

Technical Presentation

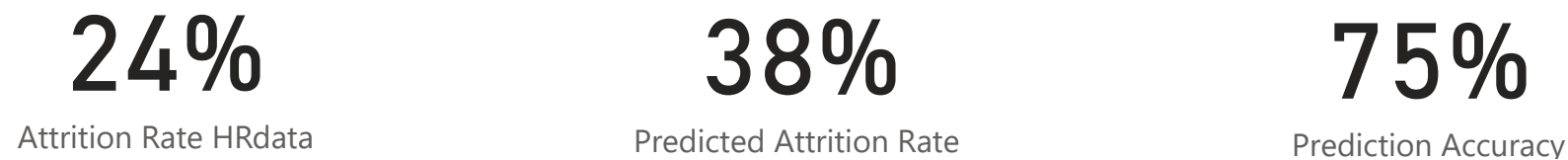
Employee Attrition Analysis

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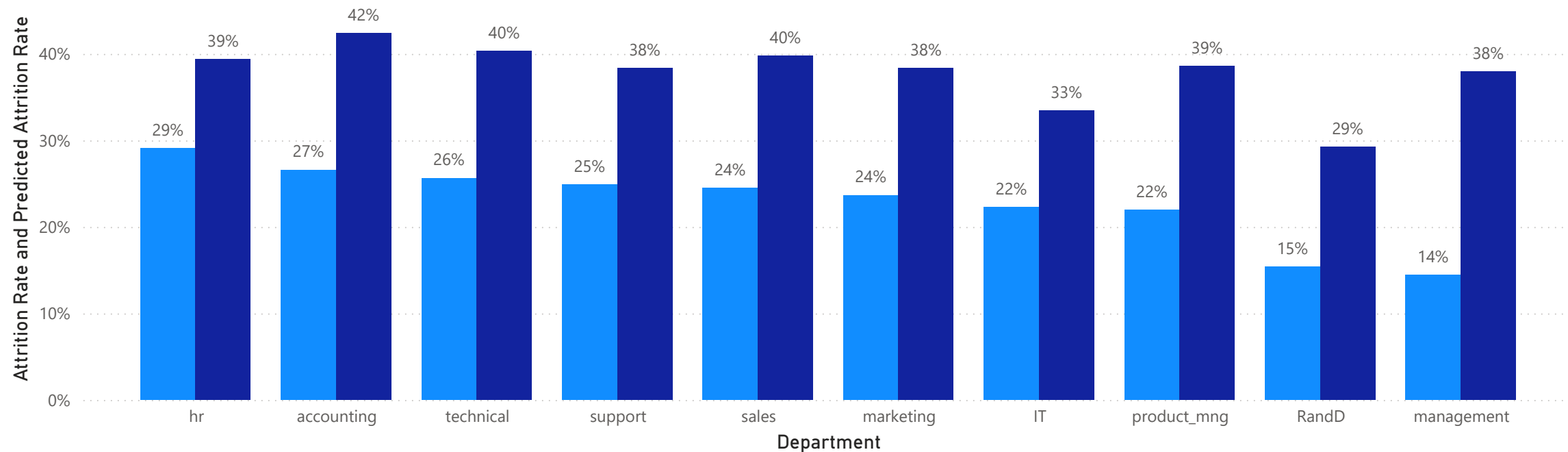
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KBK Electronics, Inc had a 24% attrition rate in Q1 and seeks to reduce that to 10% by the end of Q4 by exploring job variables which may be factors.
If left unchecked, the Predicted Attrition Rate may rise to 38% (75% prediction accuracy rating).



