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INST354

Case Study

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1.

Based on the expected values of each option, the company should choose to build a medium-sized coffee lounge in their headquarters to maximize profits. The expected monetary value of building a medium-sized lounge is 445.25 thousand dollars.

Calculations:

$$\text{EV Small} = 0.1825*(400) + 0.3955*(400) + 0.4220*(400) = \mathbf{400}$$

$$\text{EV Medium} = 0.1825*(200) + 0.3955*(500) + 0.4220*(500) = \mathbf{445.25}$$

$$\text{EV Large} = 0.1825*(-400) + 0.3955*(300) + 0.4220*(800) = \mathbf{383.25}$$

2.

The employees may be experiencing the availability heuristic which causes them to come to biased conclusions. Heuristics are form of system 1, or automatic thinking, where decisions are made quickly and with little effort based on association and perception (Kahneman, D. (2011) Thinking, Fast and Slow, p 19-58). The availability heuristic is the tendency for people to make conclusions or judgments based on the first thing, or most available thing that comes to mind (RC, chapter 5.3). Last summer, many employees were laid off which is both unnatural and potentially stressful memory for current employees. In this case, the employees must automatically think about the high number of layoffs last summer when asked about job security due to how stark the memory of last summer's layoff spree is and make the conclusion that the current likelihood of being laid off is high, even though it may be low in reality.

To help employees make more accurate judgements about their job security, the company should attempt to reduce the effects of past layoff experiences which may introduce the availability heuristic. A way that the company can apply this is to release a statement after a large lay off spree stating that the company laid people off due to rare circumstance and that it should not drastically affect people's perception of job security at the company. This will allow employees to not automatically think and make judgements based on past large, negative experiences related to job security, and rather make judgements based on the current condition and experience at the company.

3.

According to the LP model, the company should invest \$300,000 into time off for employees, \$700,000 into celebrating employee accomplishments and \$0 into all other plans. This result considers the constraints set by the company and returns a total profit of \$112,000 per year.

Model:

$$\text{Max. } 0.091A + 0.161B + 0.073C + 0.056D + 0.123E$$

$$\text{S. t. } B + C \leq 300,000$$

$$A + D \geq 400,000$$

$$A + B + C + D + E \leq 1,000,000$$

	accomplishments	time off	team-building	retreats	classes		
	A	B	C	D	E		
Number to Offer	700000	300000	0	0	0	Total Profit (Return/Year)	
Unit Profits (Return/Year)	0.091	0.161	0.073	0.056	0.123	112000	
Constraints						Used	Available
		300000			0	300000	<= 300,000
	700000			0		700000	>= 400,000
	700000	300000	0	0	0	1000000	<= 1,000,000

4.

Examining the existing variables in the employee attrition dataset, I hypothesize that Age, Environment Satisfaction, Job Satisfaction, Job Involvement and Total Working Years are characteristics associated with tenure at the company (YearsAtCompany). I believe that Age and Total Working years contribute to how long a person has worked at a specific company since in general, those who are older or have more years to work have a better chance of working for a company for a longer period than compared to young adults. If a person is 21 with three years of work experience, the max number of years that they could work for a single company is 3 years. On the other hand, someone who is 43 who has 20 years of work experience has a higher chance of working for longer at one company. I also believe that Environment Satisfaction, Job Satisfaction and Job Involvement contribute to tenure as these variables reflect how much a person enjoys their job at the company. If a person enjoys the environment, their job and is actively involved in their position, then they will most likely be willing to stay with the company for a long time.

I performed correlation tests to examine the relationship between the tenure and the hypothesized variables. From the correlation tests, I found that only the correlation tests for Age and TotalWorkingYears variables had p-values < 0.05 signifying that they are the one hypothesized variable where the correlation coefficient is statistically significant. Age has a correlation coefficient of 0.311, which signifies a weak but positive correlation. The TotalWorkingYears variable has a correlation coefficient of 0.6281332, which signifies moderate positive correlation. Based on the results, we can see

that both Age and TotalWorkingYears positively correlate significantly to tenure, but TotalWorkingYears has a slightly stronger correlation with tenure. We can also surprisingly see that Environment Satisfaction, Job Satisfaction and Job Involvement and not significantly correlated with tenure. Examining the regression model predicting tenure using the hypothesized variables, we can once again see that Age and TotalWorkingYears are the only variables that are statistically significant (p-value < 0.05). We can also see that Total working years has a moderate positive relationship with the tenure variable (0.611). However, we can see that the Age variable has a weak negative relationship with tenure (-0.145). This is different from the results of our correlation test, and could have changed due to the presence of other predictors.

```
# Establish as Categorical Variables
library(r)
employees$EnvironmentSatisfaction <- as.factor(employees$EnvironmentSatisfaction)
employees$JobSatisfaction <- as.factor(employees$JobSatisfaction)
employees$JobInvolvement <- as.factor(employees$JobInvolvement)

## Regression model
library(r)
mod1 <- lm(employees$YearsAtCompany ~ employees$i..Age + employees$EnvironmentSatisfaction +
employees$JobSatisfaction + employees$JobInvolvement + employees$TotalWorkingYears)
summary(mod1)
```

Call:
lm(formula = employees\$YearsAtCompany ~ employees\$i..Age + employees\$EnvironmentSatisfaction +
employees\$JobSatisfaction + employees\$JobInvolvement + employees\$TotalWorkingYears)

Residuals:

Min	1Q	Median	3Q	Max
-17.5447	-2.1101	0.0666	2.6157	18.7345

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	4.71486	0.81475	5.787	8.76e-09 ***
employees\$i..Age	-0.14460	0.01826	-7.921	4.65e-15 ***
employees\$EnvironmentSatisfaction2	0.53015	0.39250	1.351	0.177
employees\$EnvironmentSatisfaction3	0.59594	0.35454	1.681	0.093 .
employees\$EnvironmentSatisfaction4	0.15999	0.35559	0.450	0.653
employees\$JobSatisfaction2	0.26535	0.39246	0.676	0.499
employees\$JobSatisfaction3	0.36605	0.35438	1.033	0.302
employees\$JobSatisfaction4	0.22304	0.35149	0.635	0.526
employees\$JobInvolvement2	0.40021	0.56950	0.703	0.482
employees\$JobInvolvement3	0.09944	0.53893	0.185	0.854
employees\$JobInvolvement4	0.09956	0.64529	0.154	0.877
employees\$TotalWorkingYears	0.61138	0.02143	28.531	< 2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 4.675 on 1458 degrees of freedom
Multiple R-squared: 0.4221, Adjusted R-squared: 0.4177
F-statistic: 96.8 on 11 and 1458 DF, p-value: < 2.2e-16