

Final Project MHR

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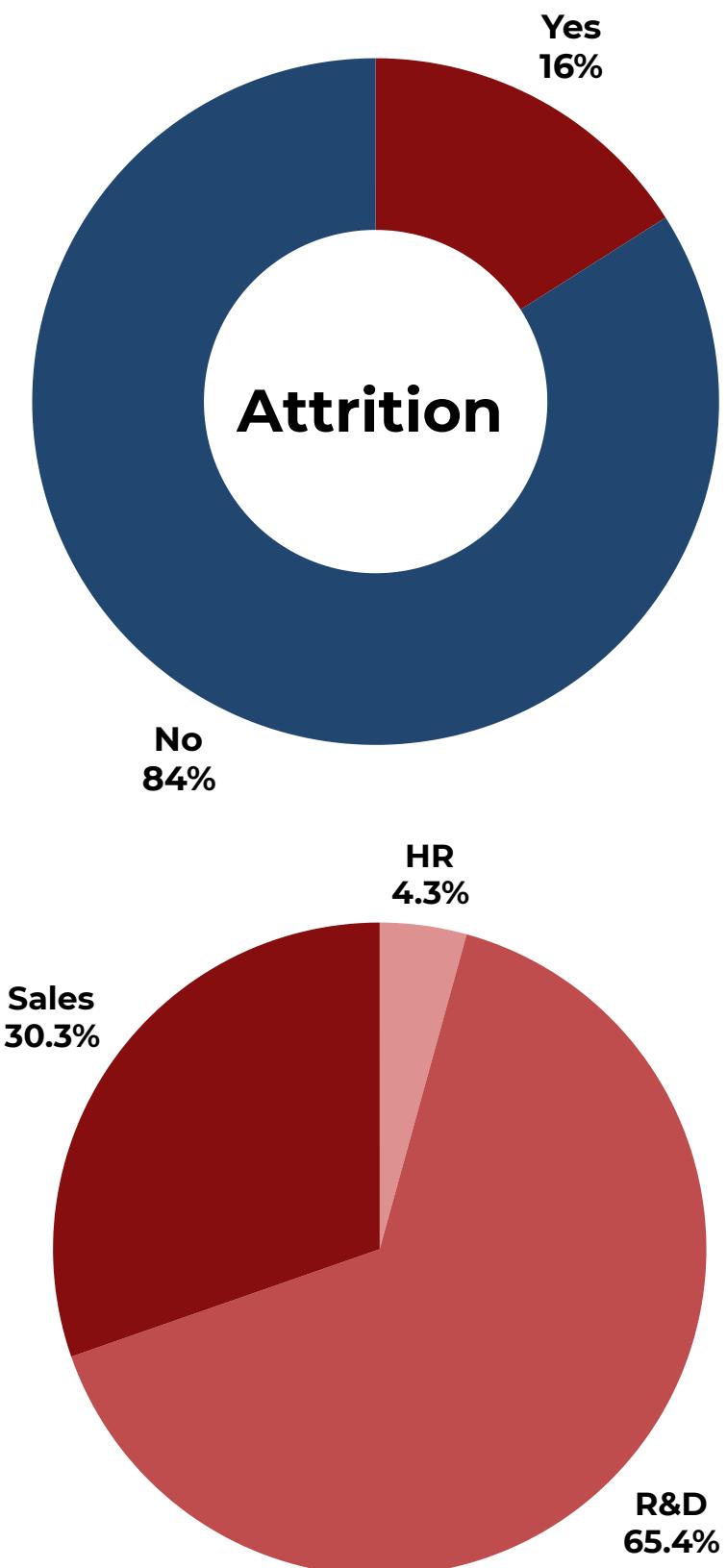
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Summary



Descriptive statistics



Allocation of the employees among the departments

Department	Stayed (%)	Left (%)	Key Insight
Human Resources	69.84%	30.16%	⚠️ Highest attrition rate
Research & Development	84.29%	15.71%	Moderate attrition
Sales	84.98%	15.02%	Lowest attrition

