Employee Turnover Case Study – Salifort Motors

Introduction

Salifort Motors is experiencing a 24 percent annual employee attrition rate—high enough to raise recruiting costs, erode institutional knowledge, and stall key projects. The company provided an HR dataset (14,999 records, 10 columns) capturing satisfaction scores, performance reviews, workload metrics, tenure, promotions, compensation tier, department, and whether an employee left. This case study combines exploratory data analysis (EDA) and machine-learning modeling to answer core retention questions and recommend data-backed interventions.

Business Questions

- What percentage of employees are leaving the company?

- Which departments experience the highest turnover?

- How does satisfaction differ between stayers and leavers?

- Does workload (monthly hours) correlate with attrition?

- How does salary level impact turnover?

- Are promoted employees less likely to leave?

Data Preparation

Using Python, null rows (<1 percent) were dropped, categorical columns were cleaned (salary, department), and one-hot encoded for the predictive model. Outliers in monthly hours (>310) were consolidated at the 99th percentile. The cleaned dataset was exported as `employee_turnover_summary.csv` for Tableau dashboarding.
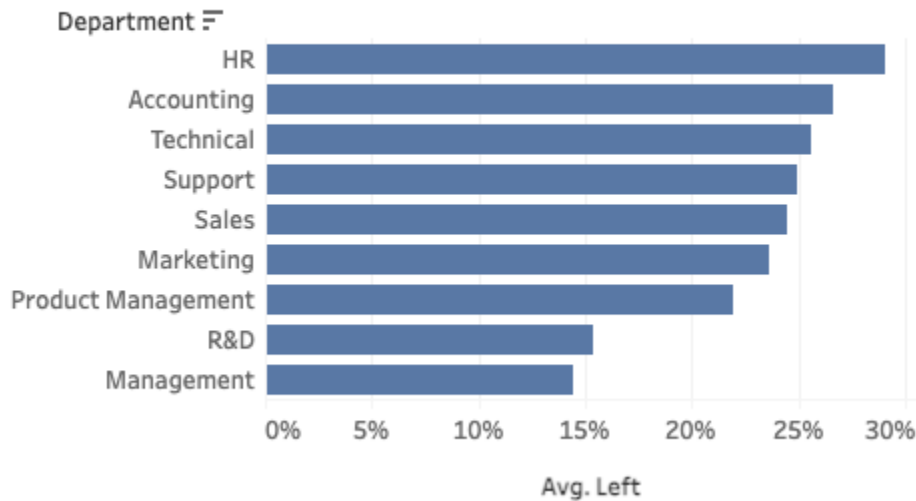
Analysis and Findings

1. Overall Attrition Rate

- Total Employees: 14,999
- Employees Left: 3,571
- Attrition Rate: 24 percent

2. Attrition by Department

Sales and Technical account for more than half of all departures (28 percent and 26 percent attrition, respectively), highlighting functional hotspots. in /visuals.
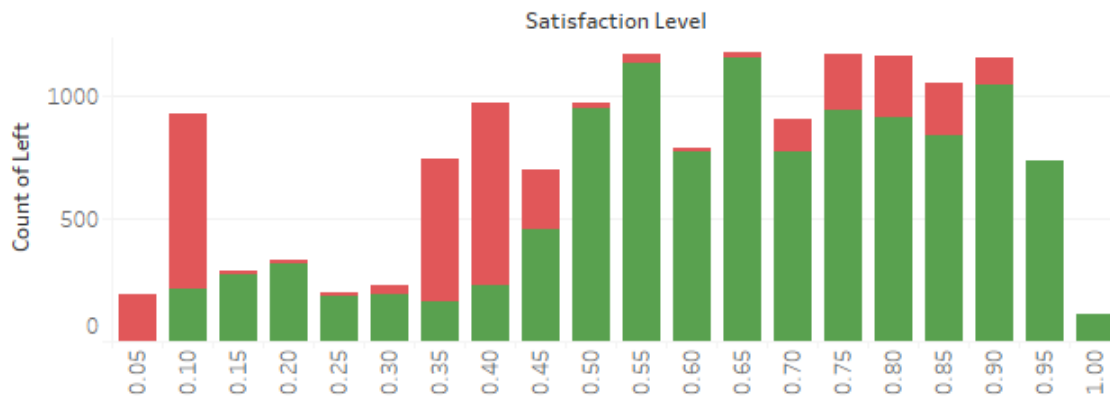
Attrition by Department

