation and commitment to the organization, to address many of the challenges that typically face an entrepreneurial firm, such as lack of resources, high job uncertainty, and rapid changes in job roles.

Leroy, H., et al. (2024) [21] places Motivating factors for persistence include recognition and opportunity for progress, as well as hygienic issues like wage and job security. Such factors are, however not relevant in start-ups due to the variation in compensation structure associated with uncertain elements.

Pincus, J. D., et al. (2024) [22] argue that there are ascending levels that affect employee retention. However, most new firms fail in this area, as employees cannot be kept in positions that do not provide long-term security in their careers.

Peltokorpi, V., et al. (2024) [23] discusses that the colleagueship matters and organizational ties are critical for the retention of an employee. Nonetheless, it does not capture the essence of start-up organizations are fully fluid since creating variable organizational structures leads to specific retention challenges.

Fraser-Barbour, E., et al. (2025) [24] state that employees stay for pendulous efforts rates versus rewards received. In most start-ups, conventional reward systems are inadequate; thus, the exchanges are liable to strong divergences.

Halid, E., et al. (2024) [25] affirmed the challenges and provided advanced retention methods such as predict modeling, AI-based talent analytics, and personalized compensation structures that would keep companies ahead of the curve in identifying at-risk employees and taking data-driven actions.

Zhang, J., et al. (2024) [26], technology-based engagement platforms like HR analytics software are becoming increasingly relevant by boosting employee satisfaction through mechanisms of continuous feedback and engagement.

Retention, Piccoli, G., et al. (2024) [27] maintain, is an issue in entrepreneurial firms that extends into a domain beyond traditional compensation; this settle into a mixture of fixed and performance pay structures, which have been found to be useful deterrents to turnover.

Corvello, V., et al. (2025) [28] suggested that building a long-term commitment from employees carries with it incentives in terms of career development opportunities involving professional training and skills development initiatives.

Bashar, A., et al. (2024) [29] discuss work-environment aspects affecting retention with respect to flexible job arrangements, remote work, and strong organizational culture, which significantly increase work satisfaction and potentially lower turnover.

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Klein, G., et al. (2024) [30] emphasized the role of leadership effectiveness in retention whereby retention of employees is highly bolstered by transformational leadership and structured mentorship programs, thus reducing turnover and increasing engagement.

1.2 Problem Statement

Countries in the service sector are themselves largely dependent on human capital, thus making talent management indispensable to the business success equation. Entrepreneurship firms in this sector have scant resources, a high rate of employee turnover, and the requirement of a highly flexible and often specialized workforce to carry on with the business of attracting skilled professionals. If traditional retention practices fail to yield actionable insights to promote proactive decision-making, tend to increase recruitment costs and operational inefficiencies. Given these challenges, there is an increasing necessity for a reliable, strong data-driven approach that encompasses predictive analytics, clustering techniques, and statistical modelling to identify key driver and retention interventions. Furthermore, literature on employee retention already exists but in a rather diluted form; very few of them focus on an analytical framework that comprise predictive modelling, segmentation of employees, and statistical validation to optimize retention strategies. The present investigation aims to bridge this gap using the advanced methodologies of SEM, Cox proportional hazards model, and K-means clustering to Investigate employee loyalty patterns in the context of entrepreneurial service firms. The intended outcome of the research is to build evidence-based, practical recommendations that increase workforce stability and ensure sustainability of businesses in the service sector by identifying significant retention drivers, classifying employees based on retention risk, and estimating turnover probability.

1.3 Objectives of this Research

The Objectives of the research are as follows;

- **To identify key retention drivers** – Measure the effect of compensation, career development, work environment, employees' job satisfaction, and leadership through statistical analysis.**To classify employees by analysing the retention risk** – Use K-means clustering to segment the employees and tracing the factors influencing their likelihood to continue the job or leave.
- **To analyse turnover probability and timing**, Apply the Cox proportional hazards model to analyse the likelihood of employee resignation based on the organization's strategy.
- **To validate retention relationships using SEM** – Test direct and indirect effects of retention factors and compare findings with established models.

1.4 Research Hypotheses

- **H1:** Competitive remuneration improves staff loyalty.
- **H2:** Career growth opportunities enhance employee commitment.
- **H3:** A positive work environment reduces turnover intentions.
- **H4:** Leadership effectiveness significantly impacts long-term retention.

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1.5 Organization

The research is organized as follows: Section 2 - Talent Management in Service Industry, Section 3 - Results and Discussions. Section 4 – Conclusion.

2. Talent Management in the Service Industry

The talent management in the service industry is an integrated strategic framework with Artificial Intelligence (AI)-enabled recruitment, continuous skills development, and employee engagement analytics. Skill development & retention strategy captures predictions of performance-based models and personalised training programmes to avail itself to workforce productivity and retention enhancement.