Total number of observants: 4,410

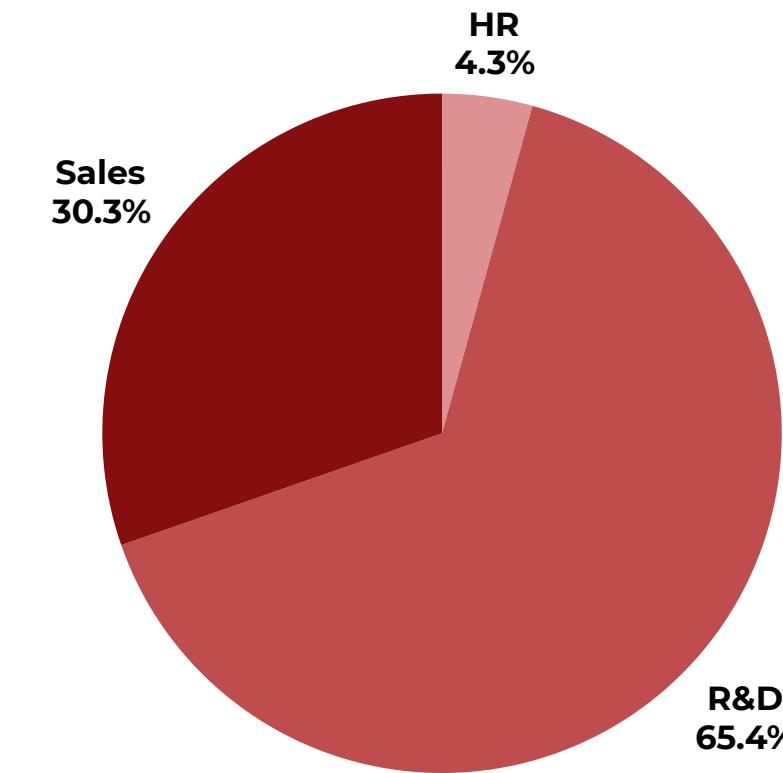
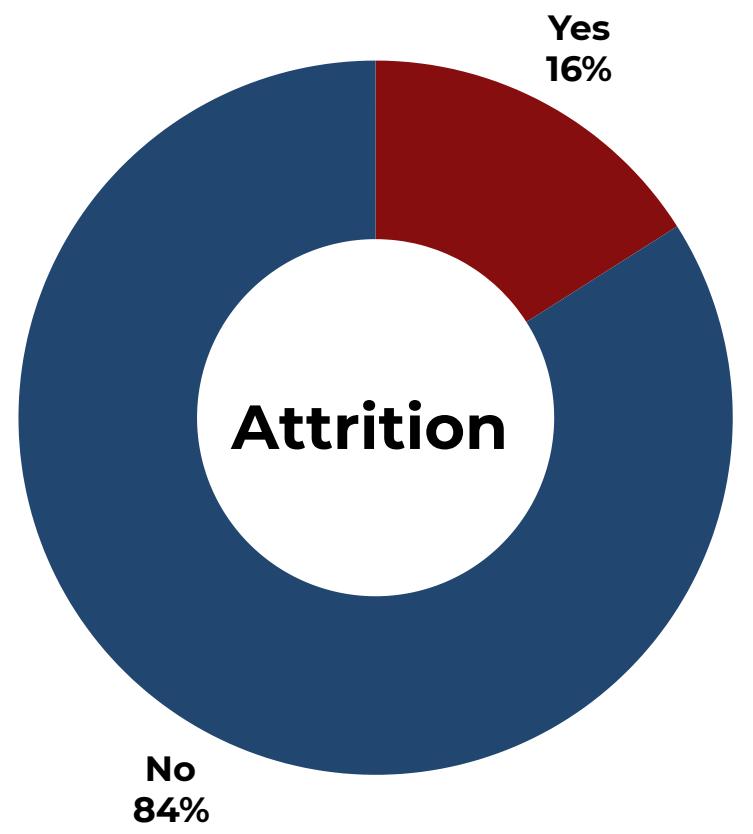
Key takeaway: Although HR has the smallest headcount, it has the highest attrition rate. That makes the loss proportionally more damaging, especially if HR handles core processes like recruitment, onboarding, and compliance.



Male

Female

Descriptive statistics



Allocation of the employees among
the departments

3 Main Questions

**Q.1
DOES GENDER
DIFFER IN THE
EXTENT TO WHICH
JOB SATISFACTION
IS RELATED TO THE
LIKELIHOOD OF
ATTRITION?**

**Q.2
HOW DO
ENGAGEMENT
AND JOB
SATISFACTION
IMPACT THE
ATTRITION
RATE?**

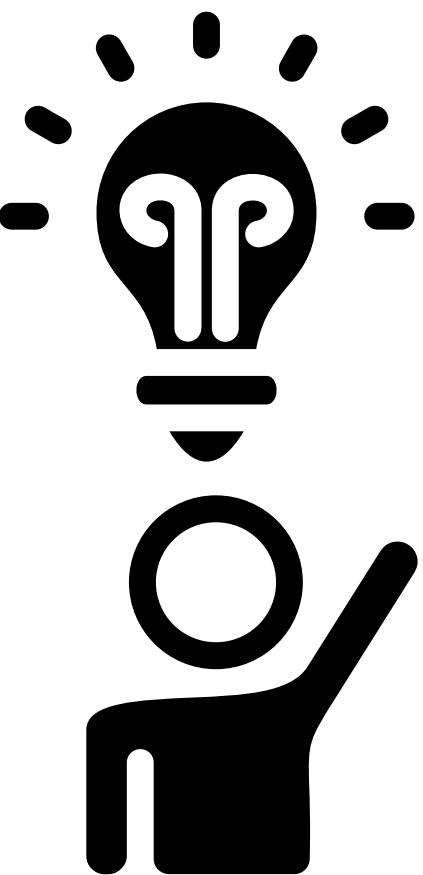
**Q.3
ARE CERTAIN
DEPARTMENTS
EXPERIENCING
HIGHER EMPLOYEE
ATTRITION THAN
OTHERS, AND WHAT
FACTORS MIGHT
EXPLAIN THIS?**

Reasoning behind chosen questions:



It supports the design of targeted, inclusive retention strategies by exploring whether satisfaction influences quitting differently for men and women.

Clarifies whether both factors should be equally prioritized, or if one is the true driver of employee retention.



Answers will help avoid wasted investment in low-impact engagement strategies.

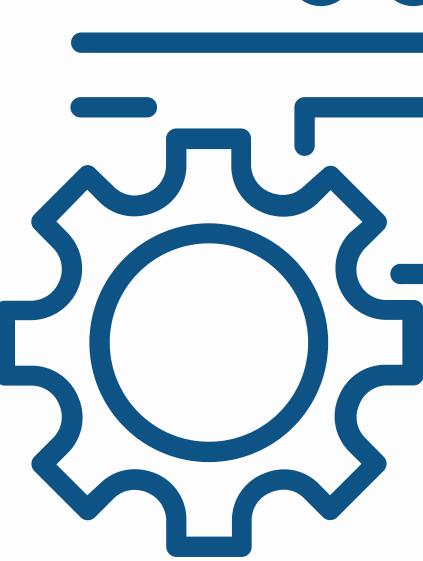
It allows us to uncover department-specific risks and understand whether attrition is due to structure, leadership, or role design.

