

# Jay Haygood

## Data Analytics Portfolio



# About Me

I have an IT background in Platform Validation and Software Quality Assurance. My recent skillset includes knowledge of Excel, PowerPoint, Tableau, SQL, and Python as tools related to the data analysis projects featured in this portfolio.



# Featured Projects

## GameCo, Inc.

Descriptive analysis of how new games may sell in the current market

## Influenza Season

Analysis examining influenza trends in the US, for use in forecasting seasonal hospital staffing

## Rockbuster Stealth

Geographic analysis of movie rentals, with intent to launch online video streaming service

## Instacart

Exploratory analysis and customer profiling, using insights to optimize marketing campaigns

## Pig E. Bank

Predictive analysis on customer retention, and decision tree

## Final CF project

# GameCo, Inc. Overview



## OBJECTIVE

Perform an analysis of video game sales data to optimize GameCo marketing plan and ROI.



## ASSUMPTION

Game sales for the various geographic regions have stayed consistent over time.



## DATA

[Video Game Sales](#)  
Source: [VGChartz](#)



## TOOLS

Excel  
PowerPoint

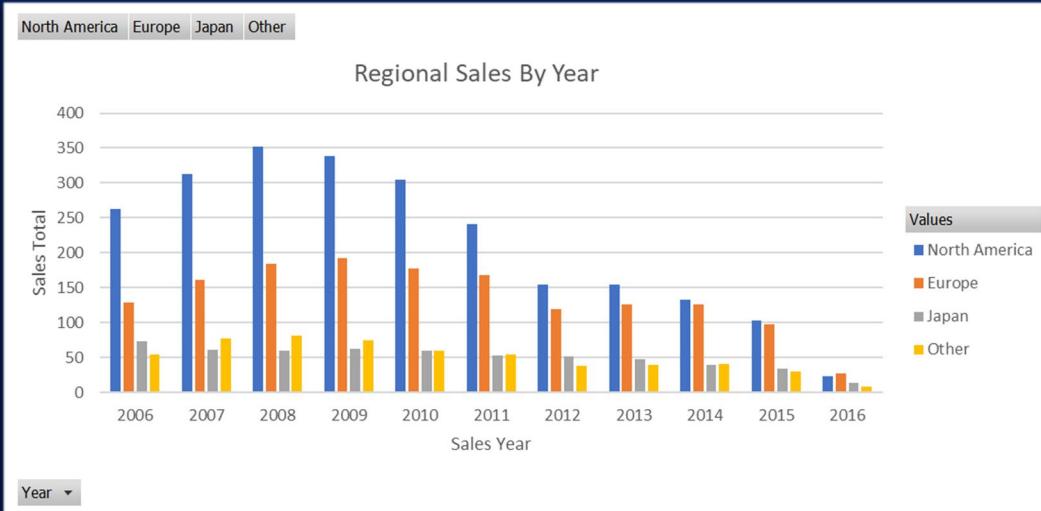


## SKILLS

Grouping and Summarizing Data  
Descriptive Analysis  
Visualizing Insights  
Presenting Findings



# GameCo, Inc. Analysis



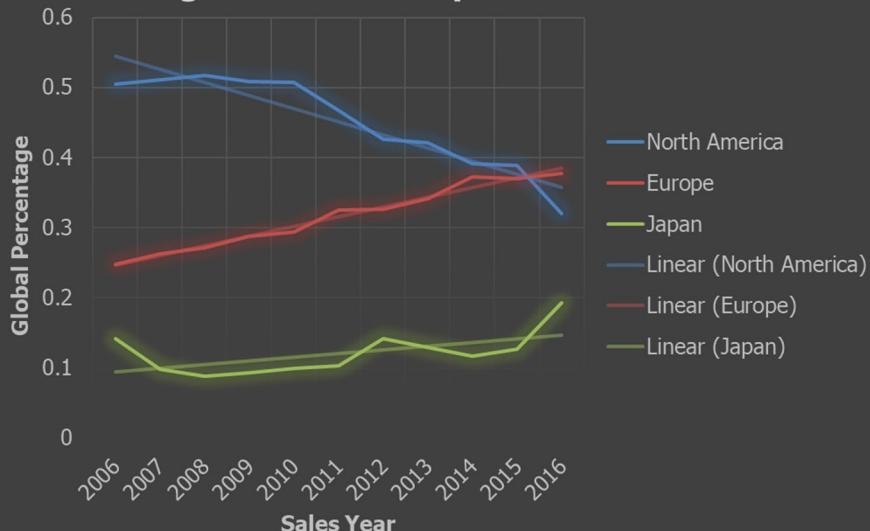
- Shows a steady decline in overall global sales since 2008, most noticeable with drop in North American sales.
- Comparing the various regional totals relative to each other in recent years, they appear generally consistent and unchanged, which would concur with GameCo's current assumptions.



