

# Exploratory Analysis of Sales Tenure and Success Rates within Vivint Smart Home. Proposal

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## Abstract

This project focuses on analyzing the relationship between sales tenure and sales success rates within Vivint Smart Home. The data has been collected from company sales records, categorizing sales representatives into three tenure levels: Rookie, Sophomore, and Veteran. The primary goal is to determine whether tenure level correlates with sales success and, if so, to develop a predictive model that can estimate a representative's likelihood of success. We aim to provide actionable insights that could guide training programs and hiring decisions, ultimately optimizing sales performance.

## Introduction

Understanding the link between sales experience and success is crucial for improving hiring and training strategies. This study will utilize historical sales data to analyze patterns and predict outcomes. We are interested in this data to help the company enhance its sales force effectiveness and retention strategies.

## Methods

The data we collected came straight from the company itself. While merely sample data, the amount provided should be more than enough to conduct insightful predictive analysis. Once this analysis is complete we will have the ability to analyze the biggest difference between tenure and how to better train lesser developed salesmen. This study will primarily focus on comparative analysis primarily between tenure, but there are plenty of other variables that will be explored. The first test we conducted was a simple proportion test on percentage of closed sales after a customer's credit has been run. Down the line of testing we will create a plethora of other models consisting of Logistic Regression, Large Language Models, and ANOVA testing.

## Expected Outcomes

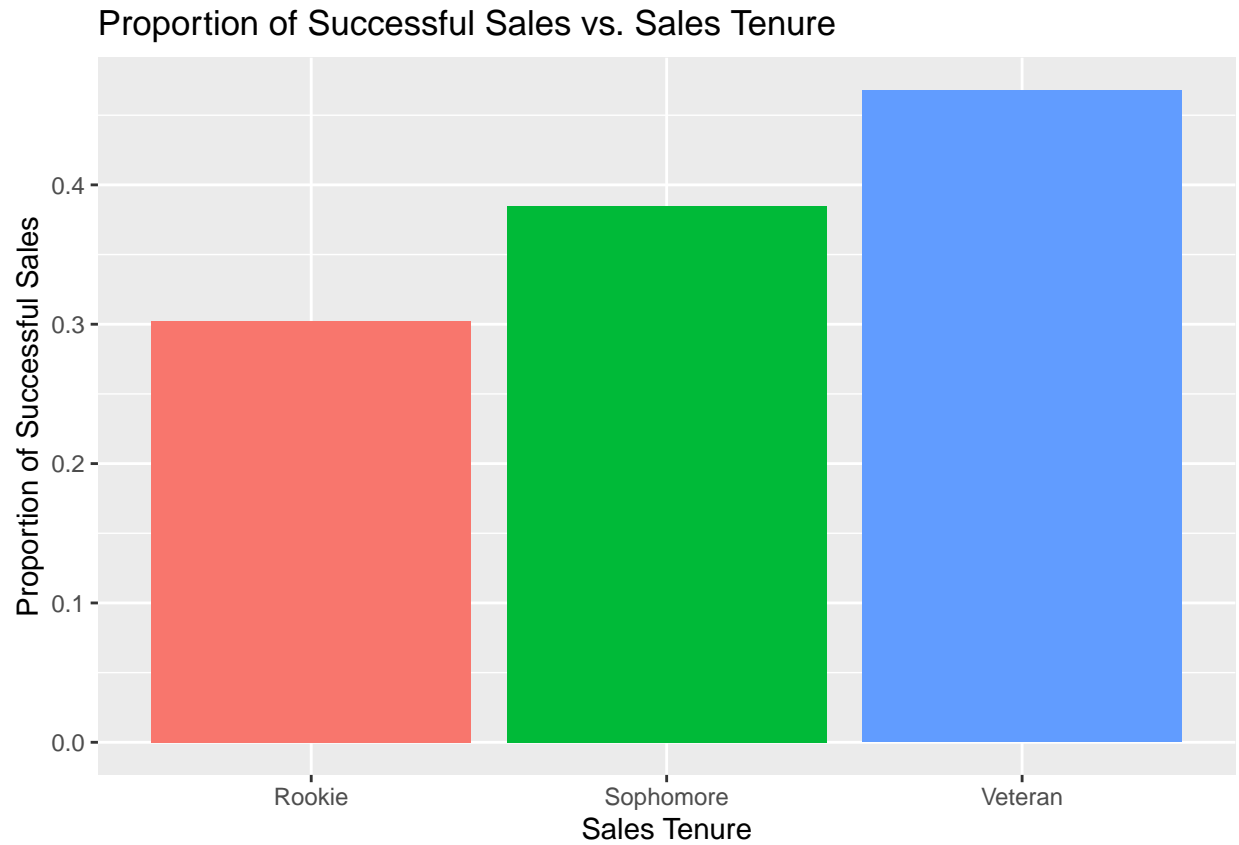
We expect to find the biggest differences in sales performance between tenures, and to create a better idea of where lower tenure salesmen should be better trained. This will enable the company to close the gap between newer salesmen and their more experienced counterparts.

## Group Contributions

An approximation of work distribution: data collection (TH - 100%), data wrangling (TH - 10%, RM 90%), data modeling (RM - 75%, TH 25%), figure and table creation (TH - 50%, RM 50%), and final poster presentation (TH 50% RM 50%).

## Preliminary Modeling & Exploration

Our preliminary data exploration includes a brief examination of the proportion of successful sales across tenure levels and an examination of sales revenues across tenures.