Attrition Rate and Predicted Attrition Rate by Department

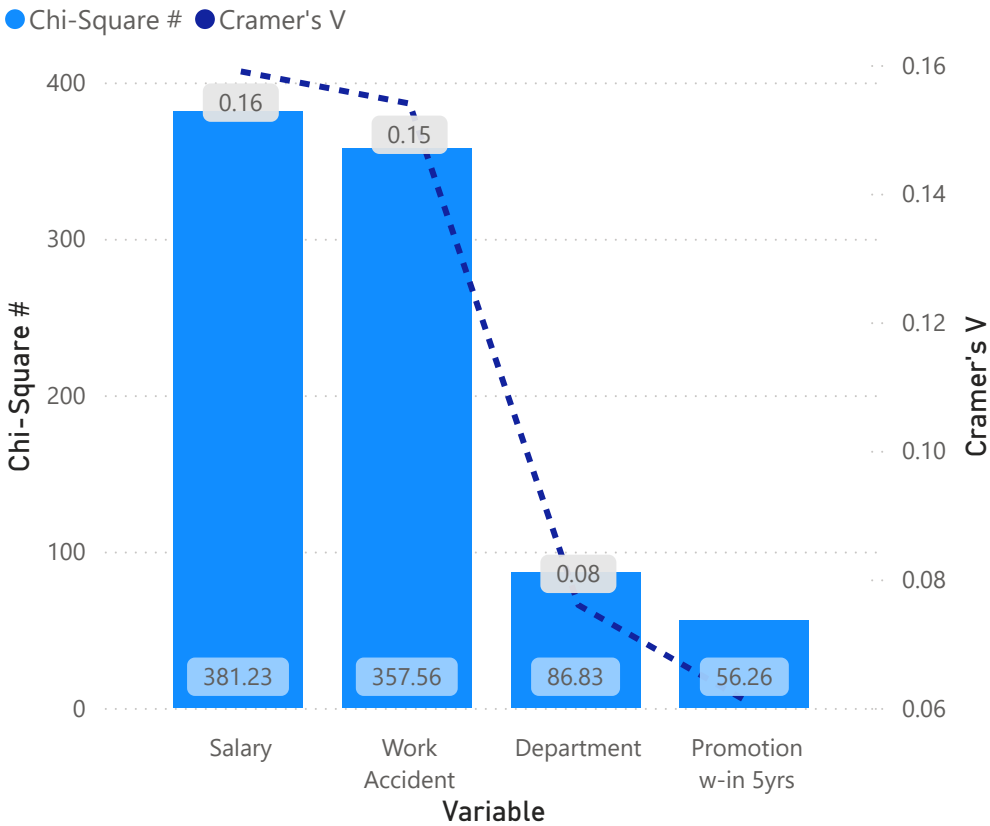
● Attrition Rate ● Predicted Attrition Rate



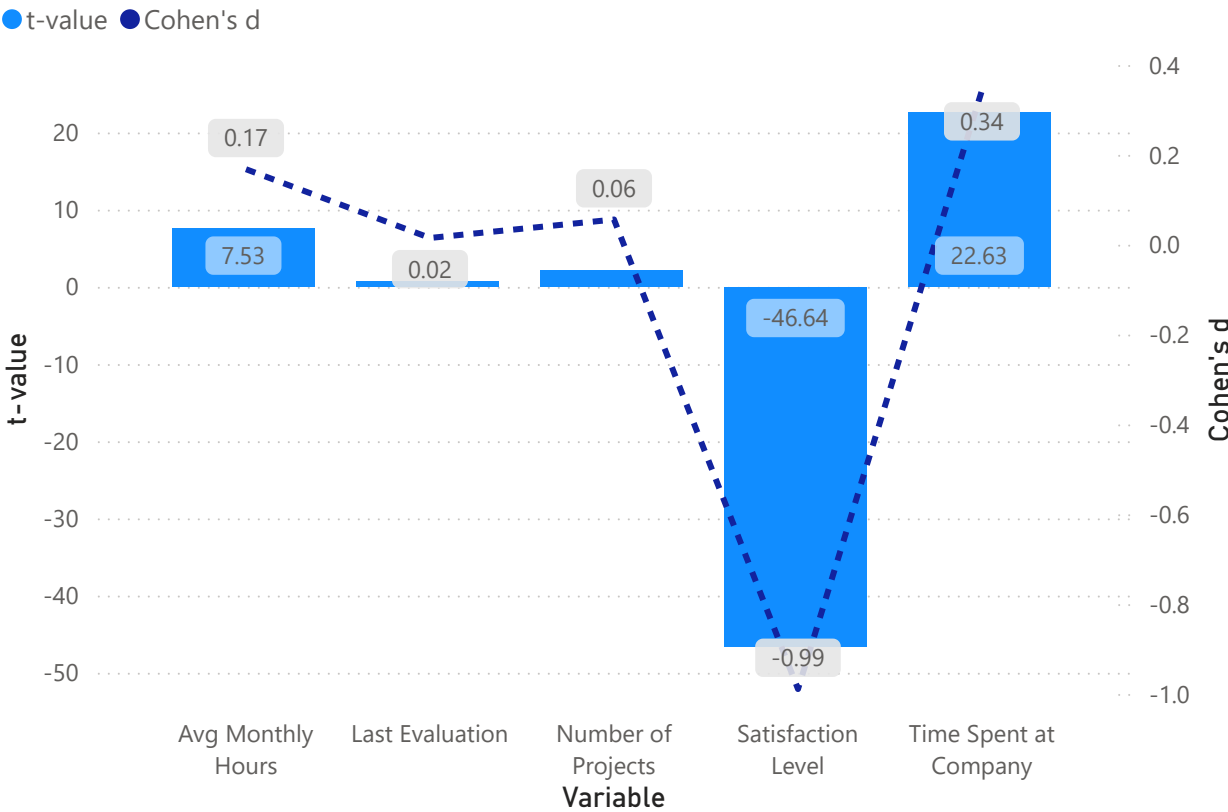
All variables returned statistically significant results ($p < 0.05$) except for Last Evaluation ($p = 0.47$).
Top three variables which appear to have the most impact on attrition are: Salary ($X^2 = 381.23$); Work Accident ($X^2 = 357.56$); and Satisfaction Level ($t = -46.64$). More details in Appendix A.