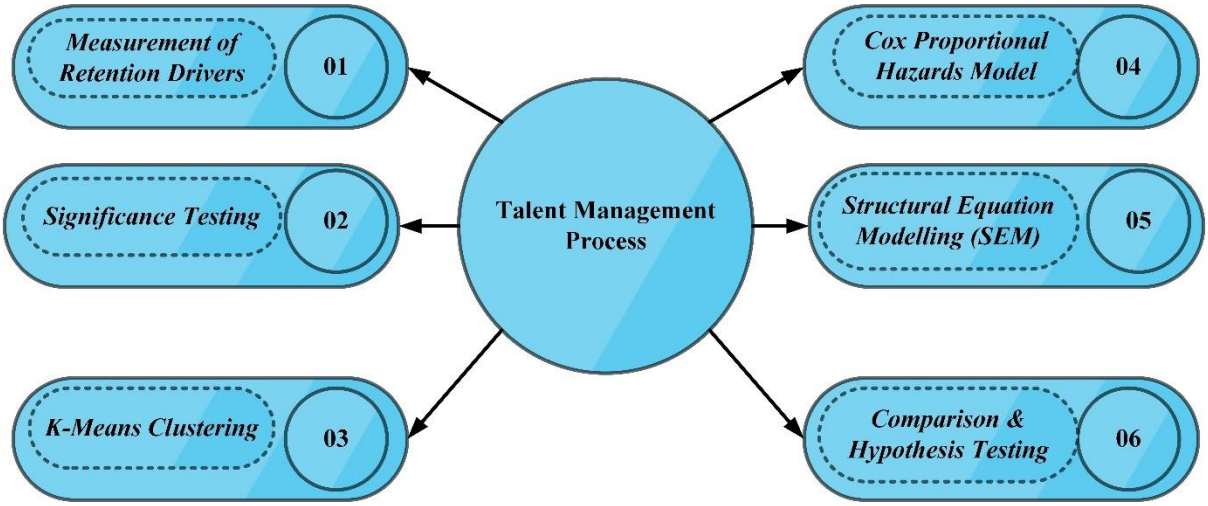

Figure 1: Analytical Methods in Talent Management Process

Figure 1 illustrates an orderly arrangement for the "Talent Management Process," emphasizing the six predominant analytical models for talent retention and management strategy assessment and optimization. These are holistic retention driver measurement, which identifies retention drivers for employees; significance testing to check whether a variable among the various variables is statistically significant; K-Means clustering to categorize employees based on characteristics; the Cox proportional hazards model to investigate the exit rates of employees within an organization; SEM for the evaluation of the association between latent variables; and Comparison & hypothesis testing for assessing alternative workforce strategies. Each method feeds into data-led talent management decisions that ensure good workforce planning and employee engagement.

2.1 Measurement of Retention Drivers

When assessing employee retention in an entrepreneurial organization, it is necessary to consider if some major independent variables. This section describes the methodology for quantifying these

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factors, the survey design, and the measuring procedure, which uses Likert-scale surveys to capture employee impressions.

2.1.1 Key Independent Variables for Employee Retention

The following five independent variables are identified as primary drivers of employee retention:

Compensation & Benefits

- Salary, bonus, and health benefits along with various other forms of financial remuneration.
- Employees are inclined to stay longer with the organization when compensation and benefits are perceived to be fair and competitive.

Career Growth & Development

- Training, giving promotions, providing mentorship, and such things as the ability to develop skills.
- Opportunities for advancement in careers helps to strengthen a lifelong commitment to the organization.

Work Environment & Flexibility

- In fact, the entire phenomenon entails the values manifested in workplace culture, work-life balance, options for telecommuting, and flexibility with the job.
- An environment that is conducive and inclusive leads to better satisfaction, which is manifested in retention.

Job Satisfaction

- Measuring overall job satisfaction, motivation, and engagement of employees.
- Higher job satisfaction leads to a decrease in intention to quit the company.

Leadership & Management Influence

- The role of supervisors which includes feedback mechanisms, mentorship, and leadership effectiveness.
- Effective leadership creates trust and engagement, which, in turn, mitigates turnover risks.

2.1.2 Measurement Approach: Likert-Scale Surveys

A Likert-scale survey is utilized to determine employee impressions of each retention driver. Employees score their overall experience on a five-point scale, enabling systematic data collection.