Analytic approach

Type of Variable	Variable's Names
Control	Age
Control	Gender
Control	Job Level
Control	Total Working years
Control	Years at the Company
Control	Monthly Income



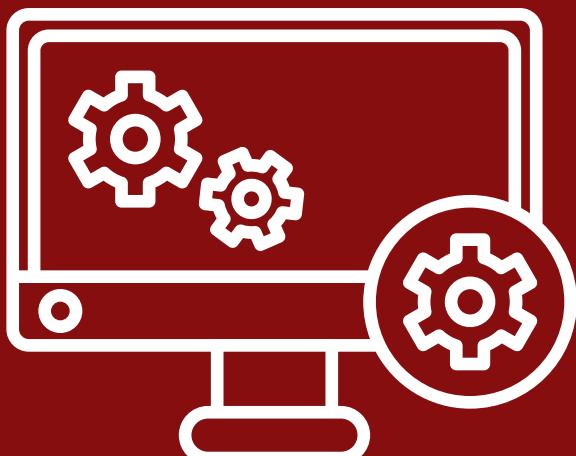
Type of Variable	Variable's Names
Independent	Job Satisfaction
Independent	Job Involvement
Independent	Department
Dependent	Attrition



Tools and Key Variables

Tools Used:

- T-tests
- Fixed-effects concept
- Turnover modelling
- Descriptive Stats + Chi-Square Test
- Logistic Regression
- Margins Plot



Key Variables:

- **Gender: Female (ref), Male**
- **Attrition Flag (1 = Yes, 0 = No)**
- **Department**
- **Age**
- **Monthly Income**
- **Job Level**
- **Total Working Years**
- **Job-Satisfaction (1 = very low, 4 = very high)**
- **Engagement proxy = Job-Involvement score (1–4)**
- **Turnover flag: 1 = left, 0 = stayed**

Q1 Does gender differ in the extent to which job satisfaction is related to the likelihood of attrition?

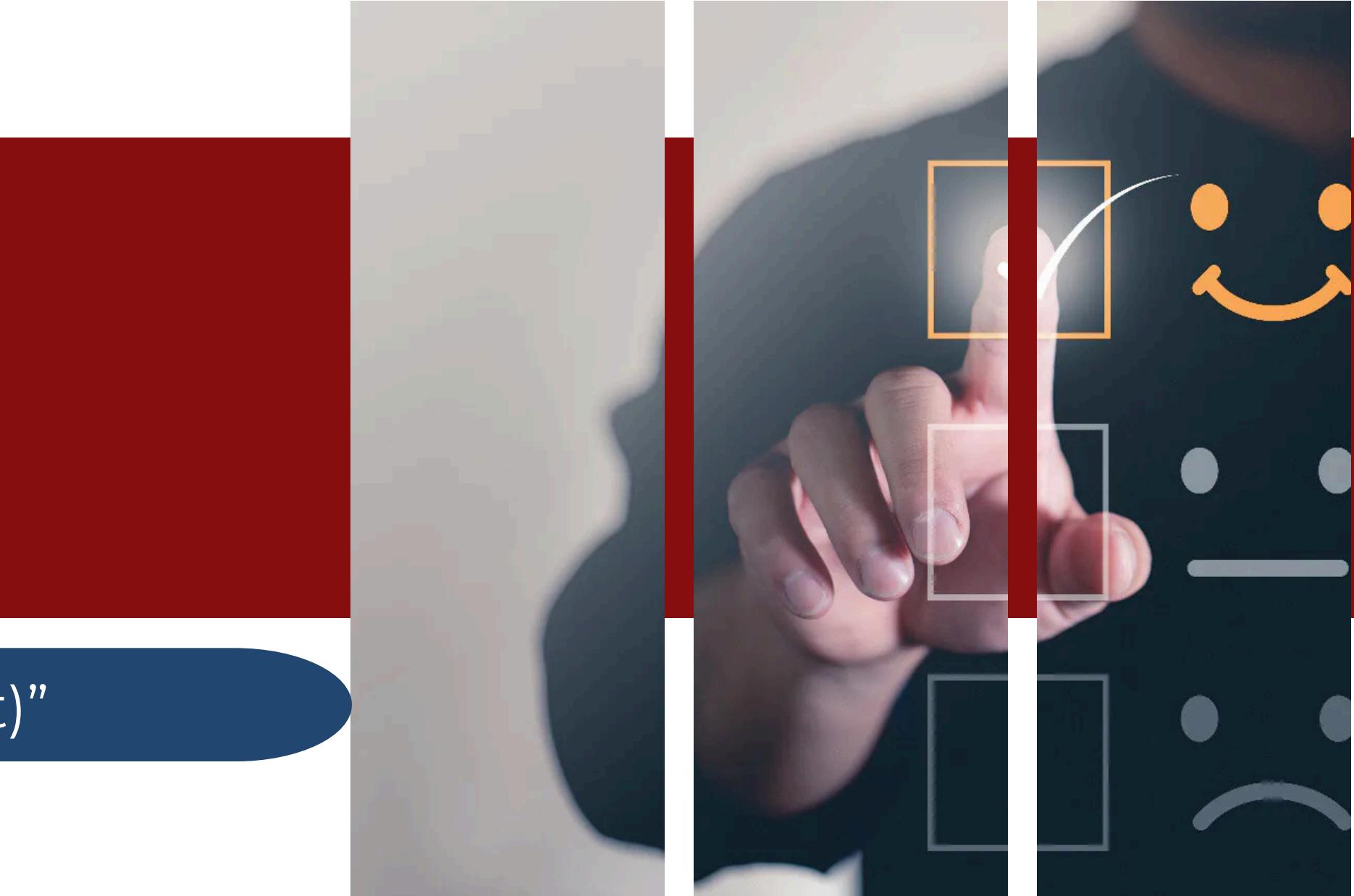
“logit turnover jobsatis i.gend, vce(robust)”