Cramer's V: Salary and Work Accident variables indicate weak to moderate strengths in the relationship (.16 and .15, respectively).
Cohen's d: Satisfaction Level has a large impact on attrition levels (-0.99); all others in the t-test are determined small or slightly above small (like Time Spent at Company at 0.34).

Chi-Square Tests



t-Tests



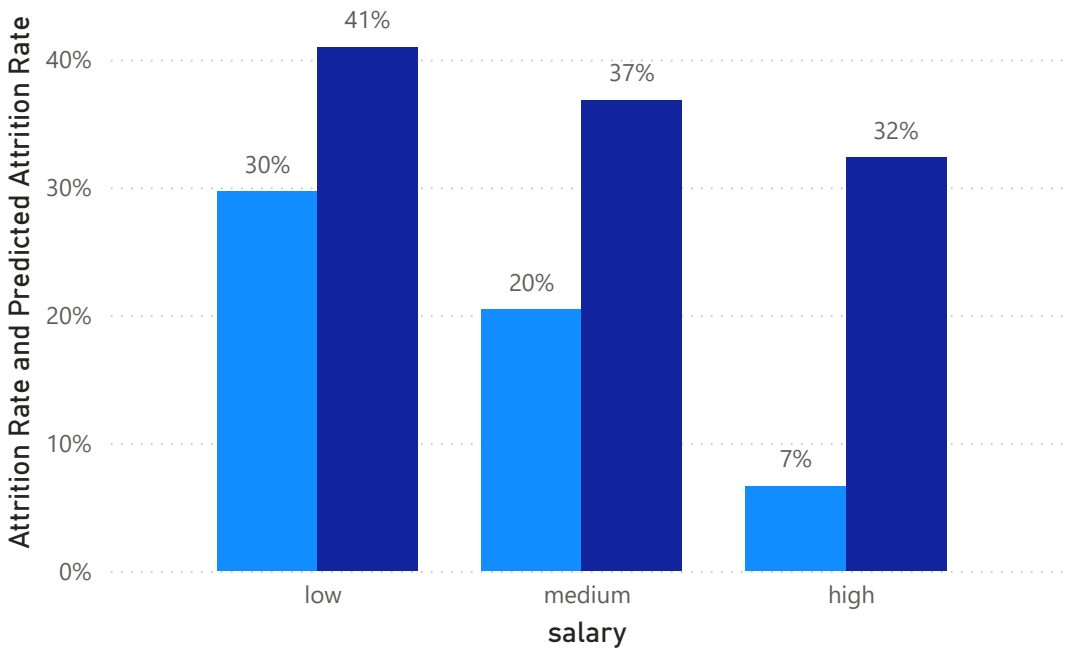
The highest current number (30%) and predicted number for attrition (41%) both come from the lowest salary group, but the other salary levels indicate high predictions as well.

Management has the lowest current attrition rate (7%) and has the largest group of high-salary employees (36%) out of all the other departments.

Across all departments, the majority of employees are either paid low (49% of total) or medium (43%) salaries as opposed to high (8%) ones.

