

USC: Employee Retention and Flight Reason Discovery

DSO 599: HR Analytics

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Current State of USC



HCM DATA

USC implemented a new HCM system about 6 years ago.

RECRUITING DATA

USC implemented a new recruiting system about 4 years ago.

ANECTDOTAL INFORMATION

Could people be using USC as a stepping-stone location for other institutions?

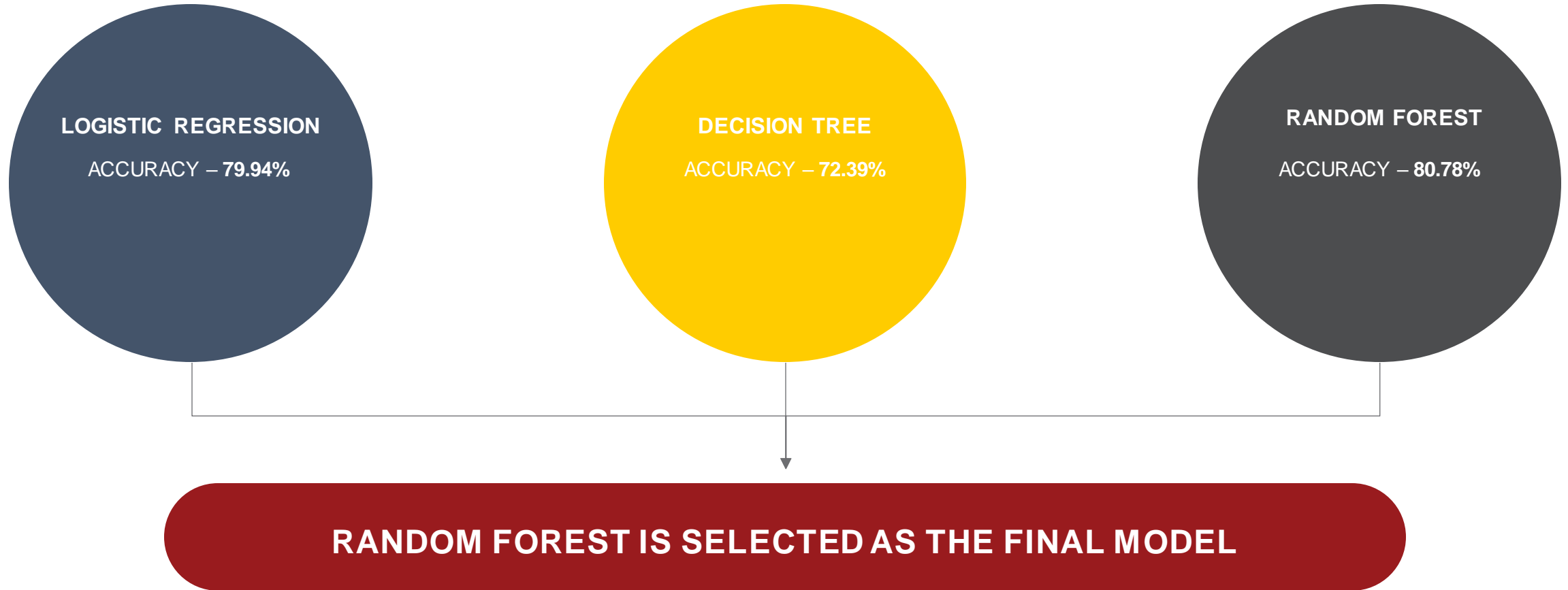
WHAT ARE THE ATTRIBUTES THAT LEAD TO HIGH TURNOVER AT THE UNIVERSITY?