Job satisfaction (jobsatis):

- Coef = -0.2536
- z = -6.97, p < .001
- 95% CI for b: [-0.325, -0.182]

Gender (Male vs. Female):

- Coef = 0.1131
- z = 1.33, p = .184 (n.s.)
- 95% CI for b: [-0.054, 0.280]



- Job satisfaction is a significant predictor: each one-unit increase in satisfaction reduces the log-odds of turnover by 0.254 ($OR \approx 0.78$), holding gender constant.
- Gender alone (male vs. female) does not significantly predict turnover. ($p > 0.05$)

Is the gender × job-satisfaction interaction in a logistic model statistically significant?

"logit turnover c.jobsatis##i.gend, vce(robust)"

jobsatis (women's slope):

- b = -0.1077, SE = 0.0566, p = .057 (marginal)

Simple slopes (log-odds):

- Women: b = -0.1077
- Men: b = -0.1077 + (-0.2413) = -0.3490

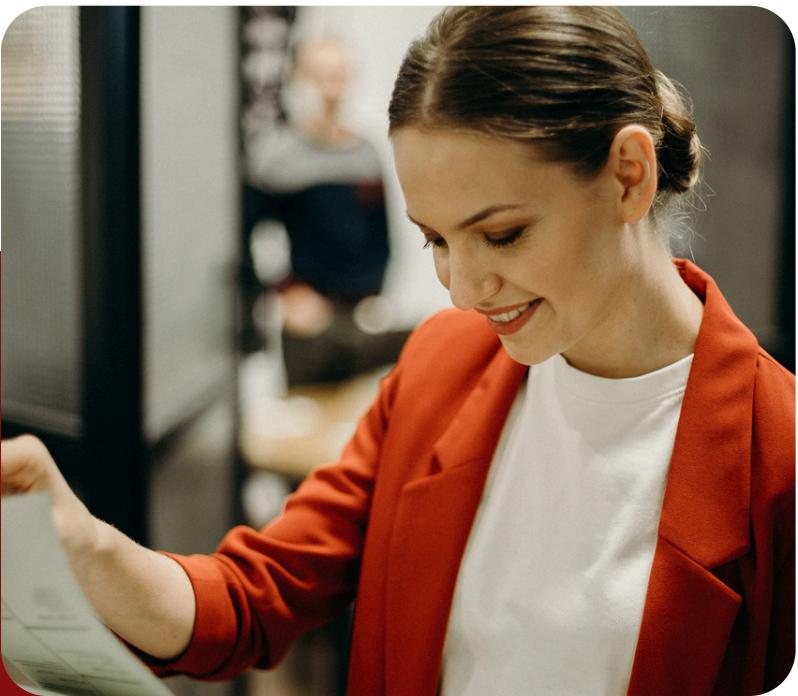
gend#jobsatis (difference for men):

- b = -0.2413, SE = 0.0741, p = .001

Strength of the
job-satisfaction

Turnover
relationship
differs by gender

The interaction term is significant
(p=.001)
Satisfaction reduces turnover much more
strongly among male employees.

