

Why This Casebook?

In the dynamic world of Human Resource Management, data is no longer a back-office tool—it's a front-line driver of strategic decisions. From hiring and compensation to retention and employee growth, HR professionals today are expected to make evidence-based decisions.

This casebook is designed to help you:


- Apply Pandas skills to real-world HR scenarios
- Think critically like a data-driven HR manager
- Navigate messy, multi-source datasets
- Build insights that drive action in organizations


These case studies align with what you've learned in the 10-chapter Pandas tutorial and are rooted in the realistic datasets we've built together.


How to Use This Casebook

- Each case study simulates a business situation.
- There is no one right answer—multiple approaches are welcome.
- Use multiple datasets to connect the dots.
- Ask yourself: "What would I recommend if I were the HRBP?"


1. Are We Overstaffed or Just Distributed?


 **Business Scenario:** The COO is concerned that some regional offices might be overstaffed while others are understaffed, affecting both costs and service delivery. The business wants to ensure optimal distribution of employees across locations to support upcoming projects.


 **Objective / Problem Statement:** Analyze the current workforce distribution across departments and regions. Identify if any specific regions are over- or under-resourced in comparison to headcount averages.

 **Data Hints:** Use the employee master file and the work location map to aggregate headcount by region and department. Consider employee roles to distinguish between levels.


2. New Hire Surge or Sustainable Growth?


 **Business Scenario:** The CHRO noticed a steep rise in new hires over the last few quarters. There's a need to determine whether this represents business growth or temporary backfills.


 **Objective / Problem Statement:** Review hiring patterns over the past 5 years to determine if increases are consistent, seasonal, or reactive to attrition.

 **Data Hints:** Analyze joining dates from the employee master, compare hires by year or quarter, and overlay with attrition log and role classifications.


3. Which Locations Have the Longest-Serving Workforce?


 **Business Scenario:** Facilities and HR are evaluating succession planning needs and want to identify regions where the workforce is aging or nearing retirement.


 **Objective / Problem Statement:** Calculate and compare average employee tenure across regions and flag locations with senior workforce concentration.

 **Data Hints:** Use joining dates from the employee master and map locations using the work location dataset. Tenure = current date - joining date.


4. How Diverse Are Our Departments by Gender and Age?


 **Business Scenario:** The Diversity & Inclusion office wants a comprehensive snapshot of diversity across business units to benchmark inclusion goals.


 **Objective / Problem Statement:** Generate department-level diversity reports showing gender representation and age group distribution.

 **Data Hints:** Use gender data from employee master. Approximate age from year of joining or use synthetic age if available.


5. What's the Average Time-to-Productivity Based on Department?


 **Business Scenario:** L&D wants to know how long it takes new hires in different departments to achieve average or above performance.


 **Objective / Problem Statement:** Determine average time (in months) between employee joining and receiving a performance score ≥ 3.0 , segmented by department.

 **Data Hints:** Merge performance review records with employee master file using employee ID and joining date.


6. Map Team Sizes to Department Budgets – Are We Efficient?


 **Business Scenario:** Finance is interested in understanding if departmental budgets align with actual headcounts and workload.


 **Objective / Problem Statement:** Compare team sizes and average salary burden to the annual budget allocated to each department.

 **Data Hints:** Use employee master, salary data, and department info (with budget). Group by department for headcount and total salary expense.


7. Office Relocation Planning Based on Headcount Clustering


 **Business Scenario:** The Admin team is evaluating space utilization. They want to identify locations with employee density that may justify expanding or consolidating office space.


 **Objective / Problem Statement:** Highlight cities or buildings with high concentration of employees by department and role type.

 **Data Hints:** Use employee location data and role/department combinations from employee master.


8. Which Business Units Are Growing or Shrinking?


 **Business Scenario:** The CHRO wants to track strategic business growth and workforce shifts across business units.


 **Objective / Problem Statement:** Identify trends in department size over time (expanding, stable, declining) using historical hiring data.

 **Data Hints:** Count employees by department using join dates over time (group by year) and compare against exit patterns.


9. Do Departments with Younger Workforce Have Higher Attrition?


 **Business Scenario:** HR suspects that younger employees may be exiting faster in certain departments.


 **Objective / Problem Statement:** Analyze attrition rates by department and correlate with age brackets of current and exited employees.

 **Data Hints:** Use attrition log and employee master. Age may be approximated from joining date or using a synthetic age column.


10. Regional HR Load Balancing – Who Manages What?


 **Business Scenario:** The HR headcount per region needs review. There's a mismatch between HR support and employee volume in several offices.