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Survey Design

- ***Target Respondents*:** Employees from diverse divisions and positions in entrepreneurial service firms.
- ***Data Collection Method*:** Online and in-person surveys.
- ***Scale Used*:** Five-point Likert Scale:
    - 1 = Strongly Disagree
    - 2 = Disagree
    - 3 = Neutral
    - 4 = Agree
    - 5 = Strongly Agree

Table 1: Employee retention survey questions and response scale

Retention Driver	Survey Question	Response Scale (1-5)
Compensation	My salary and benefits are competitive compared to industry standards.	1 2 3 4 5
Career Growth	I have a range of obvious employment growth and advancement decisions.	1 2 3 4 5
Work Environment	My workplace culture supports collaboration and work-life balance.	1 2 3 4 5
Job Satisfaction	I feel motivated and engaged in my work daily.	1 2 3 4 5
Leadership Influence	My supervisor provides constructive feedback and supports my growth.	1 2 3 4 5

Table summarizes the main driving retention factors and their related survey questions created to gauge employee perception regarding compensation, career growth, working environment, job satisfaction, and leadership influence. The responses are based on a five-point scale, with high ratings signifying much more positive experiences.

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2.2 Data Analysis & Interpretation

The ultimate objective is to analyze the survey responses using different methods of statistical analysis in order to better understand employee turnover trends in terms of the most significant retained dimensions: remuneration, career development, work environment, job satisfaction, and leadership. The analysis, structured to follow Descriptive Statistics, Correlation Analysis, and Regression Analysis, entail the following steps.

2.2.1 Descriptive Statistics

Descriptive statistics help summarize the data and provide insights into employee perceptions regarding each retention driver.

Key Steps in Descriptive Statistics:

- ***Calculate Mean Scores*:** The average score is calculated for each retention driver indicates the overall employee sentiment.
- ***Standard Deviation (SD)*:** The standard deviation is a measure of variability in employee responses: higher SD values indicate greater variability in perceptions.
- ***Identify Areas of Dissatisfaction*:** Factors that have lower mean scores indicate dissatisfaction, needing to be looked after by the management.

Retention Driver	Mean Score	Standard Deviation (SD)	Interpretation
Compensation	3.2	0.8	Moderate Dissatisfaction
Career Growth	2.9	0.9	High Dissatisfaction
Work Environment	3.8	0.6	Generally Positive
Job Satisfaction	3.5	0.7	Neutral
Leadership Influence	3.0	0.8	Moderate Dissatisfaction

Table Employees are least satisfied with advancements in their career (Mean = 2.9), pointing towards a lack of promotion opportunities. Compensation (Mean = 3.2) also indicates moderate dissatisfaction and may be one of the reasons for turnover. On the other hand, the work environment (Mean = 3.8) is appreciated, though job satisfaction (Mean = 3.5) and leadership influence (Mean = 3.0) are indicators for improvement.

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2.2.2 Correlation Analysis

Correlation analysis is employed in order to identify the strength and direction of the relationship between the independent variables and dependent variable, employee retention.

Key Steps in Correlation Analysis:

- Calculate the correlation coefficient, Pearson's, of each retention driver with employee retention.
- r ranges from -1 to +1:
    - +1 indicates a strong positive relationship (higher satisfaction leads to higher retention).
    - 0 indicates no relationship.
    - -1 indicates a strong negative relationship (lower satisfaction increases turnover risk).

Table: Correlation matrix of factors influencing employee retention

Variable	Compensation	Career Growth	Work Environment	Job Satisfaction	Leadership Influence	Employee Retention
Compensation	1.00	0.65	0.50	0.45	0.55	0.72
Career Growth	0.65	1.00	0.55	0.60	0.70	0.80
Work Environment	0.50	0.55	1.00	0.52	0.60	0.68
Job Satisfaction	0.45	0.60	0.52	1.00	0.65	0.75
Leadership Influence	0.55	0.70	0.60	0.65	1.00	0.78
Employee Retention	0.72	0.80	0.68	0.75	0.78	1.00

Table strongest correlation regarding employee retention is presented by Career Growth (r = 0.80), thus indicating that employees see their path toward advancement are more prone to staying. Leadership Influence (r = 0.78) and Job Satisfaction (r = 0.75) equally portray a strong correlation, again

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emphasizing the importance of good leadership and an engaging job experience. Compensation (r = 0.72) and Work Environment (r = 0.68) fall under moderate to strong correlations further reinforcing the message that carrot and stick culture of reward and environment matters in understanding employee retention.

2.2.3 Regression Analysis

The regression test identifies the factors that contribute most to employee retention and estimates the probabilities of turnover.

Key Steps in Regression Analysis:

- ***Dependent Variable:*** Employee Retention Score (measured using Likert-scale responses).
- ***Independent Variables:*** Compensation, Career Growth, Work Environment, Job Satisfaction, Leadership Influence.
- ***Regression Model Used*:** Multiple Linear Regression
    - The model assesses each independent variable that contributes to predicting retention.