Data Cleanup Process



Predictive Model – Flight Risk

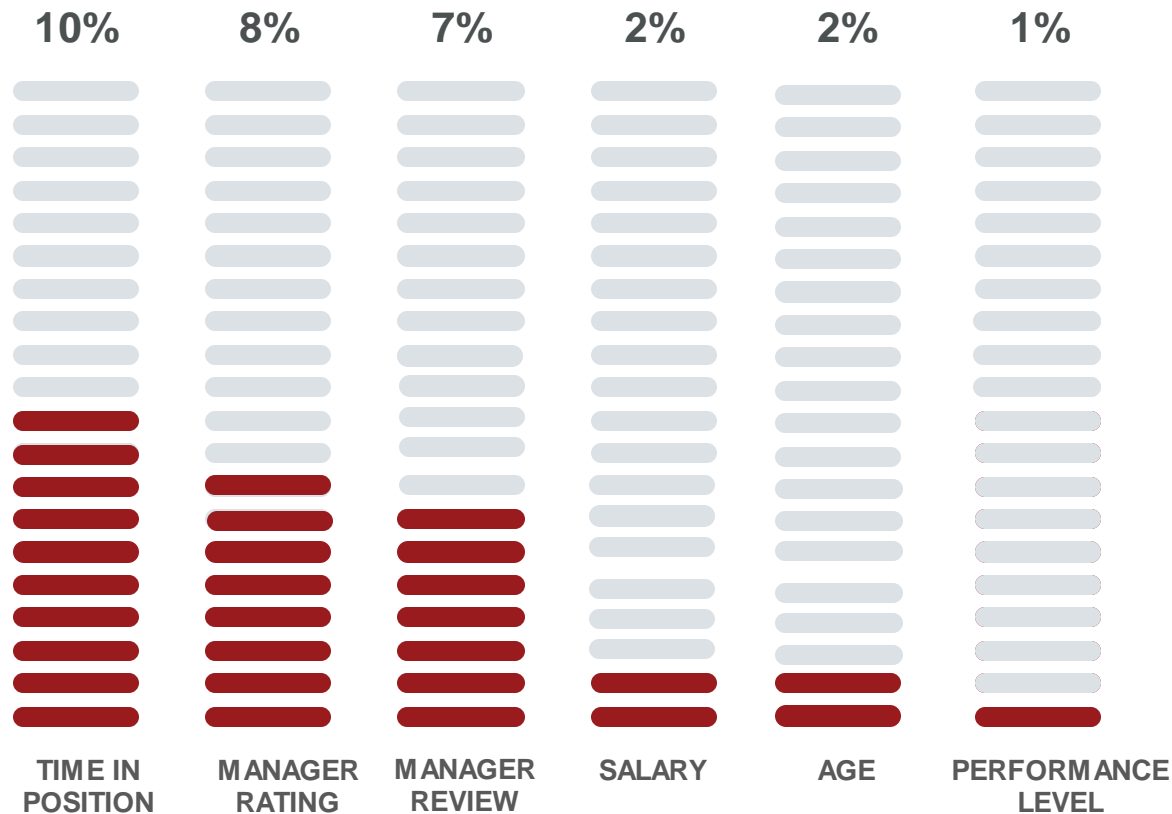
The flight risk predictive score was computed using three algorithms:



Predictive Model – Feature Engineering



Using the Random Forest algorithm, 18 variables were ranked based on their feature importance.



*representing only top and bottom three features

7.1%

EMPLOYED

7.2%

REJOINED

74.9%

TERMINATED

AVERAGE SCORE FOR FLIGHT RISK

Flight Risk - Three-Pronged Focus

EMPLOYEE REVIEW DIFFERENTIAL

Represents the difference between what a manager rates the employee and how the employee rates themselves.

MANAGER REVIEW

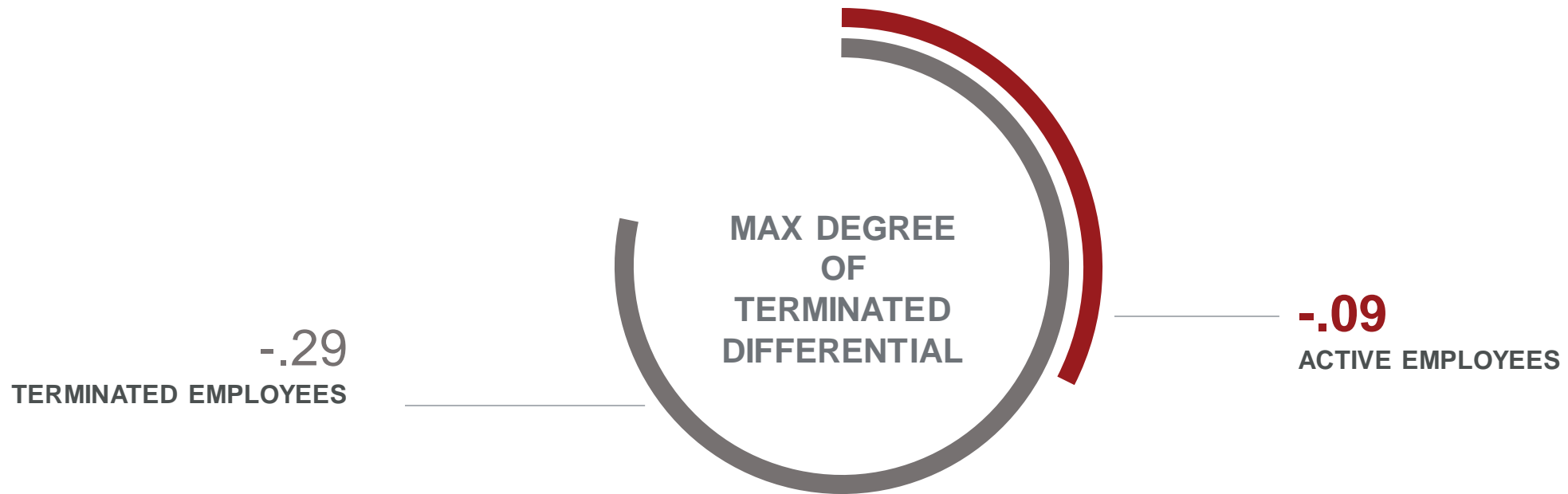
Indicator on how “good” the manager is. In theory, the lower the manager review, the higher chance employees under the manager will leave.