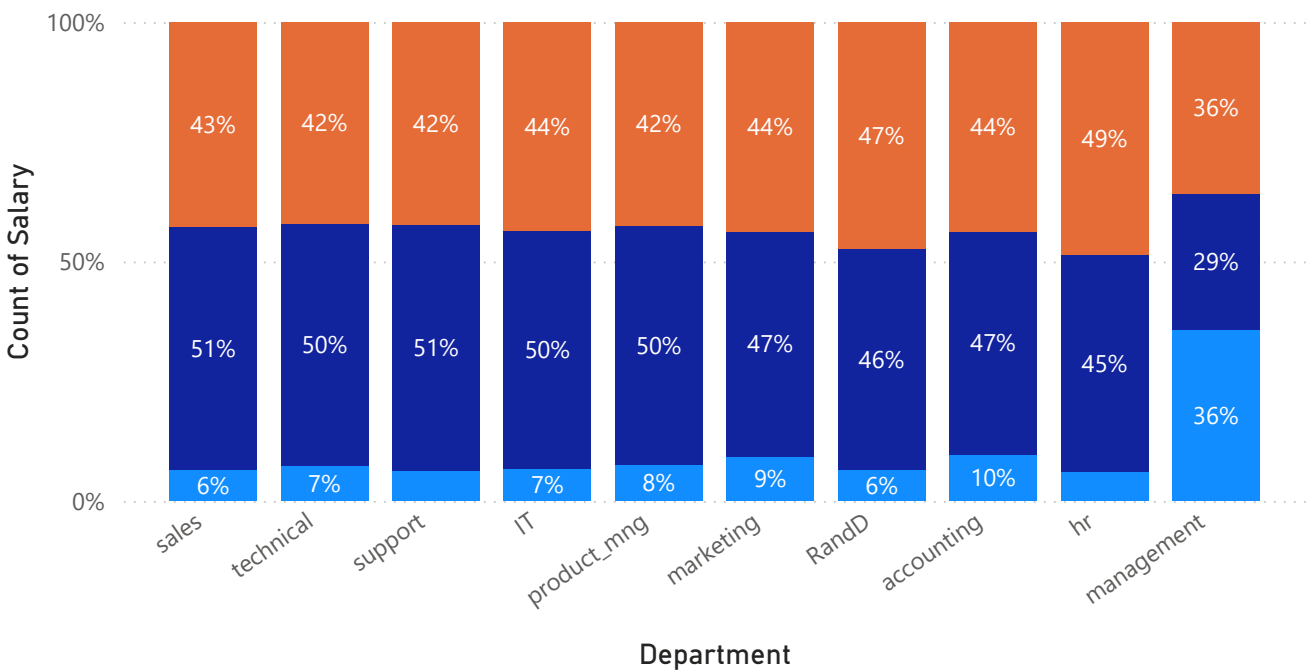
Attrition Rate and Predicted Attrition Rate by salary

Attrition Rate Predicted Attrition Rate



Salary by Department

salary high low medium



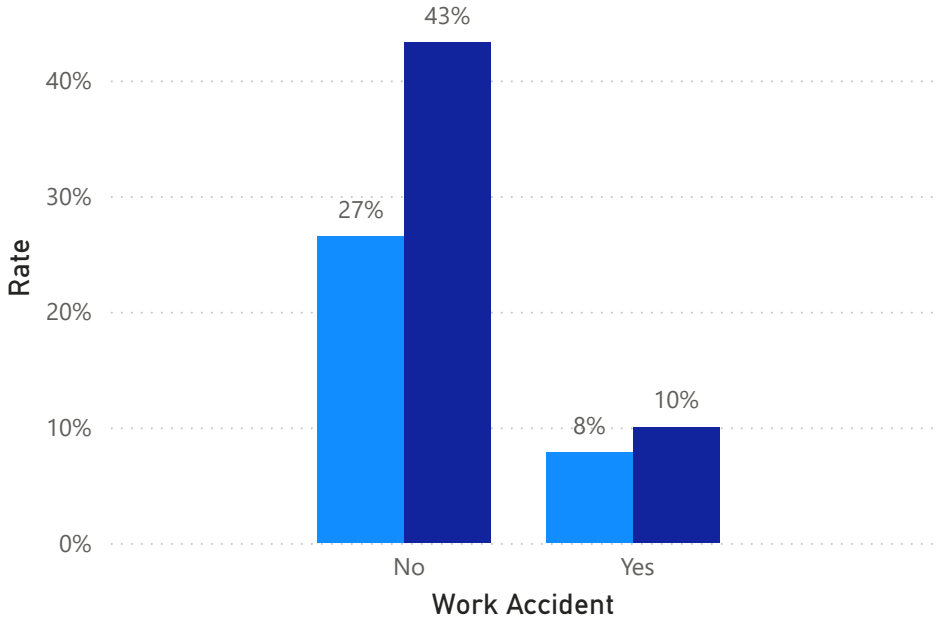
The chi-square tests for Work Accidents ($X^2=357.56$) showed a large difference between observed and expected values, a stronger indication of a relationship.

Seeing that "Time Spent at Company" and "Average Monthly Hours" also offered statistical significance, these variables were cross-referenced with Work Accident.