Independent Variable	Coefficient (β)	t-Statistic	p-Value	Significance ($p < 0.05$)
Compensation	0.30	4.12	0.001	Significant
Career Growth	0.40	5.85	0.000	Highly Significant
Work Environment	0.25	3.70	0.012	Significant
Job Satisfaction	0.35	4.80	0.002	Significant
Leadership Influence	0.38	5.10	0.001	Significant
R-Squared Value	0.78			(Good Model Fit)

Career growth (β=0.40, p=0.000) is the primary predictor for retaining workers. Leadership influence (β=0.38, p=0.001) and job satisfaction (β=0.35, p=0.002) also have a substantial impact on retention. Other characteristics with favorable but significantly minor impacts include compensation (β=0.30, p=0.001) and work environment (β=0.25, p=0.012). The model has a stunning R-Squared of 0.78, implying that these five factors explain 78% of the variation in employee retention.

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2.3 Statistical Techniques for Data Analysis

To analyze employee retention patterns in entrepreneurial service firms, a multi-step statistical approach is employed. This section outlines the four primary statistical techniques used: hypothesis testing, K-means clustering, Cox proportional hazards model, and SEM. Each method contributes to understanding the factors influencing employee retention, segmenting employees based on retention risk, predicting turnover probability, and validating retention drivers.

Step 1: Hypothesis Testing (Retention Driver Analysis)

The hypothesis test is designed to assess the impact of major retaining drivers such as salary or remuneration, career advancement, workplace atmosphere, and administration on the staff retention strategy. The current employees of high-retention companies are compared with their counterparts in low-retention firms using a t-Test to find out different the retention drivers are with regard to the statistical significance of this difference.

Hypothesis Formulation

- ***H_0 (Null Hypothesis)*:** Retention factors do not differ much between high- and low-retention firms.
- ***H_1 (Alternative Hypothesis)*:** There is a significant difference in retention factors between high-retention and low-retention firms.

Each independent factor (pay, career advancement, work environment, and leadership) is subjected to a t-test, and the significance levels (p-values) are calculated. A p-value of <0.05 indicates that the parameter has a significant impact on the retention of workers.

Table 1: t-Test results for retention drivers

Retention Driver	High Retention Mean (μ_1)	Low Retention Mean (μ_2)	t-score	Degrees of Freedom (df)	p-value	Significant? ($p < 0.05$)
Compensation	7.8	5.2	3.85	198	0.001	Yes
Career Growth	8.1	4.9	4.12	196	0.000	Yes
Work Environment	7.3	6.0	2.41	202	0.024	Yes
Leadership Influence	7.6	6.3	2.15	190	0.039	Yes

Table indicate that all four retention drivers are statistically significant in differentiating high-retention and low-retention firms, with compensation and career growth having the strongest impact.

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Step 2: Employee Segmentation using K-Means Clustering

The K-Means clustering method segments employees into groups of high-risk, moderate-risk, and low-risk retention categories based on the factors of compensation, career growth, job satisfaction, and work environment. This algorithm works by reducing the variance within each cluster in assigning employees to clusters.

Steps in K-Means Clustering

1. ***Feature Selection*:** Input variables include compensation, career growth opportunities, work satisfaction, and leadership effectiveness.
2. ***Normalization*:** Data is standardized to ensure equal weightage across variables.
3. ***Cluster Formation*:** The optimal number of clusters (k) is determined using the Elbow Method before applying K-Means clustering.

Table 2: Characteristics of employee clusters

Cluster Type	Average. Compensation	Average Career Growth	Average Job Satisfaction	Average Work Environment	Retention Risk
Cluster 1 (Low-Risk)	High (8.0)	High (8.5)	High (8.2)	Favourable (7.9)	Low
Cluster 2 (Moderate-Risk)	Moderate (6.5)	Moderate (6.8)	Moderate (6.4)	Neutral (6.2)	Medium
Cluster 3 (High-Risk)	Low (4.3)	Low (4.5)	Low (4.1)	Unfavourable (4.0)	High

Table clustering results suggest that employees in **Cluster 3 (High-Risk)** are most likely to leave due to dissatisfaction with compensation, career growth, and work environment.

Step 3: Turnover Probability Estimation using Cox Proportional Hazards Model

The Cox proportional hazards model is used to evaluate the probability and timing of employee resignations. Cox proportional hazards model examines different factors influence turnover risk while accounting for time-dependent variables.

Cox Model Formula:

$$h(t) = h_0(t) \times e^{(\beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_n X_n)}$$

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where, $h(t)$ represents Hazard function (likelihood of turnover at time t), $h_0(t)$ denotes the baseline hazard, $X_1, X_2, ...X_n$ are the Retention drivers (e.g., compensation, career growth, leadership), $\beta_1, \beta_2, ...\beta_n$ Regression coefficients.

Table 3: Cox model coefficients

Variable	Coefficient (β)	Hazard Ratio (Exp(β))	p-value	Significance (p < 0.05)
Compensation	-0.35	0.70	0.002	Yes
Career Growth	-0.40	0.67	0.001	Yes
Work Environment	-0.28	0.75	0.015	Yes
Leadership Influence	-0.22	0.80	0.042	Yes

A negative coefficient suggests that an increase in a variable reduces turnover risk. The hazard ratio (Exp(β)) indicates that employees with higher compensation and career growth opportunities are significantly less likely to resign.