AVERAGE TIME IN POSITION

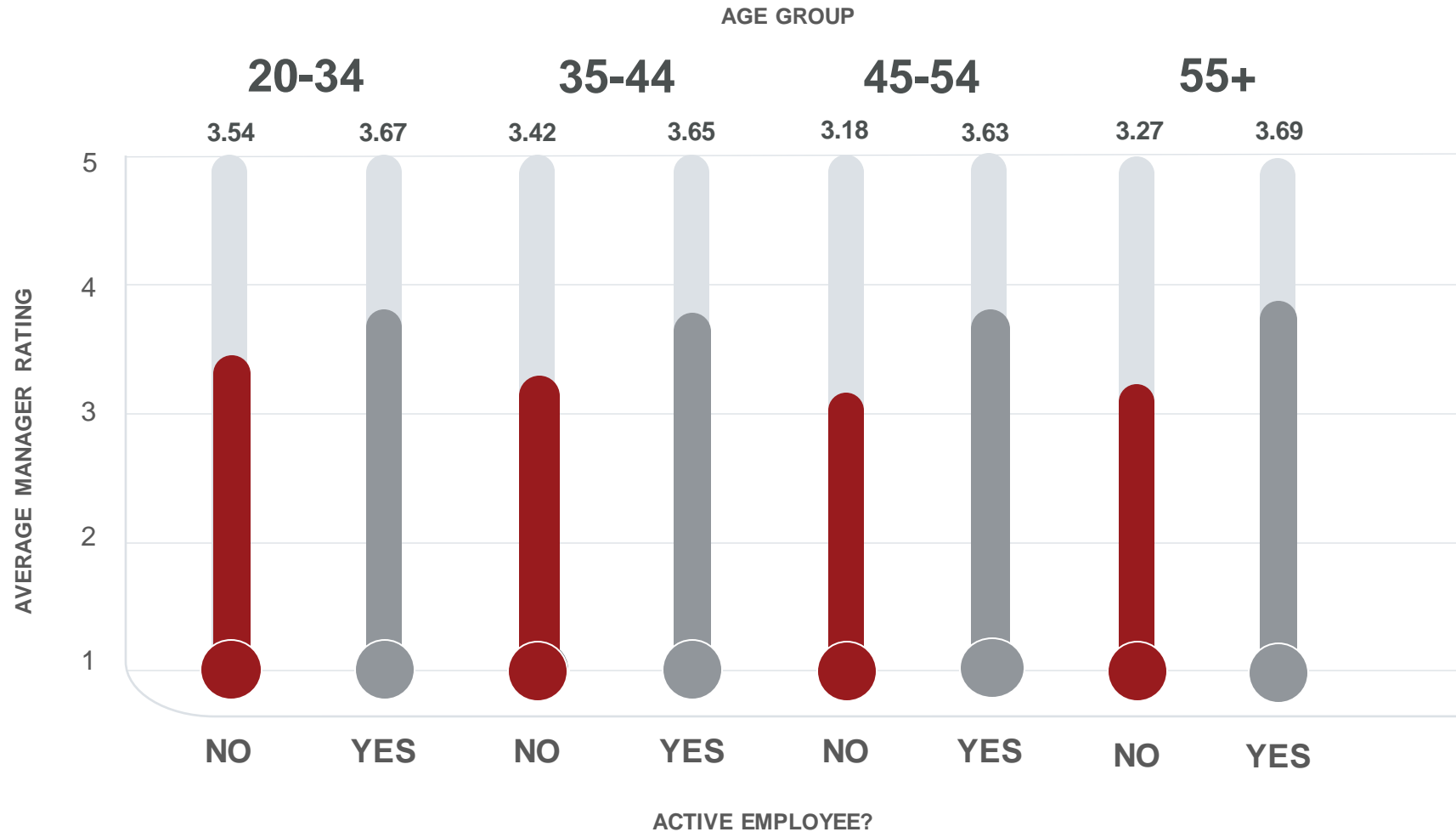
Represents the average amount of years in positions outside of the university. If they start getting close to the average years they stay in a position, this may be an indicator of leaving.

Prong 1: Employee Review Differential vs Termination Status

Employee Review Differential is defined as: Manager Annual Review Score minus Employee Annual Self Review Score. A large negative differential means that the employee is rating themselves higher than the manager.