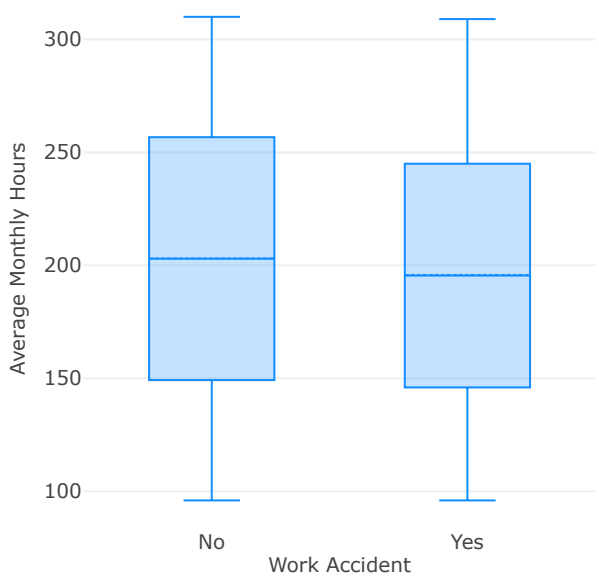
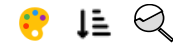
There is little difference in the median and mean between work accidents despite average monthly hours (No = 203 mean/median, Yes = 196 mean/median), as well as for the data regarding how many years someone has been with the company (No= 6 mean/median, Yes = 6 mean/median).

By Work Accident

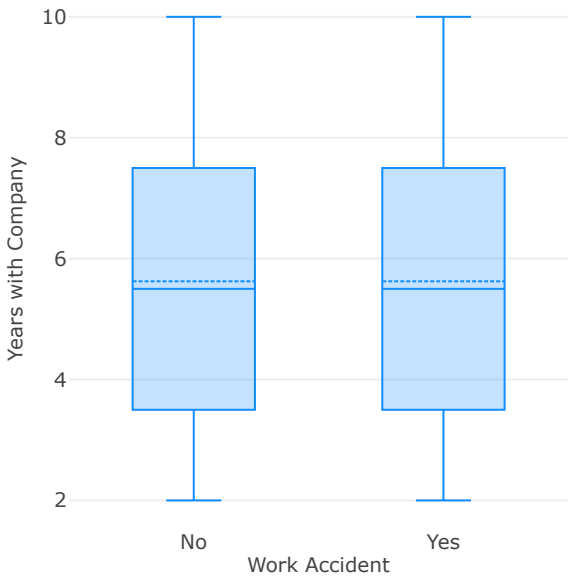
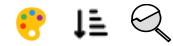
Attrition Rate Predicted Attrition Rate



