

MGT-415 Executive Summary

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Descriptive Analytics for Identifying Valuable Customers

Introduction

The aim of this exercise is to extract insights to understand which types of customers are most valuable to a Telecom company's profits. We are interested only in customers who have not churned. These insights can be used to focus retention efforts on more valuable customers, thus optimizing resource allocation. The methodology in this exercise is mostly descriptive in nature.

Customer Demographics

To segment customers in terms of their values to the company, we initially focused on demographic information rather than services provided. There are four demographic attributes in which customers are segmented: gender, senior citizenship, relationship status, and the existence of dependents. While males and females are nearly equal in numbers, there are about 7 times as many non-senior customers as senior customers. We have about 300 more customers with a partner than those with none. Finally, there are twice as many customers without dependents than those with dependents.

More specifically, we discovered that the largest two segments are "non-senior males (or females) without partners and dependents" totaling at 19% and 18% respectively. Furthermore, the next two largest segments are "non-senior males (or females) with partners and dependents" at 14% each. From this, it follows that our primary customer segment is young to middle-aged, unmarried individuals with no children. Our secondary customer segment is young to middle-aged married individuals with children.

Customer Value

In order to understand the value of the customer segments, we investigate the effect of categorical variables on the monthly charges and tenure of customers. We looked at the four demographic variables as well as the use of paperless billing, contract duration, and payment method. We assume that higher tenures or monthly charges imply higher value for the company, and as such these types of customers must be retained. To this end, we employ t-tests for all binary variables and ANOVA tests for variables with more than two categories.

T-Tests

Variable	Is there statistically significant (5% level) difference in:	
	Avg. Monthly Charges	Avg. Tenure
Male/Female	X	X
Senior/Non-senior	\$20.56	5.15
Partner/No Partner	\$7.56	17.43
Dependents/No Dependents	"No dependents" pay more \$6.38	"Dependents" stay longer 5.77

The table indicates statistically significant variables in green with the absolute difference in average values in each cell. Bolded is the customer segment having the higher mean value in both criteria. The results indicate that all variables except for gender were found to be statistically significant. Moreover, senior citizens and customers with partners have higher monthly charges and longer tenures respectively whereas customers with dependents have longer tenures but lower monthly charges. The magnitude of the significance can be gathered from the absolute differences. These results are further illustrated in the histograms in Figure 1. In these histograms one can see that the mode of monthly charges is around \$20-\$30. Otherwise, there is a rough normal distribution. For the tenure, we observed an interesting phenomenon in the partner/no-partner variable – the distribution reverses, with customers with partners staying 17.43 months longer on average than those without partners. Furthermore, people with dependents are more likely to be long-term customers while those without are split; most customers are either new or loyal. A similar result is observed for the senior/non-senior variable.

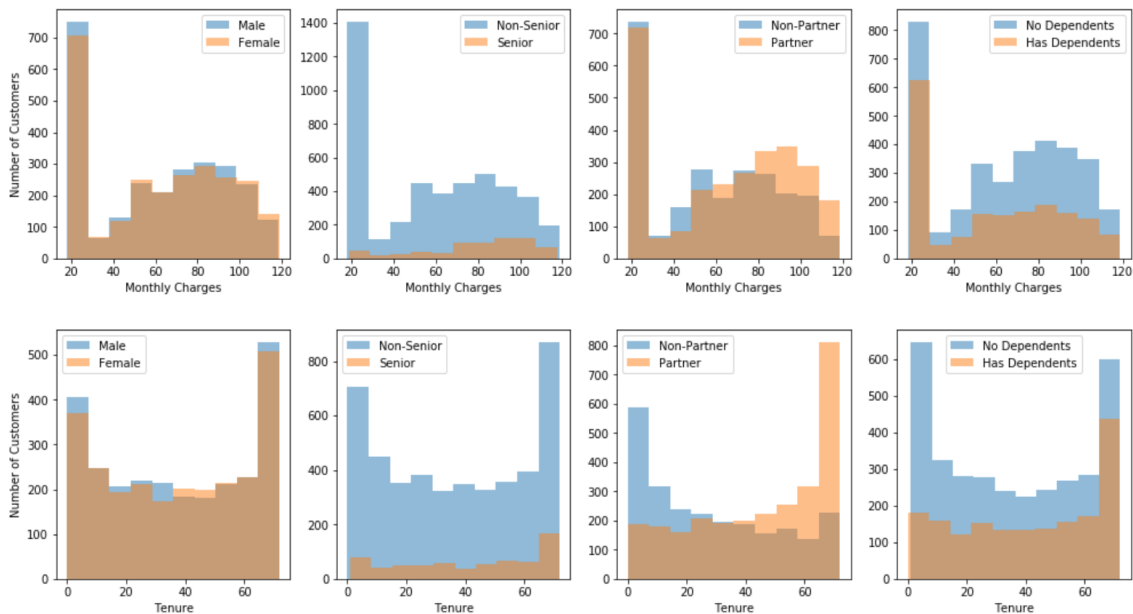


Figure 1: Histograms of monthly charges and tenure for each customer segment

ANOVA

In terms of contract options, we found that on average customers with paperless billing pay \$21 more in monthly charges and stayed 4 months longer. Using the ANOVA tests, we also discovered that contract length showed significant differences only for tenure, but not the monthly charges. However, this is quite obvious as two-year contracts, for instance, must clearly have longer tenure than monthly contracts. It is still interesting note, however, that yearly contracts are most common, followed by monthly and then two-year contracts. For the payment method, both indicators showed significance. More interestingly, automatic payment methods (credit card and bank transfer) showed little difference, but on average both exhibited longer

tenures than electronic checks and mailed checks. The monthly charges followed a slightly different pattern with electronic checks having the highest charges, mailed checks the lowest and automatic methods in-between.

Additional Insights

There is one primary difference in the approach taken between our analysis and the sample solution: mainly the engineering of a new feature using the total charges and tenure to compute the customer value over one year. In our analysis we investigated instead the tenure and monthly charges as both add value in different ways. However the conclusions in terms of which groups add more value are largely the same.

We further neglected to investigate the different services consumed by customers. However, the sample solution confirms the assumption that additional services implies that customers add more value, at least in terms of revenue. Profitability is difficult to analyze as there is no data on the costs of these services. The additional insight that is obtained is the percent-change effect of an additional service. For example, fiber optic internet creates higher customer value than the presence of online security. This can be explained considering that online security is considered a standard service whilst a premium can be charged for a fiber optic connection.

Conclusion

We can conclude that the most valuable customers are senior citizens, customers with partners, and customers without dependents. Of these, the most frequent are customers with partners and without dependents. Merging both the customer value and the count of different customer types, the company can decide on which customers it should focus primarily.

Furthermore, longer contracts create longer tenure implying more loyalty, this does not immediately imply that a focus on longer contracts is beneficial as this might push customers to change providers after a long contract. Finally, customers paying by electronic check are more valuable than those paying in an automatic way or by mail, the underlying reasons for this are at this point unclear.