Prong 2: Manager Review vs Termination Status



KEY TAKEAWAY



ACTIVE

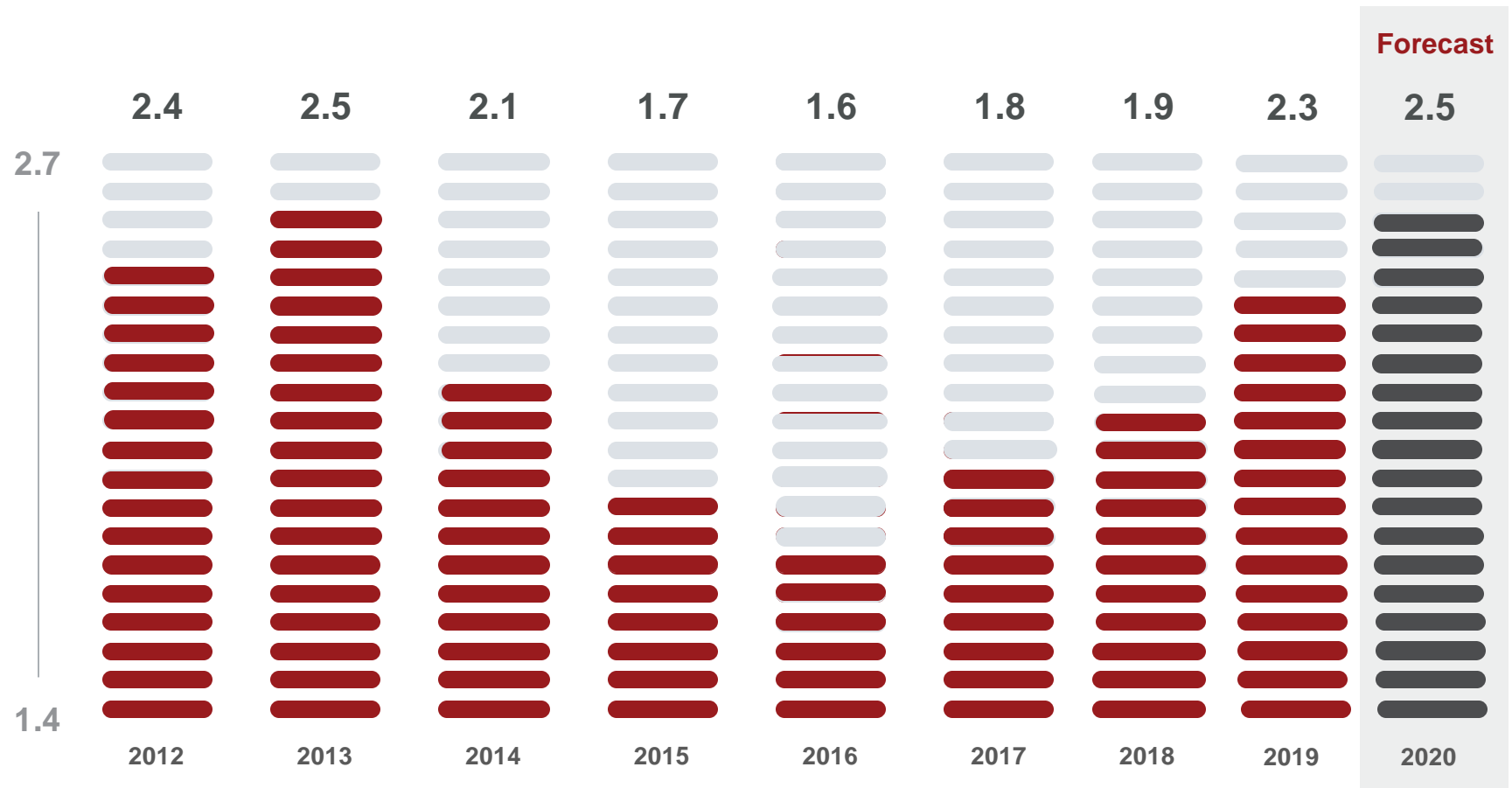
Active employees generally have better managers than those who have been terminated. On average for each age group it is around 3.6.



TERMINATED

Managers of terminated employees have a noticeably lower average, spanning 3.18 to 3.54.