 **Objective / Problem Statement:** Identify employee-to-HR ratio by location and flag offices with potential HR support gaps.

 **Data Hints:** Use employee master and work location map. Tag HR representatives by region and calculate ratios.


11. Equal Pay or Equal Perception?


 **Business Scenario:** A recent internal engagement survey flagged compensation fairness as a concern among employees in Finance and IT.

 **Objective / Problem Statement:** Determine if there are significant differences in salary and bonus between genders and locations within those departments.

 **Data Hints:** Use salary data, employee master, and department details. Group by gender, location, and department.


12. Who's Driving the Bonus Budget?


 **Business Scenario:** The CFO has observed a surge in bonus disbursements and seeks clarity on where and to whom the increases are being allocated.

 **Objective / Problem Statement:** Analyze which departments and levels are contributing most to total bonus payouts.

 **Data Hints:** Use salary info (bonus component), employee master for department and role.


13. Salary Compression Risk in Long-Tenured Roles


 **Business Scenario:** The HRBP suspects that newer hires may be earning close to or more than tenured employees in the same roles.


 **Objective / Problem Statement:** Evaluate average salary by tenure and compare for similar roles and departments.

 **Data Hints:** Use salary, role, department, and joining date from employee master.


14. Which Grades and Roles Are Outliers in Compensation?


 **Business Scenario:** The Comp & Ben team is reviewing fairness and consistency in pay across job levels.


 **Objective / Problem Statement:** Identify roles or grades that show unusually high or low average salary compared to their peers.

 **Data Hints:** Use grade and role with salary information. Visualize distribution by grade.


15. Identify the Salary Distribution by Department and Gender


 **Business Scenario:** As part of the annual DEI audit, HR is tasked to report department-wise gender pay equity.

 **Objective / Problem Statement:** Generate average salary and standard deviation by gender across departments.

 **Data Hints:** Combine salary file with employee master. Group by department and gender.


16. Benchmark Compensation Against Internal Grade Levels


 **Business Scenario:** Talent Acquisition needs to benchmark offers for lateral hires based on historical internal compensation.


 **Objective / Problem Statement:** Determine median and range of salaries for each grade level.

 **Data Hints:** Use salary history and grade level fields. Consider filtering most recent year only.


17. Has Our Bonus Strategy Been Consistent Across Locations?


 **Business Scenario:** Leadership questions whether bonus percentages vary unfairly across office locations.

 **Objective / Problem Statement:** Analyze average bonus as a percentage of salary by location for the last 3 years.

 **Data Hints:** Merge salary and employee location data. Calculate bonus percentage.

18. Impact of Promotions on Compensation Growth

 **Business Scenario:** Finance wants to quantify how promotions have contributed to overall compensation inflation.

 **Objective / Problem Statement:** Analyze salary jumps post-promotion and calculate average increment.

 **Data Hints:** Use promotion history, salary over time, and joining data.

19. Average Total Compensation of Exited vs Retained Employees

📌 **Business Scenario:** Exit interviews suggest compensation dissatisfaction. HR wants to validate if exited employees were underpaid.

🎯 **Objective / Problem Statement:** Compare average total compensation (salary + bonus) of current and exited employees over past 3 years.

💡 **Data Hints:** Use salary file, bonus, and employment status.

20. Cost Efficiency: Revenue per Salary by Department (if extended)

📌 **Business Scenario:** A strategic review calls for benchmarking cost efficiency by team.

🎯 **Objective / Problem Statement:** Estimate revenue-to-cost ratios by department using salary data as cost proxy.

💡 **Data Hints:** Use total salary from salary info grouped by department. (Revenue figures may be added synthetically.)

🎓 Learning & Development

21. Training the Right People or the Easiest to Reach?

📌 **Business Scenario:** The L&D team is questioned for training the most available rather than the most impactful employees.

🎯 **Objective / Problem Statement:** Review whether top performers and high-potential employees are receiving adequate training.

💡 **Data Hints:** Compare training participation with performance scores and promotion history.

22. Are Trained Employees Performing Better?

📌 **Business Scenario:** A VP questions the ROI of recent technical training programs.

🎯 **Objective / Problem Statement:** Compare average performance scores between trained and non-trained employees over time.

💡 **Data Hints:** Merge training records with performance reviews. Control for department.

23. Training Participation vs. Engagement Scores

📌 **Business Scenario:** HR wants to know if employees who are actively trained feel more engaged at work.

🎯 **Objective / Problem Statement:** Correlate training attendance with survey scores on engagement and satisfaction.