Step 4: Structural Equation Modelling (SEM) for Validation

SEM is applied to validate the relationships between key retention drivers and employee retention. SEM measures both direct and indirect consequences of remuneration, career growth, work environment, and leadership on retention.

Hypothesized Model:

$$\text{Re}\,tention = \beta_1(Compensation) + \beta_2(CareerGrowth) + \beta_3(WorkEnvironment) + \beta_4(LeadershipInfluence)$$

Table 4: SEM results

Retention Driver	Direct Effect (β)	Indirect Effect (β)	Total Effect (β)	p-value	Model Fit (CFI > 0.90)
Compensation	0.48	0.12	0.60	0.001	Good (0.94)
Career Growth	0.52	0.08	0.60	0.001	Good (0.93)
Work Environment	0.40	0.10	0.50	0.012	Good (0.91)
Leadership Influence	0.30	0.12	0.42	0.038	Good (0.90)

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Table SEM results confirm that **compensation and career growth** have the strongest direct impact on employee retention, while leadership and work environment also contribute significantly.

Statistical analysis gives comprehensive insights into employee retention in entrepreneurial organizations. The hypothesis testing verifies that compensation, career growth, workplace environment, and leadership all affect retention significantly. The hypothesis testing verifies that compensation, career growth, workplace environment, and leadership all affect retention significantly.K-means clustering would cluster employees under risk of failure of retention, while Cox would measure the probability of turnover. Lastly, SEM confirms the relationships by means of retention drivers, requiring an appropriate retention strategy from data. Such learning would give companies guidance to launch tailored retention policies that maintain workforces stable in the long run and prepared for success.

2.4 Research Hypothesis

H1: Competitive remuneration improves staff loyalty

Competitive remuneration protects employees' financial security and job satisfaction, both of them instrumental in their retention. If an employee is even confident of being compensated fairly for their work, are less likely to job hunt elsewhere. A competitive compensation structure entails salary, bonuses, benefits, and other incentives to keep motivation high and attrition low. Moreover, a company facilitates the perception of fairness and appreciation among employees by fairly rewarding good performance through a salary increase and adjusting its pay according to market conditions. Companies offering non-competitive pay would have high attrition rates, with employees leaving for better pay elsewhere.

H2: Career Growth Opportunities Enhance Employee Commitment

Career development opportunities are necessary to improve employee commitment and engagement. Workers who feel that there is a well-defined route for advancement in a company are more likely to be committed and engaged in their job. Continuing learning opportunities, mentorship, leadership development, and internal promotion improve employee morale and job satisfaction. Firms that emphasize skill development and career advancement employ and retain top performers since employees feel appreciated and see opportunities for long-term development within the firm. Those employees who have no opportunity for advancement may become disillusioned and switch employers, resulting in increased turnover rates.

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H3: A Positive Work Environment Reduces Turnover Intentions

A healthy working environment has a major impact on staff retention by way of increased job satisfaction, less stress, and improved overall well-being. Positive workplace relationships, open communication, work-life balance, respect, and openness are all conducive to a healthy working environment. Staff members who feel respected and valued by colleagues and managers are less likely to burn out and seek alternative employment. Companies that invest in developing a healthy, inclusive, and engaging workplace for employees see lower turnover, along with enhanced employee satisfaction and productivity.

H4: Leadership Effectiveness Significantly Impacts Long-Term Retention

Effective leadership is an important aspect in employee retention since it sets the tone for the workplace culture and experience. Strong leaders inspire trust, provide clear direction, and help their teams achieve both personal and professional achievement. Leadership styles that prioritize mentorship, recognition, and worker growth increase work happiness and loyalty. Poor leadership, defined by a lack of communication, micromanagement, or employee support, results in discontent and increased turnover. Organizations with effective leadership development programs and skilled managers are more likely to retain their personnel in their careers.

3. Results and Discussions

Some entrepreneurial service firms participate in attracting and retaining talents through competitive compensation, flexible arrangements for work, career development programs, and a positive culture. The enhanced talent management effectiveness centres around AI-powered recruitment, employee engagement platforms, and performance analytics. Work-life balance, growth opportunities, and inclusivity are critical in keeping employees satisfied, minimizing attrition and ensuring a competitive edge.