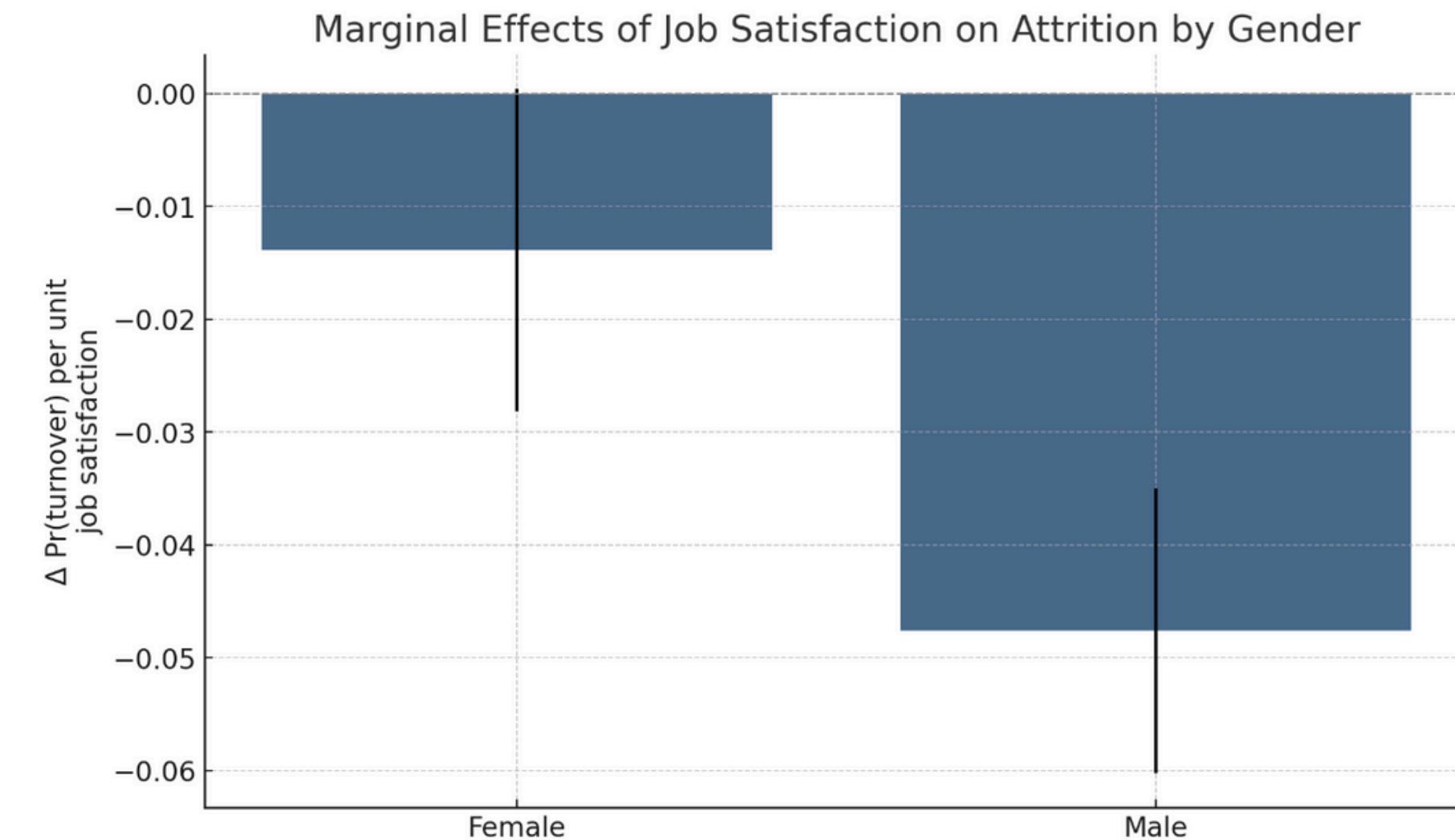


WHAT IS THE CHANGE IN PREDICTED ATTRITION PROBABILITY ASSOCIATED WITH A ONE-UNIT INCREASE IN JOB SATISFACTION FOR MALE EMPLOYEES VERSUS FEMALE EMPLOYEES?

Gender	dy/dx ($\Delta \text{Pr}(\text{turnover})$ per $\Delta \text{jobsatis}$)	SE	z	p	95% CI
Female	-0.01391	0.00730	-1.91	0.057	[-0.02821, 0.0001]
Male	-0.04760	0.00645	-7.38	<.001	[-0.06025, -0.0349]

Women: a one-unit increase in job satisfaction is associated with a 1.4 pp lower probability of turnover (marginally insignificant).

Men: the same one-unit increase is associated with a 4.8 pp lower probability of turnover (highly significant).



Recommendation for Q1 Based on the key findings:

Job Satisfaction Is a Key Driver of Retention

Key Finding	Statistic (p-value)
Job satisfaction (stronger ↓ attrition)	$b = -0.254, p < .001$
Gender (Male vs. Female)	$b = +0.113, p = .184$ (n.s.)
Interaction (Male slope vs. Female)	$\Delta b = -0.241, p = .001$
Marginal effect: Women	-1.4 pp per 1-pt ↑ jobsatis ($p = .057$)
Marginal effect: Men	-4.8 pp per 1-pt ↑ jobsatis ($p < .001$)
Model fit	Wald $\chi^2(3)=59.96, p < .001$; Pseudo R ² =0.0153

Recommendations

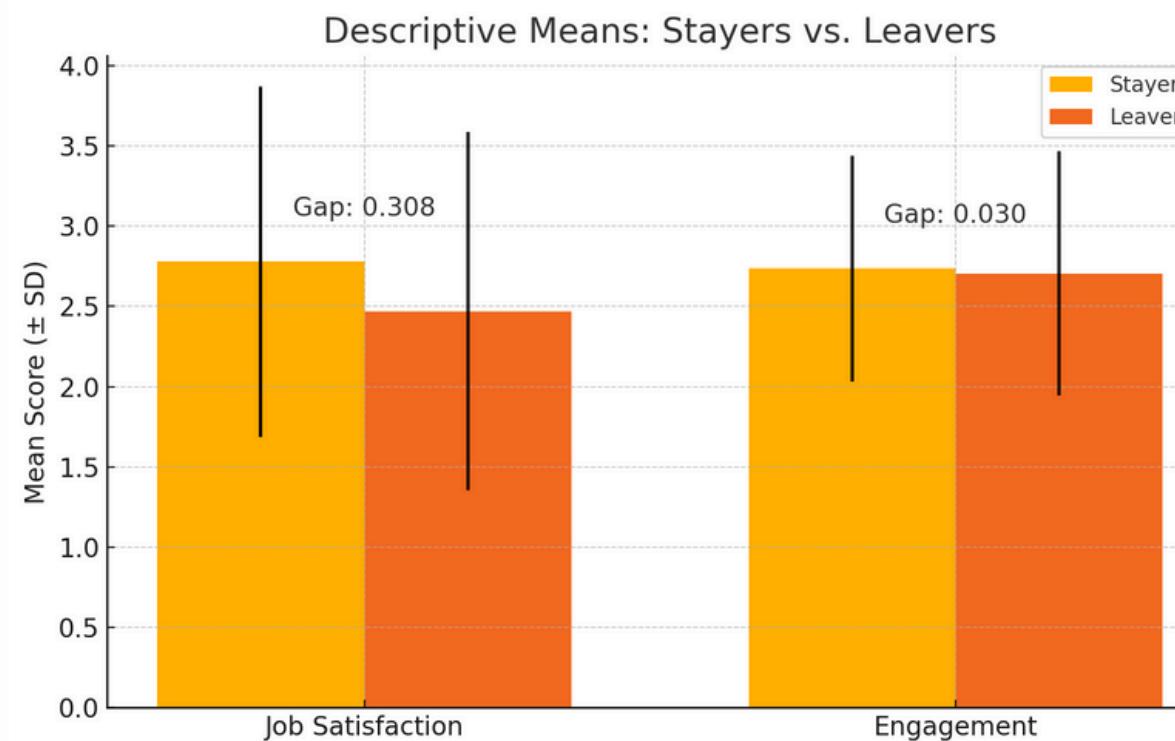
Investing in satisfaction initiatives (career development, recognition programs, work-life balance) will yield clear payoffs in reduced attrition

Tailor engagement efforts—surveys, focus groups, targeted perks—to ensure they resonate across gender segments.