💡 **Data Hints:** Merge training and survey feedback datasets. Analyze by employee.

24. Learning Access Disparity: Who's Getting Trained by Location?

📌 **Business Scenario:** Regional heads suspect unequal access to L&D programs across zones.

🎯 **Objective / Problem Statement:** Track training coverage by region and department to identify disparities.

💡 **Data Hints:** Use training records, work location map, and employee master.

25. Which Trainings Are Most Correlated with Promotions?

📌 **Business Scenario:** L&D wants to showcase which training programs have the most career advancement impact.

🎯 **Objective / Problem Statement:** Identify training types associated with employees who received promotions within a year.

💡 **Data Hints:** Join training, promotion, and employee data. Analyze training type vs promotion frequency.

Performance & Productivity


26. Does Attendance Predict Performance?


📌 **Business Scenario:** The operations team is exploring early warning signs for disengagement or underperformance and suspects attendance might be a leading indicator.


🎯 **Objective / Problem Statement:** Analyze whether there is a correlation between attendance percentage and performance scores.

💡 **Data Hints:** Merge attendance records with performance review data. Consider using recent year(s).


27. Who Are Our Most Improved Performers?


 **Business Scenario:** The CEO wants to celebrate employees who have significantly improved their performance over time.


 **Objective / Problem Statement:** Identify employees with the highest year-over-year increase in performance scores.

 **Data Hints:** Use performance reviews over multiple years. Filter those with positive performance deltas.


28. High Performance, No Promotion – Are We Losing Talent?


 **Business Scenario:** A business head believes some top performers are being overlooked for career growth opportunities.


 **Objective / Problem Statement:** Identify high-performing employees with no promotion history in the last 3 years.

 **Data Hints:** Use performance scores and promotion history. Filter top quartile performers.


29. Which Departments Have Performance Bottlenecks?


 **Business Scenario:** HR is reviewing areas where performance scores consistently trail the company average.

 **Objective / Problem Statement:** Analyze department-level average performance scores to find underperforming units.

 **Data Hints:** Aggregate performance scores by department using performance reviews and employee master.


30. Correlate Work-Life Balance Scores with Performance Over Time


 **Business Scenario:** Leadership wants to understand if perceived work-life balance influences job performance.


 **Objective / Problem Statement:** Compare trends in work-life balance survey scores with annual performance ratings.

 **Data Hints:** Use employee survey and performance datasets. Join by employee and year.


31. Identify Top 10% of Consistent Performers Over 3 Years


 **Business Scenario:** The talent management team wants to identify employees suitable for leadership grooming.


 **Objective / Problem Statement:** Find employees with consistently high performance scores over a 3-year period.

 **Data Hints:** Use multi-year performance reviews. Calculate average score and standard deviation.


32. Performance Drops After Transfers – Myth or Reality?


 **Business Scenario:** There's concern that department transfers may be impacting employee performance.


 **Objective / Problem Statement:** Determine if there's a measurable drop in performance after employees transfer departments.

 **Data Hints:** Identify transfers using promotion or department change indicators. Compare pre- and post-transfer scores.


33. Identify Employees Showing Continuous Downward Trend


 **Business Scenario:** HR wants to proactively support employees who may be on a downward performance spiral.

 **Objective / Problem Statement:** Find employees with 3+ consecutive years of decreasing performance scores.

 **Data Hints:** Use yearly performance scores. Sort by employee and year to compute trends.

34. Compare Performance of Internal Promotions vs External Hires

 **Business Scenario:** There's interest in evaluating the impact of hiring strategy on long-term performance.

 **Objective / Problem Statement:** Compare average performance scores between internal promotes and external hires for similar roles.

 **Data Hints:** Tag internal vs external from promotion history. Compare performance scores.

35. What's the ROI of High Performers in Revenue-Critical Functions?

📌 **Business Scenario:** Senior leadership wants to quantify how much top talent in key functions contributes to business outcomes.

🎯 **Objective / Problem Statement:** Identify top-performing employees in high-revenue departments and estimate their compensation-to-output efficiency.

💡 **Data Hints:** Use performance scores, compensation, and synthetic revenue mapping by department.

36. Are We Losing Talent Due to Career Stagnation?

📌 **Business Scenario:** Several exit interviews cite lack of career growth. HR suspects that long periods without promotions may contribute to attrition.

🎯 **Objective / Problem Statement:** Identify employees with more than 5 years of tenure and no promotions. Compare their attrition rate with peers.

💡 **Data Hints:** Use employee master, promotion history, and attrition logs.