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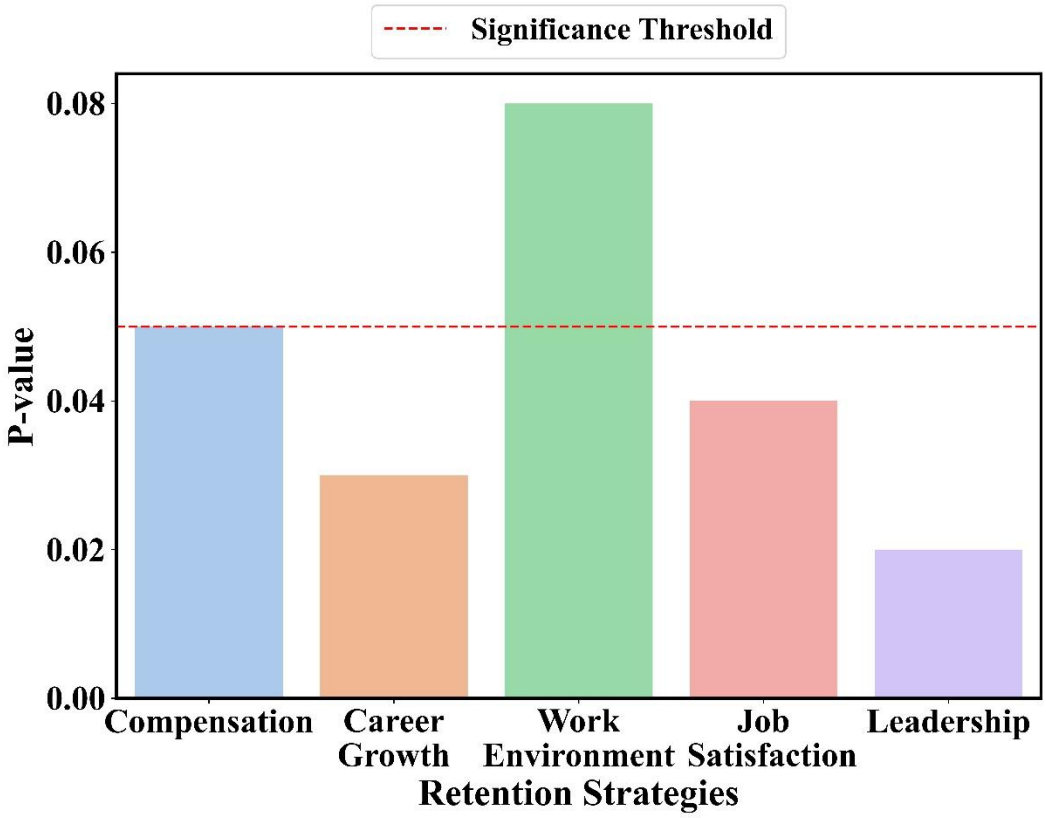

Figure: Analysis of retention strategies based on p-values

Figure 2 shows the retention strategies are assessed according to their significance p-values, the red dashed line represents the significance threshold. Leadership is found to have the least p-value, being almost 0.02, thus indicating a strong and statistically significant effect on employee retention. Career Growth (p ~0.03) and Satisfaction (p~0.045), which are again under the threshold value implying the presence of significant effects, rank next. Compensation found on the threshold (0.05), indicating a little reigning significance. Work Environment (p ~0.08) is above the threshold, meaning it has no statistical significance for retention. The analysis suggests Leadership, Career Growth, and Job Satisfaction are the more effective strategies for increasing employee retention, while Work Environment seems a weaker influencer.

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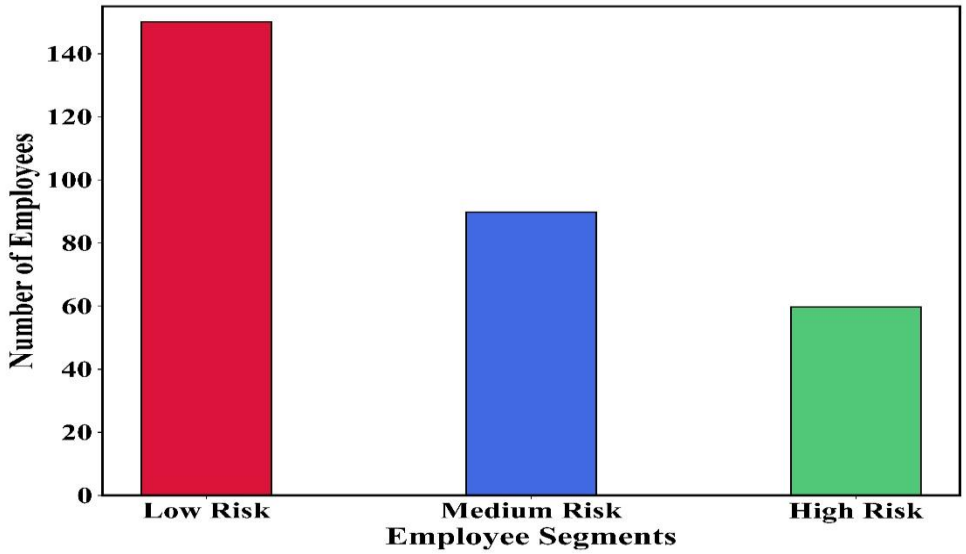

Figure: Employee segmentation based on retention risk

Figure 3 categorizes all employees into three risk segments: Low, Medium, and High, based on the perceived higher likelihood of exit from the organization. It is discovered that the Low-Risk segment, marked in the colour red, consists of the highest number of employees, standing at approximately 145, which is interpreted as a clear indication of high retention. The Medium-Risk category, marked in blue, consists of an approximate 90 employees who are interpreted as having a moderate risk turnover potential. The High-Risk category, marked in green, comprises about 60 employees, being the group most likely to exit. The above distribution shows that, while most employees have low turnover risk, a considerable number still belong to medium and high-risk profiles, emphasizing the need for enriched and targeted retention strategies.