Work Accident and Average Monthly Hours

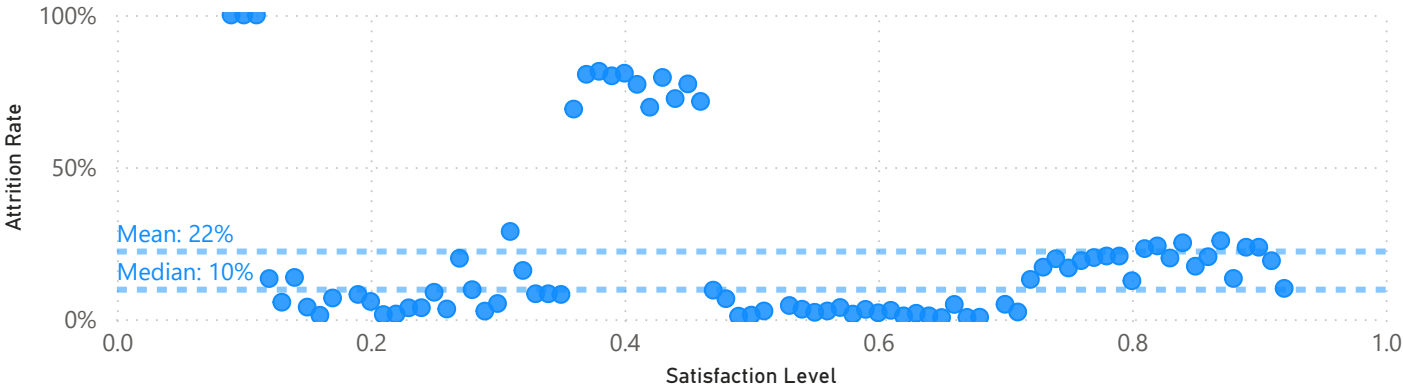


Work Accident and Years with Company

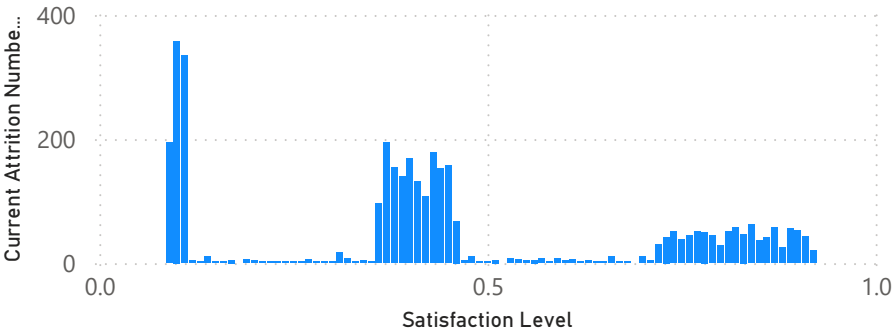


Satisfaction levels show strongest numbers for influencing attrition (p=0.000~, t=-46.64, Cohen's d=-0.99).
Current attrition peaks in several places below .5 satisfaction level, making up for 69% of all current attrition. Based on the predicted attrition rate, there is evidence that satisfaction will decrease and attrition will increase.

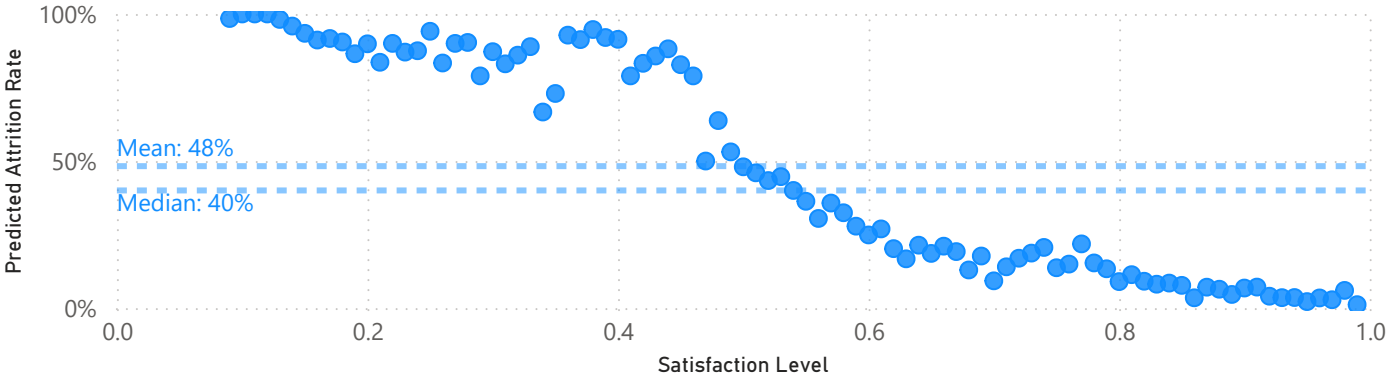
Attrition Rate by Satisfaction Level



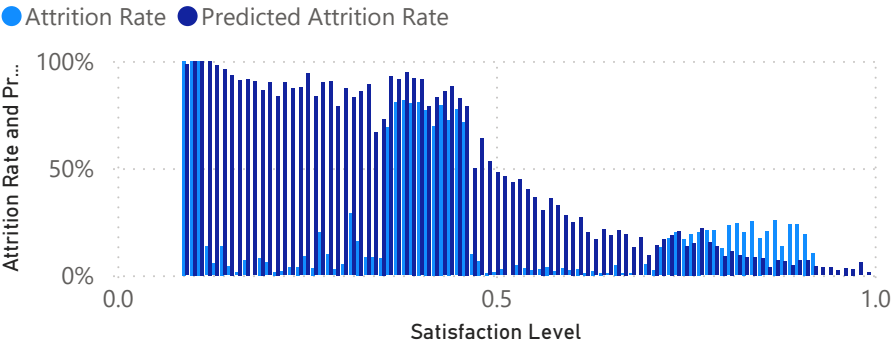
Current Attrition Numbers by Satisfaction Level



Predicted Attrition Rate by Satisfaction Level



Attrition Rate and Predicted Attrition Rate by Satisfaction Level



Here is the data for the remaining factors which play a significant but smaller role in explaining the cause behind attrition.