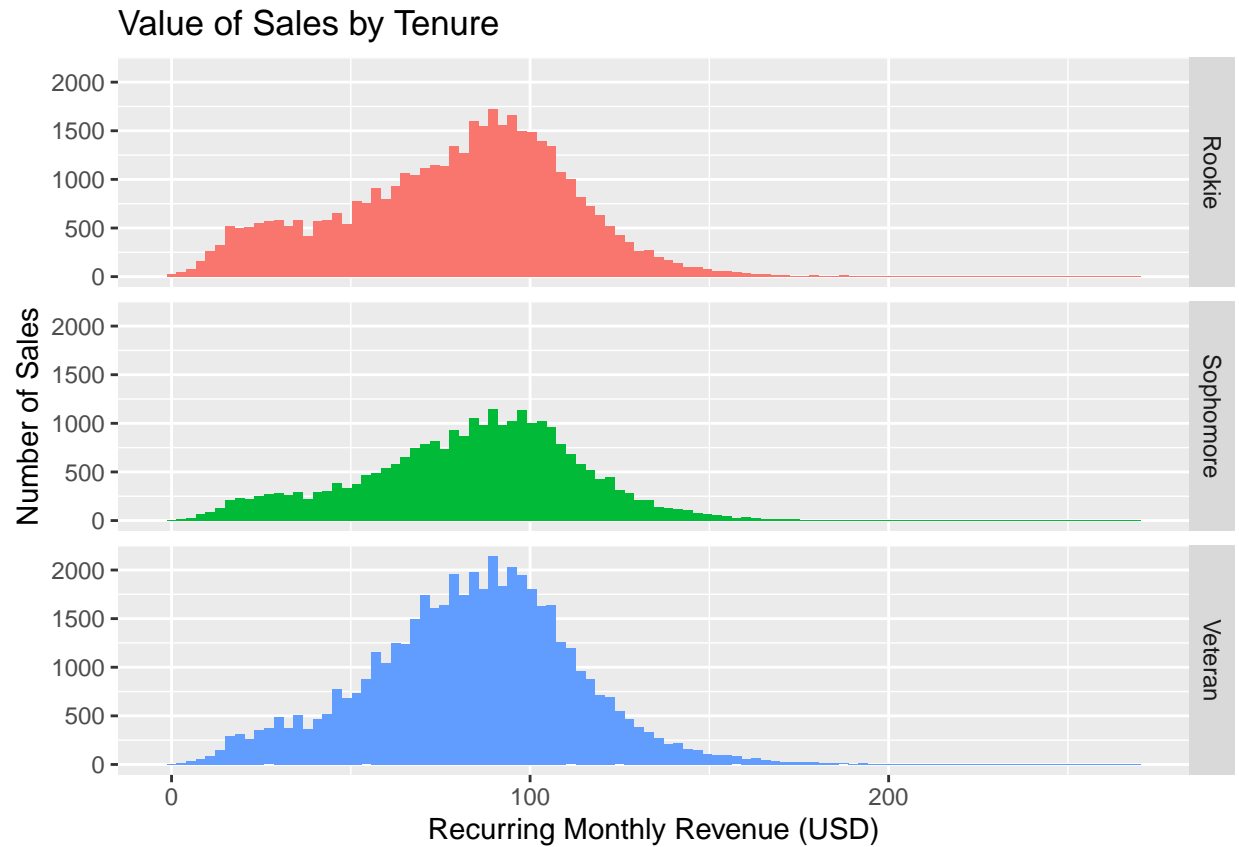


This table appears to have a basic visual correlated trend between sales closure success. In direct order of experience, from Veteran, Sophomore, and finally Rookie.

Proportion analysis testing between each pair of tenure levels resulted with the following basic analysis:

```
## [1] "Rookie / Sophomore Proportion Analysis:"  
  
##  
## 2-sample test for equality of proportions with continuity correction  
##  
## data: c(44603, 28116) out of c(164528, 82599)  
## X-squared = 1271.2, df = 1, p-value < 2.2e-16  
## alternative hypothesis: two.sided  
## 95 percent confidence interval:  
## -0.07318409 -0.06540555  
## sample estimates:  
## prop 1 prop 2  
## 0.2710967 0.3403915  
  
## [1] "Rookie / Veteran Proportion Analysis:"  
  
##  
## 2-sample test for equality of proportions with continuity correction  
##  
## data: c(44603, 50820) out of c(164528, 118611)  
## X-squared = 7637.9, df = 1, p-value < 2.2e-16  
## alternative hypothesis: two.sided  
## 95 percent confidence interval:  
## -0.1609118 -0.1538136  
## sample estimates:  
## prop 1 prop 2  
## 0.2710967 0.4284594  
  
## [1] "Sophomore / Veteran Proportion Analysis:"  
  
##  
## 2-sample test for equality of proportions with continuity correction  
##  
## data: c(28116, 50820) out of c(82599, 118611)  
## X-squared = 1583.7, df = 1, p-value < 2.2e-16  
## alternative hypothesis: two.sided  
## 95 percent confidence interval:  
## -0.09236454 -0.08377124  
## sample estimates:  
## prop 1 prop 2  
## 0.3403915 0.4284594
```

This preliminary analysis of successful sales proportions by tenure level shows that there are significant differences between the proportion of successful sales across tenure levels, confidently confirming that sales people at a higher tenure level have a higher proportion of closed sales.



This histogram shows that while Tenure may be significant when it comes to percentage of closed attempted sales, the average Production RMR of each sale is very similar. While further analysis is needed, this metric appears to be mostly insignificant. This portion of training rookies seems like it is already going well, as the difference in mean RMR by Tenure is very small.