3. Satisfaction Gap

Median satisfaction is 0.44 for leavers vs 0.66 for stayers (Mann-Whitney U p < 0.001). Employees in the bottom quartile of satisfaction are three times more likely to leave.
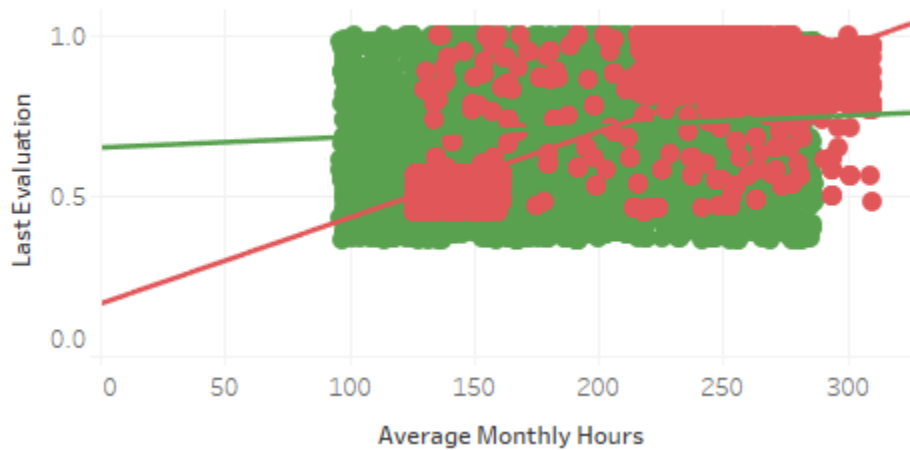
Satisfaction vs Attrition

4. Workload Risk

Average monthly hours above 250 nearly doubles churn likelihood (40 percent). A clear over-work threshold emerges at approximately 220 hours.

Workload vs Attrition

5. Compensation & Promotion

Low-salary employees leave at 39 percent, mid-salary at 20 percent, and high-salary at 9 percent. Promotion within the last five years lowers attrition to just 2 percent, demonstrating the retention value of career progression.
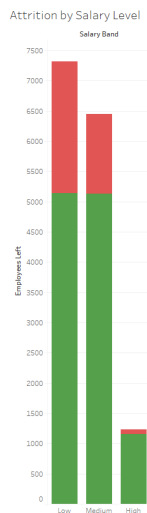
Predictive Model Summary

A Random Forest model (AUC = 0.88) and an XGBoost model (AUC = 0.90) were trained to predict attrition. Top predictors include satisfaction_level, number_project, average_monthly_hours, salary, and time_spend_company.

Recommendations

1. I recommend targeting the Sales and Technical departments with dedicated retention programs because these two functions account for over half of all employee exits, with attrition rates of 28% and 26%, respectively. These rates are significantly higher than the company-wide average of 24%, indicating department-specific risk that warrants focused intervention.

2. I recommend implementing workload monitoring to cap monthly hours at 220 because employees working more than 250 monthly hours experience nearly double the attrition rate compared to those under 200 hours. This suggests burnout is a material factor driving turnover and should be proactively managed.

3. I recommend expanding promotion opportunities across all departments because employees who were promoted within the last five years showed only a 2% attrition rate compared to the 24% company average. This strongly suggests internal mobility is an effective retention lever.

4. I recommend reviewing and adjusting compensation structures for low-salary tiers because employees in the lowest salary group left at a rate of 39%, while those in the high-salary tier left at just 9%. These findings suggest wage dissatisfaction is a significant driver of churn among lower-compensated employees.

5. I recommend implementing quarterly satisfaction pulse surveys tied to predictive risk modeling because satisfaction scores were the strongest predictor of attrition in the XGBoost model. Employees who left had a median satisfaction of 0.44, while those who stayed had a median of 0.66. Monitoring satisfaction proactively can enable early intervention.

Interactive Dashboard

A Tableau dashboard visualizes these insights with KPI tiles, departmental attrition bars, satisfaction distributions, workload risk plots, and salary vs turnover. Dashboard link: https://public.tableau.com/views/EmployeeAttritionAnalysisDashboard_17500091477360 /AttritionAnalysis

Conclusion

This case study reveals clear behavioral and structural drivers behind Salifort Motors' 24 percent attrition rate. Departments like Sales and Technical are disproportionately

affected, while employees with low satisfaction, long hours, low pay, and no promotion history are the most likely to leave. These findings are supported by both exploratory analysis and predictive modeling (XGBoost AUC = 0.90), which identified satisfaction level, monthly hours, and salary tier as top predictors of departure. That said, the analysis is constrained by the absence of additional data sources that would significantly improve the depth and actionability of the insights. For example, the dataset does not include employee age, gender, manager ID, commute time, feedback history, or exit interview text. It also lacks organizational structure variables such as manager performance, team size, or employee engagement scores. Inclusion of this richer contextual data would enable more personalized retention strategies and improve model performance through more granular segmentation. For example, linking attrition with specific managers, engagement surveys, or tenure bands could identify hidden churn risks and training needs within leadership layers. Despite these limitations, this report provides a strong data-driven foundation for immediate HR strategy improvements—particularly in workload management, compensation alignment, and internal mobility programs.