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**Alumni Giving Case**

Managerial Report

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To: University Administrators

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MEMORANDUM

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**Executive Summary**

The purpose of this case study Alumni Giving is to analyze what factors that affect the Alumni Giving Rate. Alumni donations are an important source of revenue for colleges and universities. If administrators could determine the factors that influence increases in the percentage of alumni who make a donation, they might be able to implement policies that could lead to increased revenues. Research shows that students who are more satisfied with their contact with teachers are more likely to graduate. As a result, one might suspect that smaller class sizes and lower student-faculty ratios might lead to a higher percentage of satisfied graduates, which in turn might lead to increases in the percentage of alumni who make a donation. The data table shows data for 48 national universities. The Graduation Rate column is the percentage of students who initially enrolled at the university and graduated. The % of Classes Under 20 column shows the percentages of classes offered with fewer than 20 students. The Student/faculty Ratio column is the number of students enrolled divided by the total number of faculty. Finally, the Alumni Giving Rate column is the percentage of alumni who made a donation to the university.

To the various University Administrators, I offer my analysis and recommendations on whether the graduation rate, % of classes under 20, and Student-Faculty ratio has an effect on the Alumni Giving rate. This task will be accomplished through employing descriptive statistics, simple and multiple regression reports, and plotting residual data through scatterplots.

Findings’ Results and Summary (answer to #5):

According to the data and findings from the analysis, it can be derived that University of Notre Dame, Yale University, Dartmouth College, and Princeton University are receiving substantially better donations from their Alumni. This is possibly because these universities can be seen as the top notch schools in the country. Graduates from these schools usually make a higher salary because of the status of their respective schools. It can also be derived from their graduation rate being very close to 100%. As shown in the figures and graphs below, Graduation rate has a positive linear relationship to the Alumni Giving rate.

University of California–Davis, University of California–Irvine, and University of California–San Diego all are doing substantially poorer in the area of Alumni, all being below 10%. This can possibly be attributed to the lower graduation rate and lower Student-Faculty ratio. These have been illustrated to have a linear relationship with Alumni Giving, and it definitely seems to have made an impact.

1. **Descriptive Statistics and Correlation Analysis**

To summarize the data effectively, the methods of descriptive statistics are used. These are shown in Figure 1 below:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | **Graduation Rate** | **% of Classes Under 20** | **Student-Faculty Ratio** | **Alumni Giving Rate** |
| **Mean** | | 83.04166667 | 55.72916667 | 11.54166667 | 29.27083333 |
| **Median** | | 83.5 | 59.5 | 10.5 | 29 |
| **Stand. Dev** | | 8.607167556 | 13.19371156 | 4.850787755 | 13.44134552 |
| **Min** | | 66 | 29 | 3 | 7 |
| **Max** | | 97 | 77 | 23 | 67 |
| **Range** | | 31 | 48 | 20 | 60 |
| **Sum** | | 3986 | 2675 | 554 | 1405 |

Each of 4 types of data above are analyzed and discussed individually:

1. Graduation Rate

Correlation:

The Graduation Rate distribution shows a strong, negative trend of graduation rate. It also seems to have a certain circular up and down pattern happens at each university’s graduation rate.

1. % of Classes under 20 distribution

Correlation:

The % of classes under 20 distribution's trend tends to go down. It indicates a negative (trendline goes down) and quite strong relationship (R square = 0.5)

1. Student/Faculty Ratio

Correlation:

According to the graph, the ratio’s trend is increasing when going across the list of universities. This is a positive (trendline goes up) and strong (R square = 0.6) correlation.

1. Alumni Giving Rate

Correlation:

Trendline of the Alumni Giving Rate's distribution goes down showing a negative correlation, while R square value = 0.96 indicates a strong correlation.

1. **Simple Linear Regression Model & Findings and Discussions:**

Based on these numbers, and on Graphs 1.1, 1.2, and 1.3 the following analysis has been made.

Looking at Graph 1.1 and the correlation coefficient between Alumni Giving Rate and Graduation rate, a definite positive trend can be noticed. This is reiterated through the correlation coefficient of 0.7559. This being close to 1 indicates a strong linear relationship between the two variables. This information suggests that continued support in the area of increasing the Graduation Rate is recommended in order to increase the Alumni Giving Rate.

In addition, P-value < alpha 0.05, so we conclude: These coefficients are statistically significant.

We reject Null and keep the p-value and variables

Graph 1.1:

Correlation =0.7559

Looking at Graph 1.2 shows something different than above. Student-Faculty rate and Alumni Giving rate seem to have a negative linear relationship. The correlation coefficient of -0.7242 suggests a similarity in strength of relationship.

Graph 1.2

Correlation = -0.7424

Finally, looking at Graph 1.3 and the correlation coefficient shows once again a positive slope, but a lesser strength than the two before it. This indicates that although there is a relationship, changing the % of classes under 20 will not change the Alumni Giving rate as much as the two before it. This is confirmed by looking at the correlation coefficient of 0.6456.

Graph 1.3

Correlation = 0.6456

Section two of my findings include a simple linear regression between the Alumni Giving rate and the Graduation rate. The regression findings are shown below.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SUMMARY OUTPUT | |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| *Regression Statistics* | |  |  |  |  |  |  |  |
| Multiple R | 0.755943591 |  |  |  |  |  |  |  |
| R Square | 0.571450713 |  |  |  |  |  |  |  |
| Adjusted R Square | 0.562134424 |  |  |  |  |  |  |  |
| Standard Error | 8.894328114 |  |  |  |  |  |  |  |
| Observations | 48 |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| ANOVA |  |  |  |  |  |  |  |  |
|  | *df* | *SS* | *MS* | *F* | *Significance F* |  |  |  |
| Regression | 1 | 4852.461827 | 4852.461827 | 61.33887894 | 5.23818E-10 |  |  |  |
| Residual | 46 | 3639.01734 | 79.1090726 |  |  |  |  |  |
| Total | 47 | 8491.479167 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  | *Coefficients* | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* | *Lower 95.0%* | *Upper 95.0%* |
| Intercept | -68.76118278 | 12.58265573 | -5.46475913 | 1.82099E-06 | -94.0887551 | -43.43361 | -94.0887551 | -43.43361 |
| Graduation Rate, X | 1.180515999 | 0.150731479 | 7.83191413 | 5.23818E-10 | 0.877109269 | 1.48392273 | 0.877109269 | 1.48392273 |

Using the p-value of 5.23E-10 and a significance of 0.05 we can conclude that because the Graduation rate is lower than .05 we will reject the null hypothesis, and therefore have a linear relationship. It also indicates that the coefficients are significant.

This is reiterated again through the graph of residuals below.

1. Multiple Linear Regression Model

Section three of my findings use multiple linear regression to show the relationship of Alumni Giving rate based on Graduation rate, % of Classes under 20, and the Student-Faculty ratio. It is shown below.



(Answer to #4):

Once again looking at the p-values of the variables and a significance of 0.05 we can tell that there is a linear relationship between Graduation rate and Student-Faculty ratio, but that there isn’t one between the % of Classes under 20. This model is re-done for section four, taking out the % of Classes under 20 as shown below. This is done to show only linear relationships.



1. Conclusions and Recommendations:

I make the recommendation to include more variables, such as number of sports teams, or student organization participation, or Alumni Association Population Distribution, or number of extracurricular activities offered to increase the satisfaction rate of the Universities, and hopefully the Alumni Giving rate as well.

In summary, with the data given, I recommend that with the definite linear relationships formed from Alumni Giving rate when given the Graduation rate and Student-Faculty ratio that substantial resources be poured into those fields to increase Alumni Giving ratio.