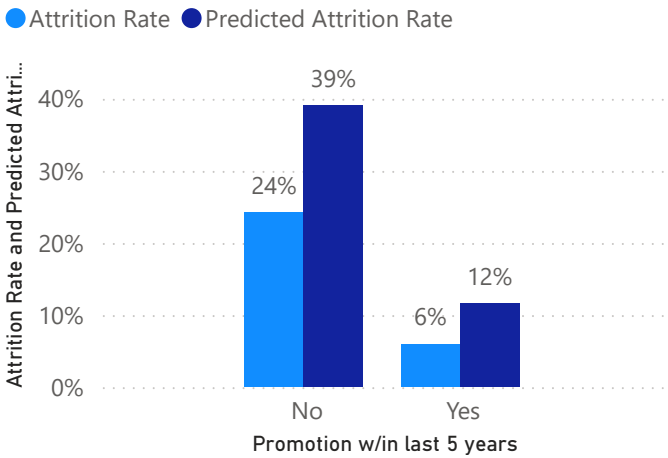
Promotion within last 5 years: There is a predicted 63% increase in attrition for individuals who have not received one.

Years at Company: Even though we see a rise and decline in attrition rates around the 5 year mark, the prediction is that there will be a 148% increase in attrition among employees who have been there 6 years.

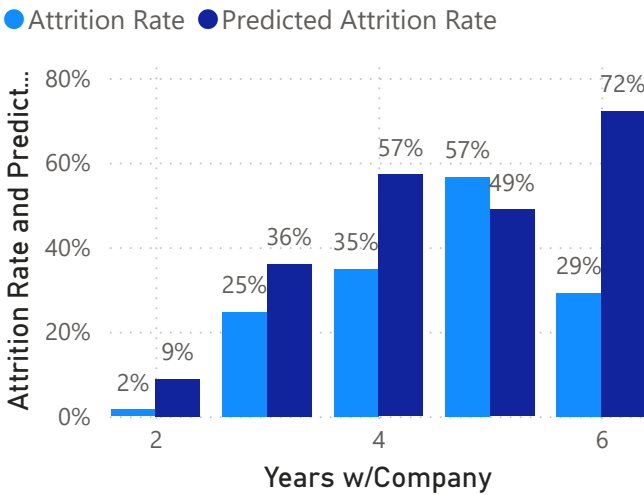
Number of Projects: Attrition rates are highest with the lower (2) and higher (6-7) number of projects but do not show sharp increases based on the project number.

Average Monthly Hours: More hours shows increased current and predicted attrition levels, but there is a spike around 129 hours and increased prediction of attrition for time spans between 129 and 160 average hours.

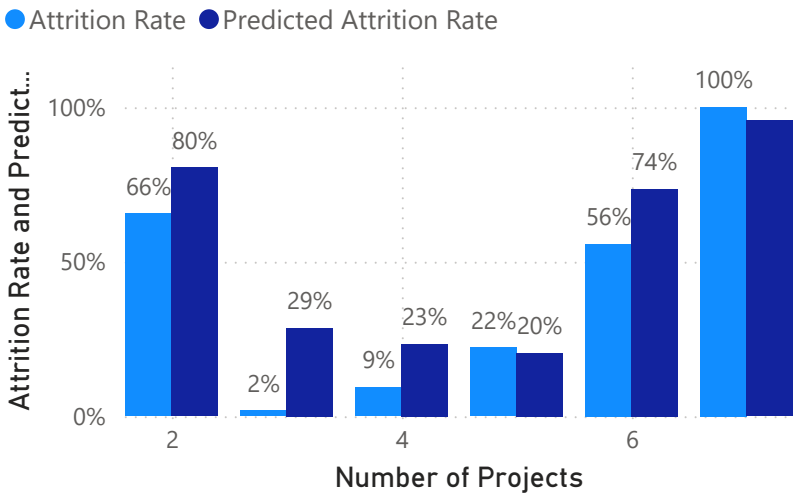
Attrition Rate and Predicted Attrition Rate by Promotion w/in last 5 years