Prong 3: Average Time in Position vs Termination Year

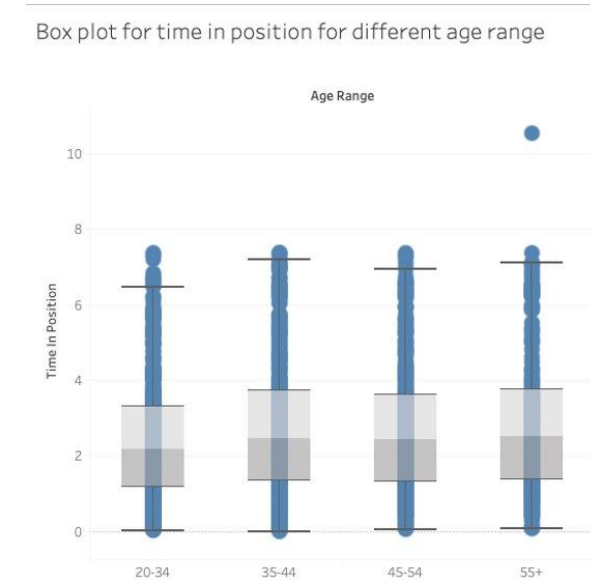
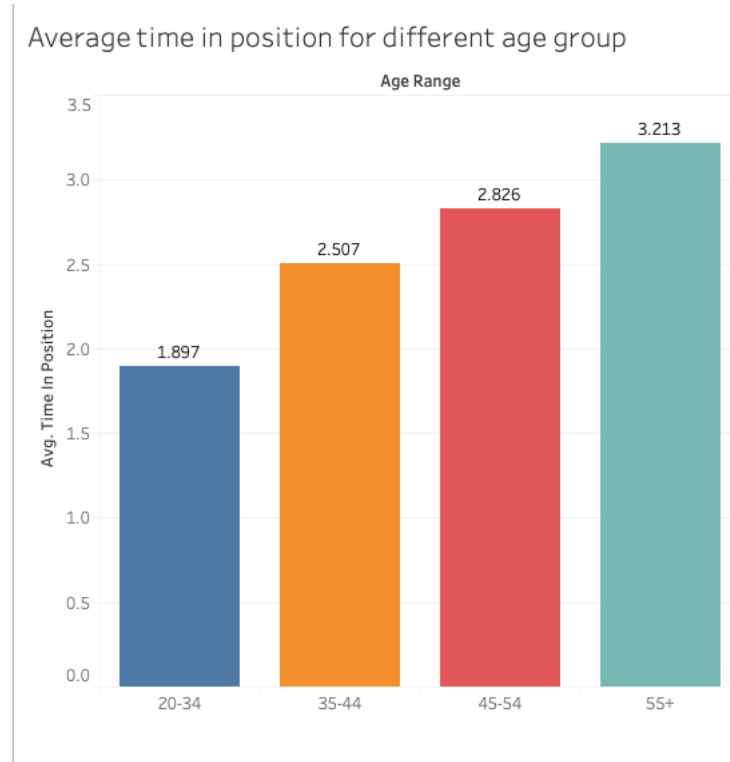


KEY TAKEAWAY

Average time in position before terminations reached an a low of 1.6 in 2016. The range seems tight between 1.4-2.7 which is to be expected, but is it possible to increase the average to around 3 years? Would employees stay a little longer if they were given a plan? Forecast is trending on the right direction; however, can we do better?

*Forecast using polynomial fit used on Tableau

Average Time in Position for Age Groups



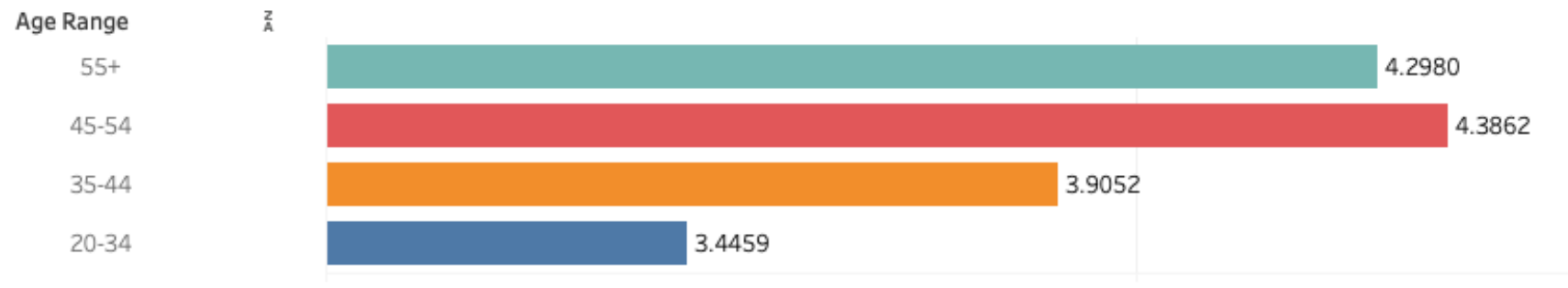
KEY TAKEAWAY

Based on the bar chart, there is clear discrepancy in average time in position, based on different age groups. The older the staff is, the more likely he/she will stay in current job.

Age group 20-34 behaves quite different compared to other age groups in terms of variabilities and number of outliers