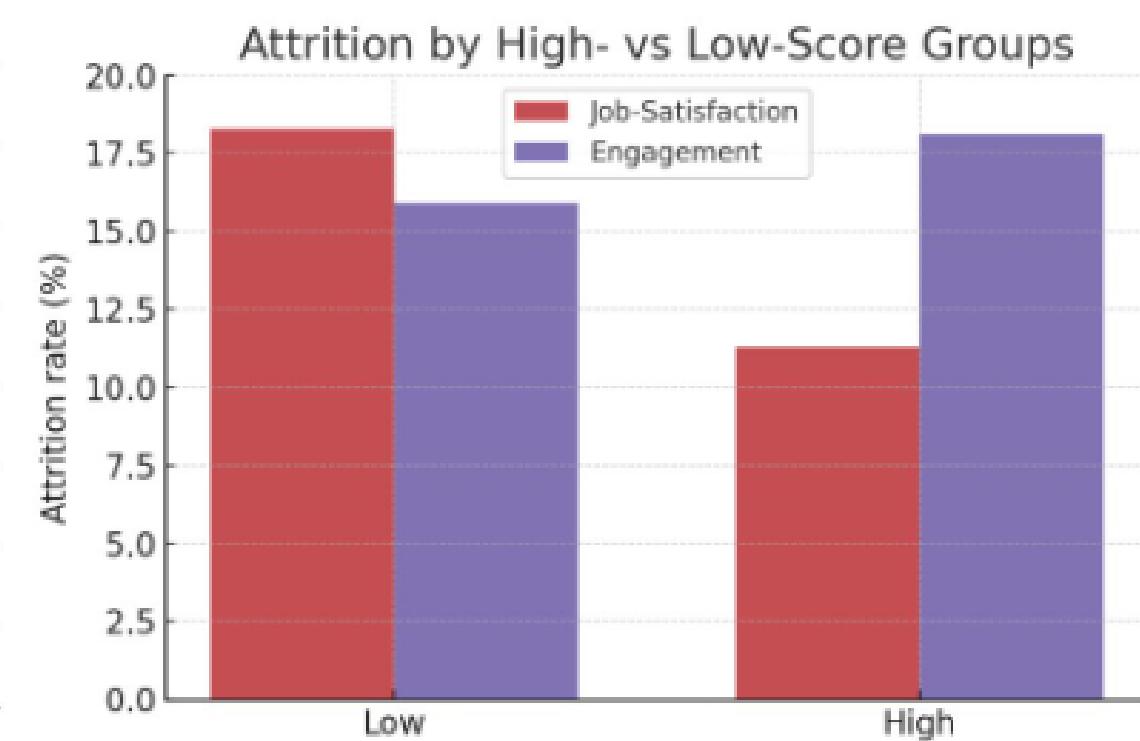
Proactively boosting satisfaction can shrink attrition rate further, with outsized gains among male staff.

Q2 How Engagement & Job Satisfaction Influence Attrition?

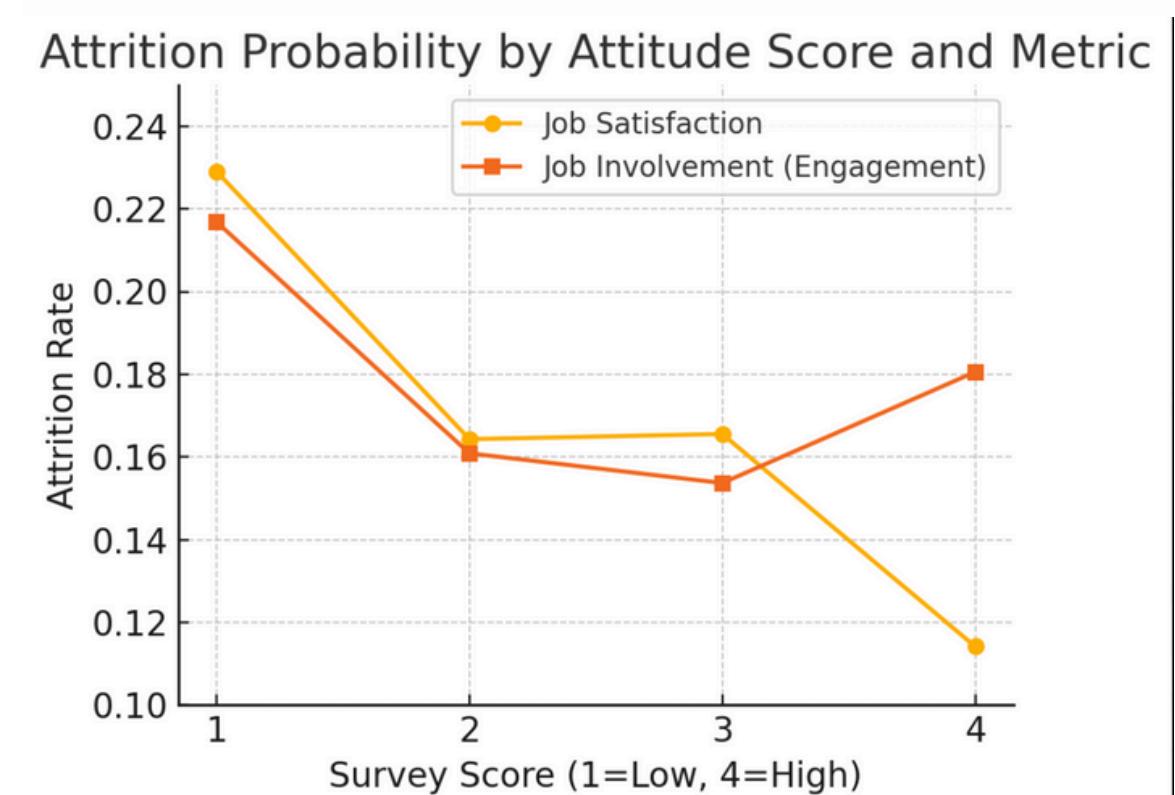
Do leavers and stayers differ in average Engagement?