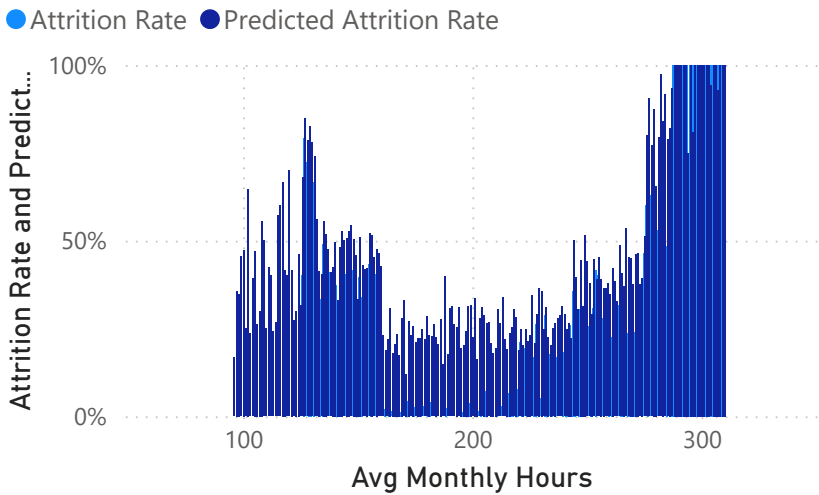
Current & Predicted Attrition Rate by Years at Company



Attrition Rate and Predicted Attrition Rate by Number of Projects



Current & Predicted Attrition Rate by Avg Monthly Hours



Key takeaways

Areas of Focus in Order of Impact



Satisfaction: Low scores make up for most of attrition and this is expected to trend towards lower satisfaction/higher attrition.



Salary: Low and medium pay groups are highest in attrition and will continue in turnover.



Work accidents: Occur despite experience at company or average monthly hours.

Areas to Watch

These play significant but smaller roles in current attrition.

- Department,
- Promotion w/in the last 5 years,
- Years at company,
- Avg monthly hours,
- Number of projects.

Statistical Test Explanation:

A chi-square test was run on categorical variables and t-tests were run on continuous numerical data in order to determine which variables are associated with attrition outside of chance. The typical $p < 0.05$ threshold was chosen.

Per results, all variables returned statistically significant results except for Last Evaluation ($p = 0.47$).

Based on the chi-square and t- values, the top three variables which appear to have the most impact on attrition are: Salary ($X^2 = 381.23$); Work Accident ($X^2 = 357.56$); and Satisfaction Level ($t = -46.64$).

Cramer's V tells us that Salary and Work Accident variables indicate weak to moderate strengths in the relationship (.16 and .15, respectively), while their chi-square scores let us know that there is a large difference between the observed data and expected values (a stronger indication of a relationship).

Cohen's d shows that Satisfaction Level has a large impact on attrition levels (-0.99); all others in the t-test are determined small or slightly above small (like Time Spent at Company at 0.34).

Attrition Rate	Department	salary	Average of Satisfaction Level	Average of time_spend_company	Sum of Work_accident	Average of number_project	Average of last_evaluation
34%	support	low	0.59	3.48	174	3.79	0.72
33%	sales	low	0.60	3.46	265	3.76	0.71
33%	management	low	0.61	3.41	30	3.78	0.71
33%	hr	medium	0.58	3.50	39	3.59	0.70
31%	marketing	low	0.60	3.53	62	3.75	0.73
30%	accounting	medium	0.58	3.68	41	3.83	0.72
28%	IT	low	0.61	3.44	89	3.79	0.72
28%	accounting	low	0.57	3.44	40	3.80	0.71
28%	technical	low	0.59	3.40	195	3.91	0.72
27%	hr	low	0.61	3.26	46	3.69	0.72
26%	technical	medium	0.62	3.45	156	3.88	0.72
23%	product_mng	low	0.62	3.43	68	3.82	0.73
23%	product_mng	medium	0.62	3.50	51	3.80	0.71
18%	IT	medium	0.62	3.56	71	3.83	0.72
18%	marketing	medium	0.64	3.63	63	3.68	0.71
17%	sales	medium	0.63	3.61	285	3.79	0.71
17%	support	medium	0.65	3.31	140	3.83	0.73
17%	RandD	medium	0.62	3.33	54	3.91	0.71
15%	RandD	low	0.62	3.38	71	3.80	0.71
14%	management	medium	0.60	4.16	37	4.01	0.74
13%	hr	high	0.67	2.91	4	3.89	0.74
12%	technical	high	0.63	3.31	30	3.65	0.70
11%	marketing	high	0.61	3.51	13	3.43	0.66
9%	product_mng	high	0.61	3.62	13	3.71	0.67
8%	RandD	high	0.59	3.53	9	3.76	0.70
7%	accounting	high	0.61	3.22	15	3.91	0.72
6%	support	high	0.66	3.22	31	3.79	0.71
5%	sales	high	0.65	3.55	37	3.86	0.70
5%	IT	high	0.64	3.07	4	3.87	0.72
0%	management	high	0.65	5.16	36	3.78	0.72
24%			0.61	3.50	2169	3.80	0.72