Average Numbers of Jobs for Different Age Groups

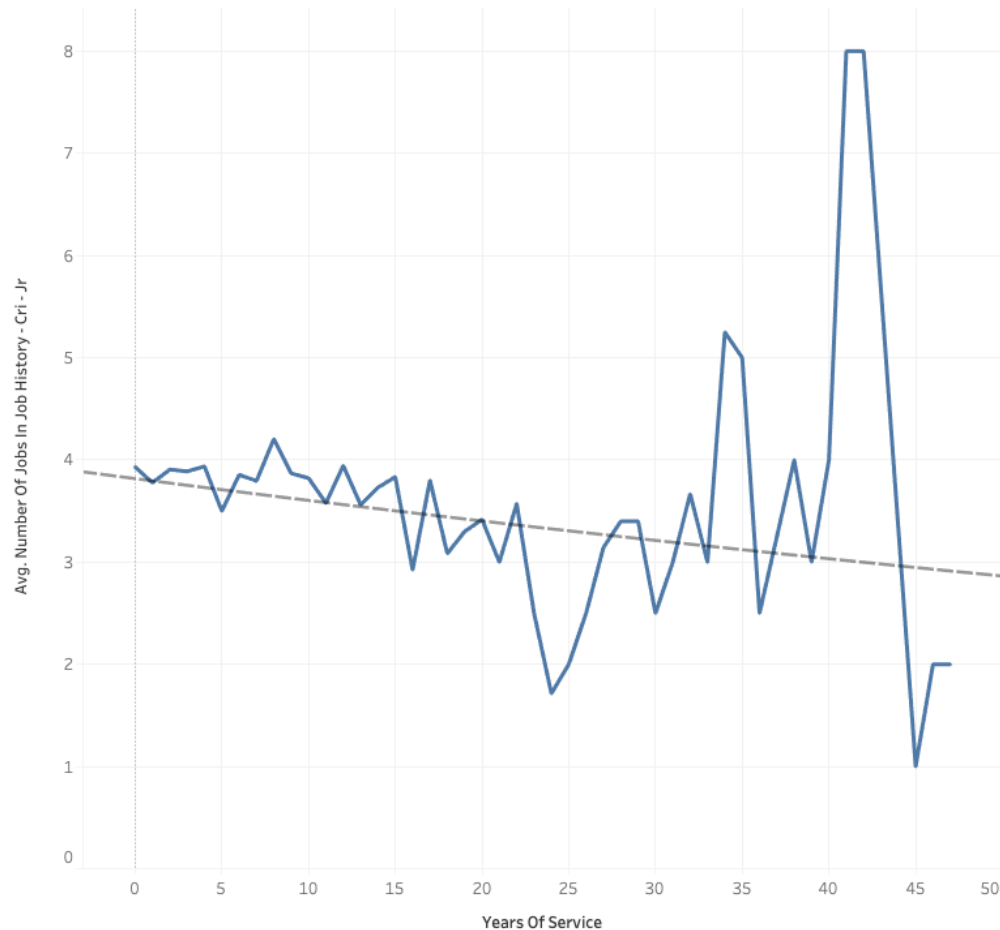
Average numbers of jobs for different age group



KEY TAKEAWAY

The average number of jobs continue to grow for each age groups except for the age group above 55. Based on this, we can suggest that the younger the staffs are, the more likely they will have more jobs in the future. Therefore, the flight risk continue to increase for younger age group.

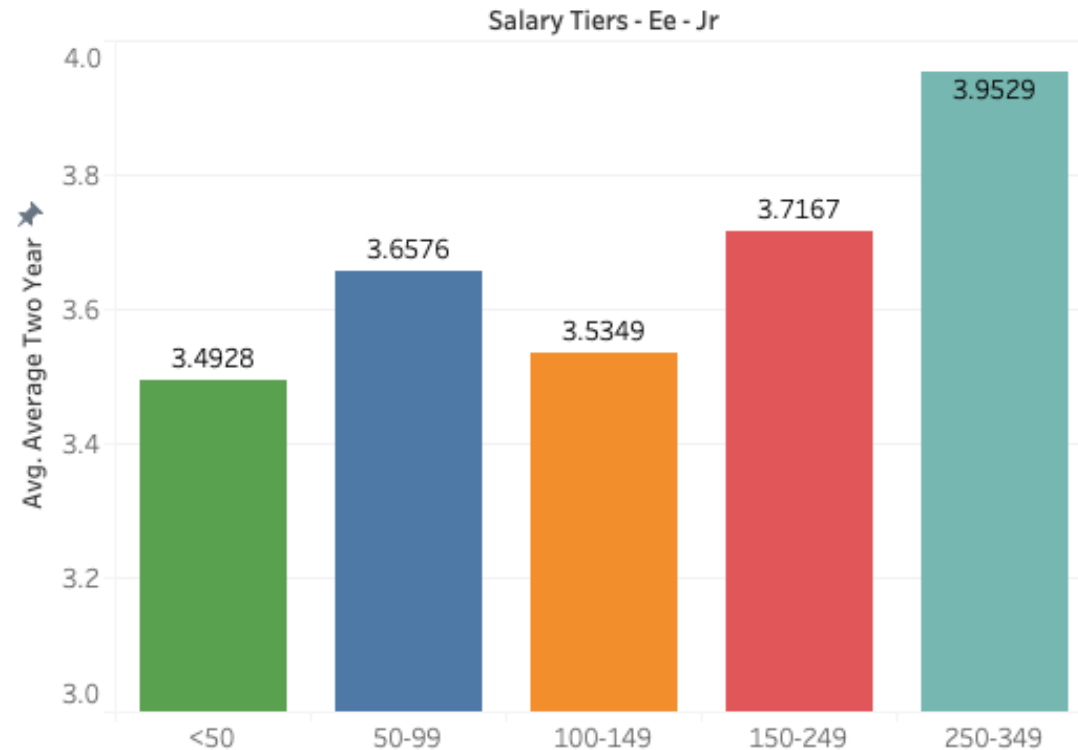
Average Number of Jobs vs Internal Years of Service



KEY TAKEAWAY

The longer a person works at the university, the less likely the person is to switch jobs. For example, if the person has 45 years of work experience, they have 1 job on average, likely only being the job in the University.