Do employees with high vs. low Engagement / Job Satisfaction have different attrition rates?



Within each metric, does a one-point change in score predict attrition?



- Job-Satisfaction gap: quitters average 2.47 vs 2.78 for stayers ($t = 6.8$, $p < .001$)
- Engagement gap: virtually zero (2.70 vs 2.73, $p = .30$)
 - Lower satisfaction clearly accompanies quitting, engagement does not.

one-third lower quit rate for high-satisfaction employees (11% vs. 18%, $p < .001$) and noted no significant difference between high vs. low engagement groups (16% vs. 18%, $p = .25$)

confirmed via a pooled logistic regression with controls that only satisfaction has a significant effect on attrition (higher satisfaction → lower quit odds, engagement ~0 effect)
Adding controls (gender, tenure, experience) didn't change this pattern.



Recommendation for Q2:

Refine engagement measurement

Replace the single job-involvement question with a richer 9-item engagement scale covering vigour, dedication and absorption.

Target low-satisfaction hot spots.

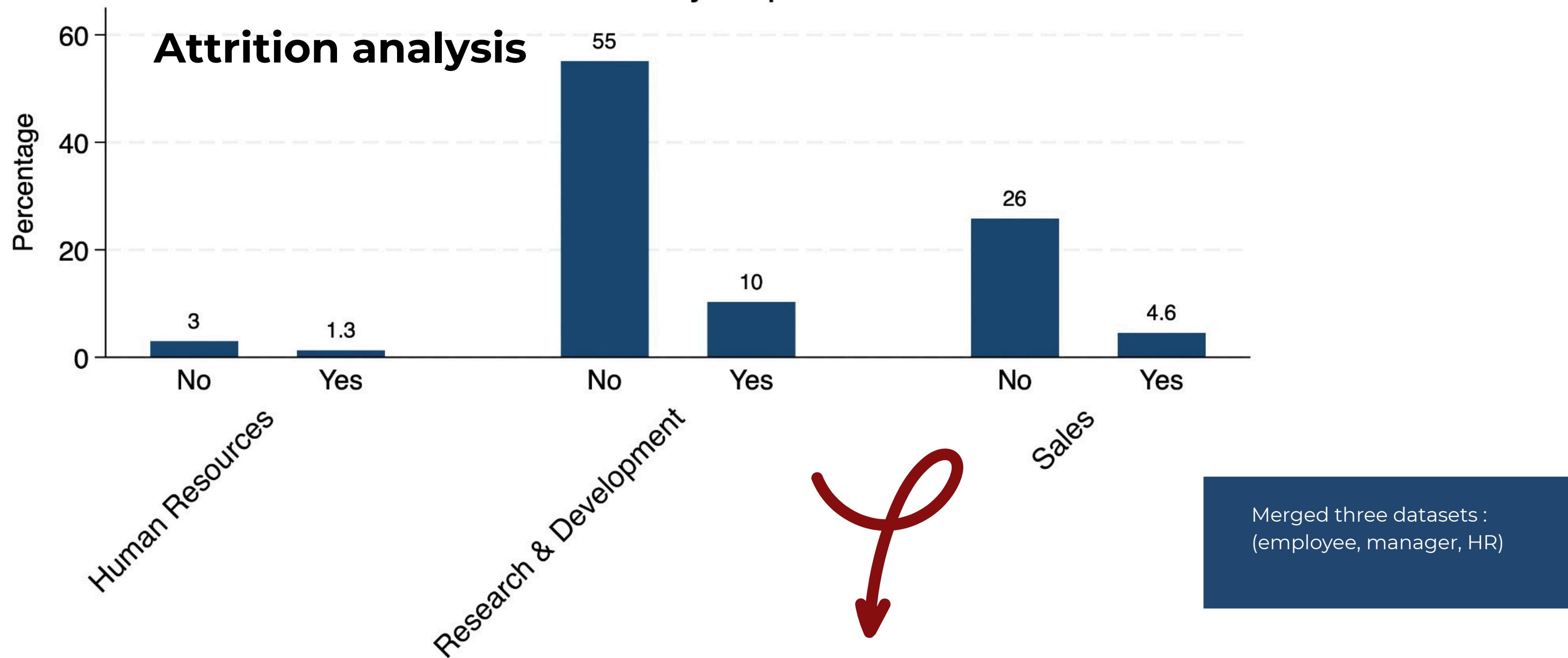
For teams or demographic pockets scoring <3, run focused stay interviews to identify drivers (pay fairness, workload, manager support). Craft local action plans (e.g., adjust workloads, recognise contributions, clarify career paths).