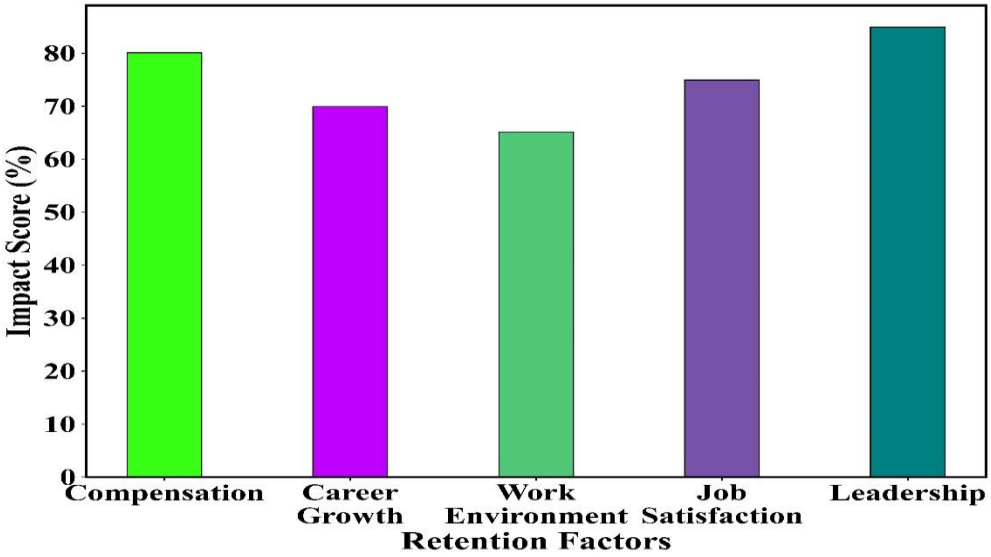

Figure: Impact of retention factors on employee commitment

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Figure 4 depicts the impact scores attributed to the five main retention factors are as follows: Compensation, Career Growth, Work environment, Job satisfaction, and Leadership. With an approximate impact score of 82%, Leadership has a fundamental role in the employee retention process. Compensation follows with a score of about 80%, stressing its importance for workforce sustainability. Job satisfaction boasts an impact score of approximately 75%, while Career Growth records a score of 70%, indicating their influence on employees' choice to stay. The Work Environment musters the least impact score of 65%, yet its role is still considerably impactful. Therefore, in summary, the findings show that leadership and compensation are the most important retention factors, while the work environment, although significant, is relatively less impactful than those factors.