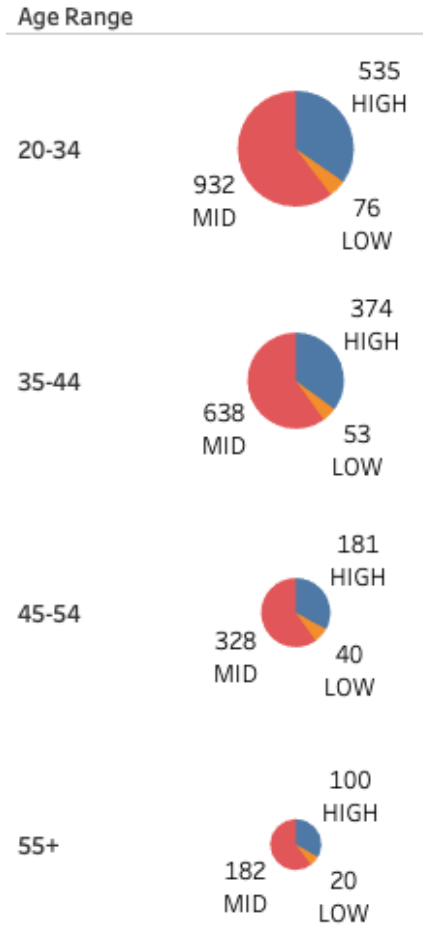
Average Two Year Review vs Salary



KEY TAKEAWAY

Based on the average two-year ratings, the higher the salary, the higher the ratings. Therefore, the two measurements may "possibly" be correlated