Build a satisfaction-led attrition risk model

Use satisfaction score, tenure, recent pay change, and absenteeism to predict who is most likely to leave; feed weekly alerts to HRBPs.



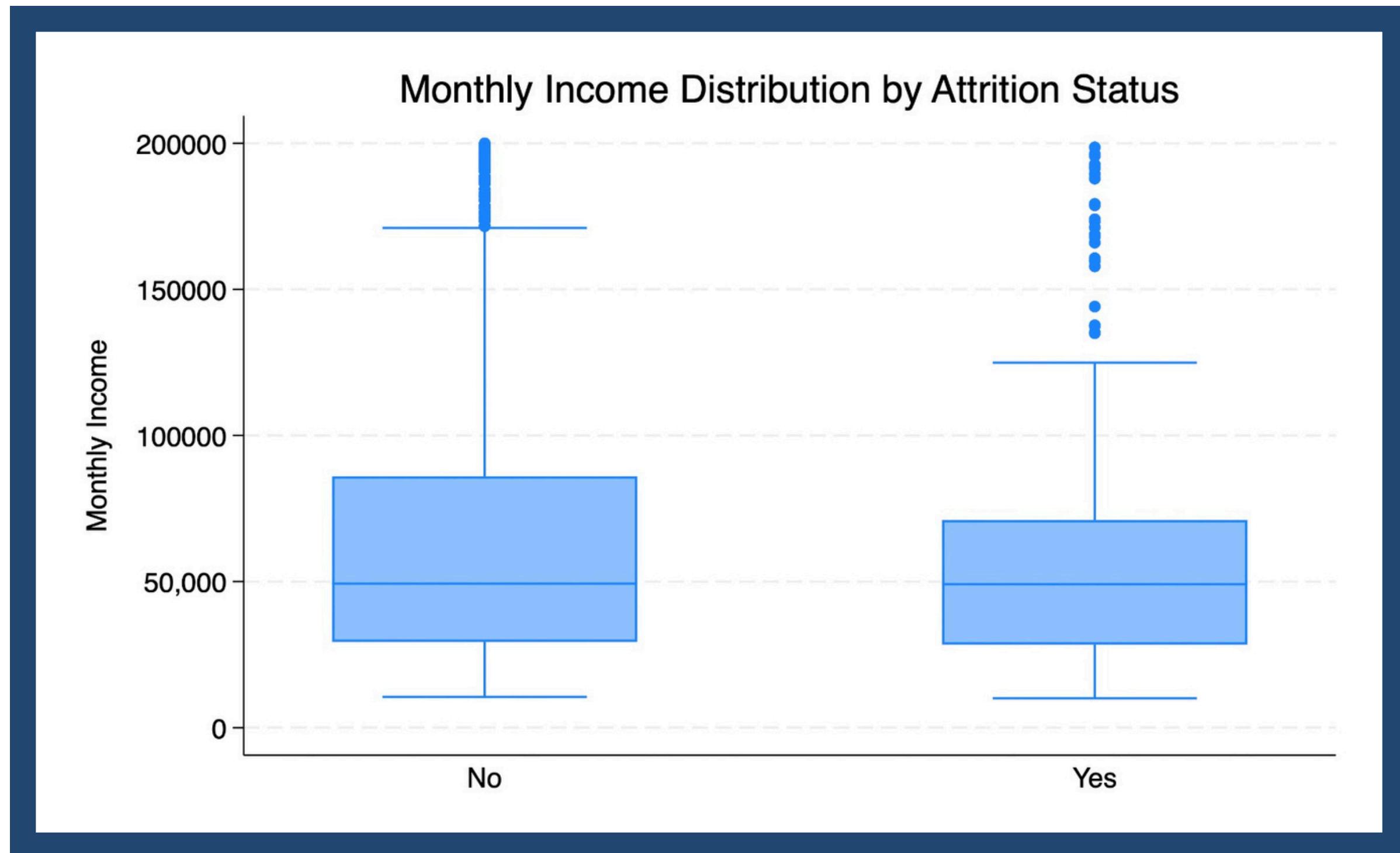
Q3 Are certain departments experiencing higher employee attrition than others, and what factors might explain this?



- Research & Development accounts for the majority of attrition cases (10%) compared to Human Resources (1.3%) and Sales (4.6%), indicating it may be a critical focus area for retention strategies.

Monthly income distribution by Attrition status

Employees who stayed tend to have higher and more widely distributed incomes, while those who left generally earned less, suggesting that lower income may be linked to higher attrition



Regression results

After controlling for individual factors, employees in R&D and Sales were significantly less likely to leave compared to HR

Significant predictors (lower attrition):

- **Age** (OR = 0.95, p < .001): Older = less likely to leave
 - **Monthly Income** (p = .018): Lower income = higher attrition
 - **Job Satisfaction** (OR = 0.77, p < .001): Strongest predictor
 - **Department** (p < .001): R&D and Sales = lower attrition than HR
-
- **Job Level** (p = 0.264)
 - **Job Involvement** (p = 0.415)

Not significant:

Recommendations

* HR is the reference group in the regression (R&D and Sales are compared against it)

1. **Use job satisfaction surveys to identify pain points**
2. **Implement compensation-based retention bonuses**
3. **Develop early-career programs targeting younger employees**
4. **Monitor department-level trends with attrition dashboards**

Summary and Final Recommendation



To reduce attrition and retain top talent, the company should prioritize initiatives that directly enhance job satisfaction, especially in high-risk departments like HR.

These may include:

Training managers to lead with support and recognize team effort.

Creating real chances for internal growth with clear career paths.

Running department-level satisfaction checks and fixing what's not working.

Making sure satisfaction efforts respect gender differences and create fair outcomes.

THANK YOU!

