**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 current customers. The information 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

When trying to segment customers in order to understand the value they bring to the company, we initially focused on demographic information rather than services provided. This was based on the assumption that additional services sold implies higher value. There are four demographic indicators for which customers are segmented: gender, senior citizenship, relationship status and the existence of dependents. Gender is approximately evenly split in the dataset. There are far fewer senior citizens than non-senior citizens. There are slightly more customers with partners than without. Finally, there are 50% more people without dependents than with dependents.

From this, it follows that the largest two segments are “non-senior, non-partner males (resp. females) without dependents” coming in at 19% and 18%. Furthermore, as expected, customers with partners are more likely to have dependents. A further 28% (Even split M/F) of customers are made up of “Non-senior males and females with partners and dependents”. Senior citizens are far less likely to have dependents in all cases.

The key insight to underline here is that customers living together, in a partnership or with dependents, may or may not pay services for the entire household. This is important to consider when investigating the market’s size.

# Customer Value

In order to understand the value of individual 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. Both a higher tenure or higher monthly charges imply added value for the company, these types of customers should thus be more actively pursued. To see if there are significant differences in average monthly charges or tenure across segments we use a T-test for all binary variables and an ANOVA test for contract duration and payment method. All variables except for gender were found to be statistically significant, this means that observed differences can be interpreted to have significance. The conclusions one was able to draw from this are: Senior citizens and customers with partners have higher monthly charges and longer tenures, customers with dependents have longer tenures but lower monthly charges. These results are further visible in the histograms in Figure 1. In these histograms one can see that for the monthly charges the mode is around $20-$30 after which there is a gap between $30-$40 where there is very low frequency. Thereafter one observes a normal distribution. For the tenures, one sees an interesting phenomena in the partner/non-partner variable: in a sense the pattern is reversed, with customers with partners preferring longer tenures. Furthermore, people with dependents are more likely to be long-term customers whilst those without are split: either new customers with very short tenures or long-term loyal customers. A similar result is observed for the senior/non-senior variable.



Figure : Histograms of Monthly charges and Tenure, split for different demographic factors.

Furthermore, in terms of contract options, we see that customers with paperless billing have significantly higher monthly charges and slightly longer tenures. Using the ANOVA tests it was found that the contract length showed only significant differences for the tenure, not the contract length. For the payment method, both indicators showed significance. One could conclude from the results that two-year contracts had the highest tenure and monthly contracts had lowest tenure. In a sense this is by design. More interestingly, automatic payment methods (credit card and bank transfer) showed little difference. The automatic methods 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 from corrected EDA (Omar Ballester)

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.