Distribution of performance level

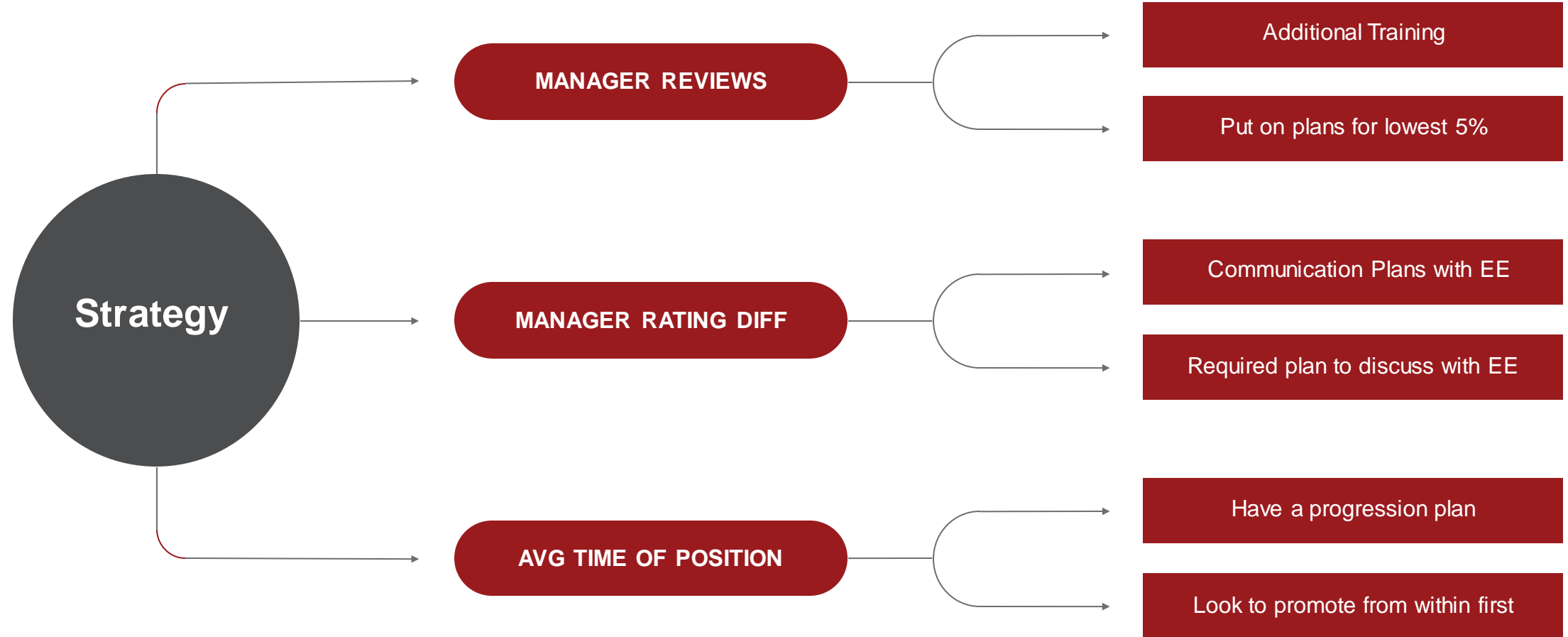


KEY TAKEAWAY

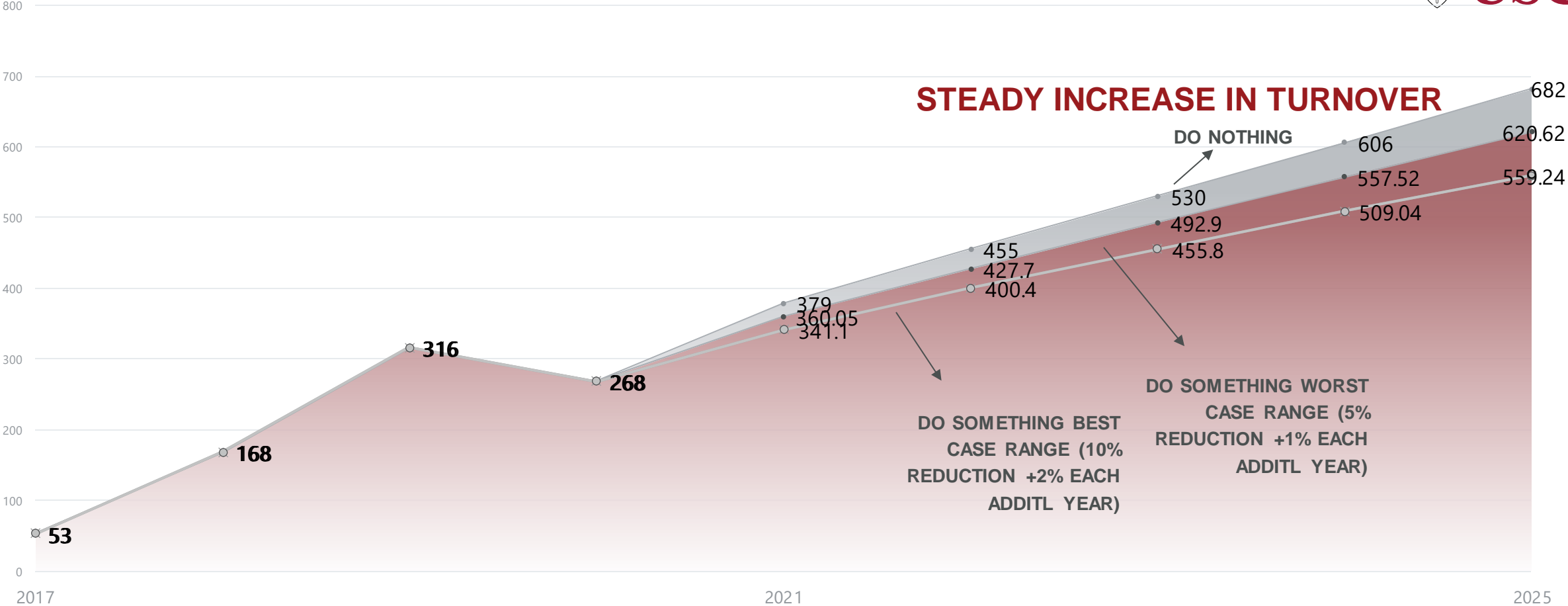
Even though the number of people grouped within a certain age group is different, there exist consistency in number of people who are rated low, mid and high.

In the future, this distribution could be used as the baseline and try to increase the number of high performers while reducing both low and mid

Our Proposal – Focus on the Important Attributes



What if we do nothing?



	2021	2022	2023	2024	2025	Saved Turnover	Savings (4.1k cost per person + 2 months loss of a position)	Cost to Implement (trainer + HR Analyst+ program cost)	ROI
Do Nothing	379	455	530	606	682	--	--	--	--
Low Range	360	427	492	557	620	196	196 * (\$4,000 + \$13,000)	5* (\$52,000 + \$72,000 + \$30,000)	4.32x
Upper Range	341	400	455	509	559	388	388 * (\$4,000 + \$13,000)	5* (\$52,000 + \$72,000 + \$30,000)	8.57x

THANK YOU!

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Appendix:

Assumptions:

- Filtered out data is a good representation of the whole staff population.
- If ANY data was incomplete, we removed each of the observations because each of the records are independent of each other and mutually exclusive.
- Small population of managers (~10%) did not have a rating, these were filled in with the average review score of the manager population.
- Estimated a 5% (+1% per year for increased efficiency) decrease in turnover for the low end of our cost savings.
- Estimated a 10% (+2% per year for increased efficiency) decrease in turnover for the high end of our cost savings.
- Average Recruiting Costs per Hire: \$4,100 according to SHRM
- Average HR Training Specialist salary : \$52,000 according to Glassdoor
- Average HR Analyst salary : \$72,000 according to Indeed

The dataset was made available by USC.