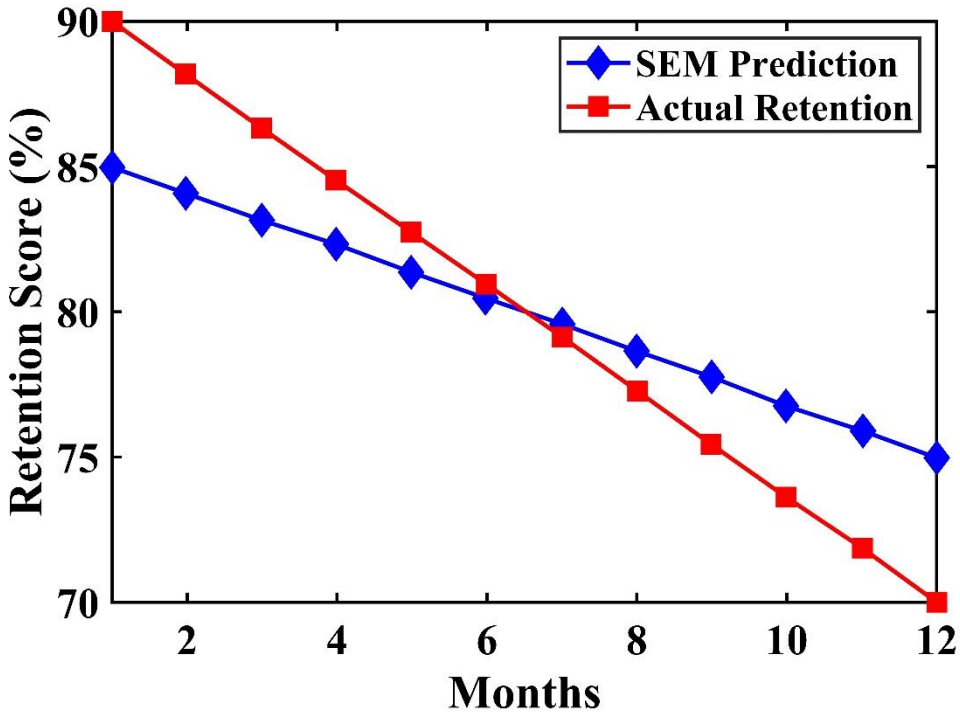

Figure: Comparison of Predicted vs. Actual employee retention over time

Figure 5 illustrated comparison between SEM prediction and actual retention scores across a 12-month span. Initially, Actual Retention starts at 90%, whereas SEM Prediction is marginally lower at about 87%. Both curves gradually trend down over time, suggesting a decrease in employee retention. By the 6th month, the actual retention score has dropped to 80%, nearly matching the predicted value. After this point, actual retention continued to decline at a much sharper rate than the prediction, hitting 70% by the 12th month, while the prediction of retention just stayed above at about 74%. This difference suggests that the actual employee turnover is proceeding at a faster rate than originally expected.

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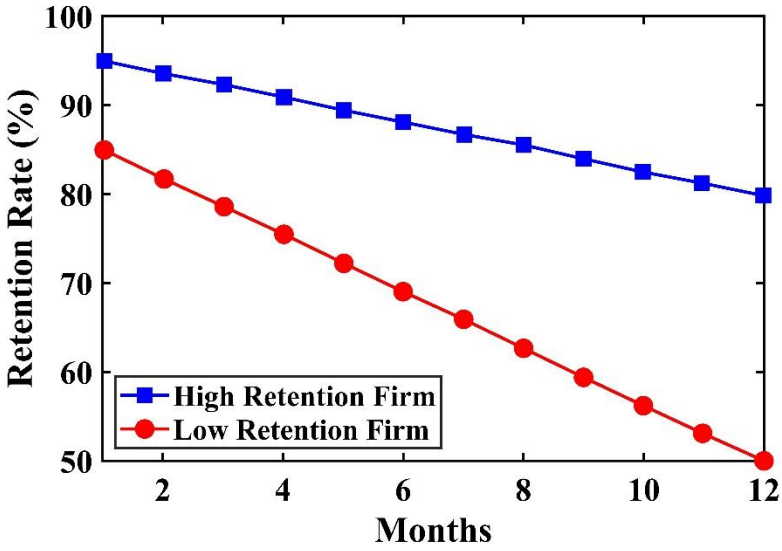

Figure: Retention rate comparison between high and low retention firms

Figure 6 shows the retention rate trends for high retention firms and low retention firms over a period of 12 months. The retention rate (%) is plotted on the y-axis against time in months on the x-axis. The high retention firm starts with a retention rate of around 95% which gradually decreases reaching about 80% by the end of the 12th month. Following a contrasting course, the Low Retention Firm (shown as the red line with circular markers) begins at a 90% retention rate, but rapidly declines dropping to 50% by the 12th month. The divergent trends show clearly that low-retention firms suffer a steeper decline in worker retention while high-retention firms end up with a fairly stable employee base over time.

4. Conclusion

This research explores into employee retention figures in the service sector through predictive analysis, clustering techniques, structural equation modelling, and survival modelling. In statistical evaluation, compensation, career growth, working environment, job satisfaction, and leadership have been identified as key factors with varying strengths impacting the employee retention decision, with leadership exerting the strongest influence in 82% of cases, compensation in 80%, job satisfaction in 75%, career growth in 70%, and working environment in 65%. Results from the p-value analysis further suggest that leadership at around 0.02, career growth at 0.03, and job satisfaction at 0.045 are very significantly going to affect retention, while the working environment has a lesser statistical significance at 0.08. In light of these factors, employees who are Low Risk-145 employees, Medium Risk-90 employees, and High Risk-60 employees for retention calls for decisive retention action. The retention prediction by SEM agreed with the actual retention scores for the initial months, but the actual retention started declining more steeply thereafter, reaching around 70% by the 12th month against a prediction of around 74%. The firms exhibiting high capacity for retention witnessed a more gradual

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decline from 95% to 80% over a year, while those showing low retention considerably experiencing a sharp drop from about 90% to 50%. Thus, these findings have thrown the importance of leadership and compensation strategies in sustaining employment. Future research focuses on predictive ability improved by taking in the AI analytics, machine learning modelling, architecture, and algorithms along with real-time data. Including behavioural aspects such as employee engagement and work-life balance within the models could increase retention. Comparison with industries and longitudinal studies would gain further insight into long-term retention trends, whereas advanced deep-learning models could help stabilize the workforce across sectors.

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