37. How Reliable Are Performance Reviews Across Managers?

📌 **Business Scenario:** The HR director wants to assess the consistency of performance rating standards across team leads and managers.

🎯 **Objective / Problem Statement:** Compare performance rating distribution across reviewers to identify bias or inconsistency.

💡 **Data Hints:** Merge performance scores with manager/reviewer data from employee hierarchy.


38. Do Employees Receive Better Ratings After Promotions?


📌 **Business Scenario:** There's speculation that promoted employees tend to receive inflated performance ratings.


🎯 **Objective / Problem Statement:** Compare employee performance scores before and after their promotion.

💡 **Data Hints:** Join performance data with promotion history. Track changes in scores year-over-year.


39. Is Training Effectively Supporting Underperformers?


 **Business Scenario:** The L&D team wants to evaluate if underperforming employees improve after attending training.


 **Objective / Problem Statement:** Measure the change in performance before and after training participation for low-rated employees.

 **Data Hints:** Use performance review and training records. Segment by employees with scores below average.

40. Who Are the Future Stars in Each Department?


 **Business Scenario:** Talent Management wants to proactively identify high-potential talent in each department for succession planning.


 **Objective / Problem Statement:** Select top 5% of performers within each department who have demonstrated consistent growth over the last 3 years.


 **Data Hints:** Use performance scores by department, aggregated across time.

Talent Retention & Attrition


41. Who's Likely to Leave Next?


 **Business Scenario:** HR leadership is working on an early warning system to reduce unexpected attrition.


 **Objective / Problem Statement:** Identify characteristics of employees who left in the past year and build a risk profile for current employees.

 **Data Hints:** Use attrition logs, performance data, tenure, salary, and engagement scores.

42. Cost of Attrition Analysis


 **Business Scenario:** Finance wants to quantify the cost implications of recent exits.


 **Objective / Problem Statement:** Calculate cost-to-replace and productivity loss due to attrition for the last fiscal year.

 **Data Hints:** Use salary info, joining/exit dates, and role types to estimate replacement time and cost.


43. Which Departments Have the Highest First-Year Attrition?


 **Business Scenario:** HR wants to improve onboarding and retention for new hires.


 **Objective / Problem Statement:** Analyze first-year attrition rates by department and location.

 **Data Hints:** Use employee master and attrition logs. Compare tenure at exit.


44. Tenure vs Exit Reasons – What Patterns Can We See?


 **Business Scenario:** HR is reviewing exit data for trends related to timing and reasons.


 **Objective / Problem Statement:** Categorize exit reasons by tenure buckets and identify common patterns.

 **Data Hints:** Use attrition log with joining and exit dates.


45. Does Training Reduce Attrition Risk?


 **Business Scenario:** L&D wants to understand whether investing in employee development improves retention.


 **Objective / Problem Statement:** Compare attrition rates of employees who attended training vs those who did not.

 **Data Hints:** Merge training and attrition datasets. Analyze by tenure and department.


46. Compare Exit Rates Across Locations and Roles


 **Business Scenario:** Senior HR management is reviewing regional attrition trends to guide policy.

 **Objective / Problem Statement:** Identify which roles and locations have above-average exit rates.

 **Data Hints:** Use employee master, work location map, and attrition data.


47. Do Promotions Impact Retention Positively?


 **Business Scenario:** The talent team wants to validate if promotions help retain high-performing employees.


 **Objective / Problem Statement:** Compare retention rates among employees who received promotions vs those who didn't.

 **Data Hints:** Use promotion history and attrition records. Segment by performance tier.


48. Exit Interview Analysis: Do Reasons Align with Exit Timing?


 **Business Scenario:** HR wants to correlate exit reasons with tenure bands for better predictive modeling.


 **Objective / Problem Statement:** Evaluate if certain reasons (e.g., compensation, culture) spike during specific tenure ranges.

 **Data Hints:** Use attrition log with reason codes and compute tenure durations.


49. Are Performance Ratings Linked to Attrition Risk?


 **Business Scenario:** There's a concern that low performers may feel disconnected and eventually resign.


 **Objective / Problem Statement:** Compare attrition rates across performance brackets over the last 3 years.

 **Data Hints:** Merge performance and attrition datasets. Analyze year-wise trends.

50. Build an Attrition Risk Index Using Multiple Indicators

 **Business Scenario:** The CHRO has requested a data-driven attrition risk score for use in workforce planning.

 **Objective / Problem Statement:** Develop a composite index using salary growth, performance trends, training participation, engagement scores, and tenure.

 **Data Hints:** Use all major datasets: performance, compensation, survey, training, and attrition logs.