- Regional sales for Europe have eclipsed that of North America for the first time, as of Q3 2016.
- While we would typically not view this as indication of a trend, being the first such occurrence, it is actually a snapshot of a bigger picture.

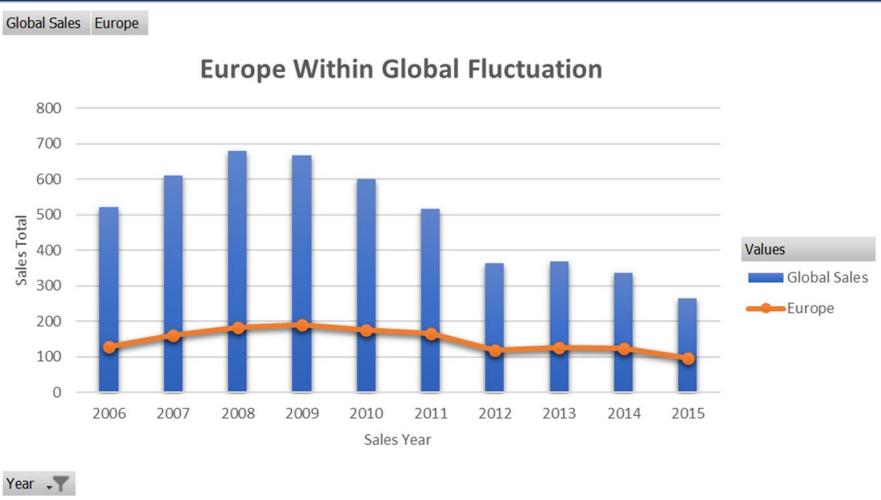


## Regional Sales Proportion Trends



- Steady and consistent increase in Europe over the last 10 years.
- The Europe increase is proportional to a decline in North America.
- Despite a sharp increase in Japan for 2016, it is too recent to affect the trendline. Still an upward trend, it is also worth consideration.

## Europe Within Global Fluctuation



- While somewhat parallel to global sales variations, Europe still maintains an overall consistency through this 10-year cycle.
- Shows a general strength and reliability in the European market.
- Note the 2008 global peak and subsequent decline, mirroring that of North American sales shown above.

# Summary and Proposals

## FINDINGS

- ❖ GameCo's assumption that regional sales have remained mostly consistent is not accurate, when considering how they figure into a steady decline in global sales.
- ❖ While European sales have eclipsed that of North America for the first time this year, their percentage of global sales has steadily increased, in direct contrast to a decline in the North American proportion.
- ❖ Japan has shown a steady increase in global proportion as well, but to a lesser degree. This is worthy of consideration in the future.

## RECOMMENDED ACTION

Focus more marketing resources on Europe, in an effort to capitalize on the existing increase in percentage of global sales for this region. As this has been a consistent trend, it would likely be a safe approach for optimal return on marketing investment.

## FINAL REPORT



# Influenza Season Overview



## OBJECTIVE

Analysis will help plan for influenza season, when additional hospital staff are needed. Final results will examine trends to proactively plan for staffing demands across the country.



## ASSUMPTION

Vulnerable populations suffer the most severe impacts from the flu, and are the most likely to be hospitalized.

## DATA

### [Influenza Deaths](#)

Source: [CDC](#)

### [Population Data](#)

Source: US Census Bureau

### [Influenza Visits](#)

### [Lab Test Data](#)

Source: [CDC \(Fluvview\)](#)

### [Flu Shot Survey](#)

Source: [CDC](#)

## SKILLS

Data Profiling,  
Cleaning, Integration,  
and Transformation

Statistical Hypothesis  
Testing

Visual Analysis and  
Forecasting

Storytelling with Data

## TOOLS

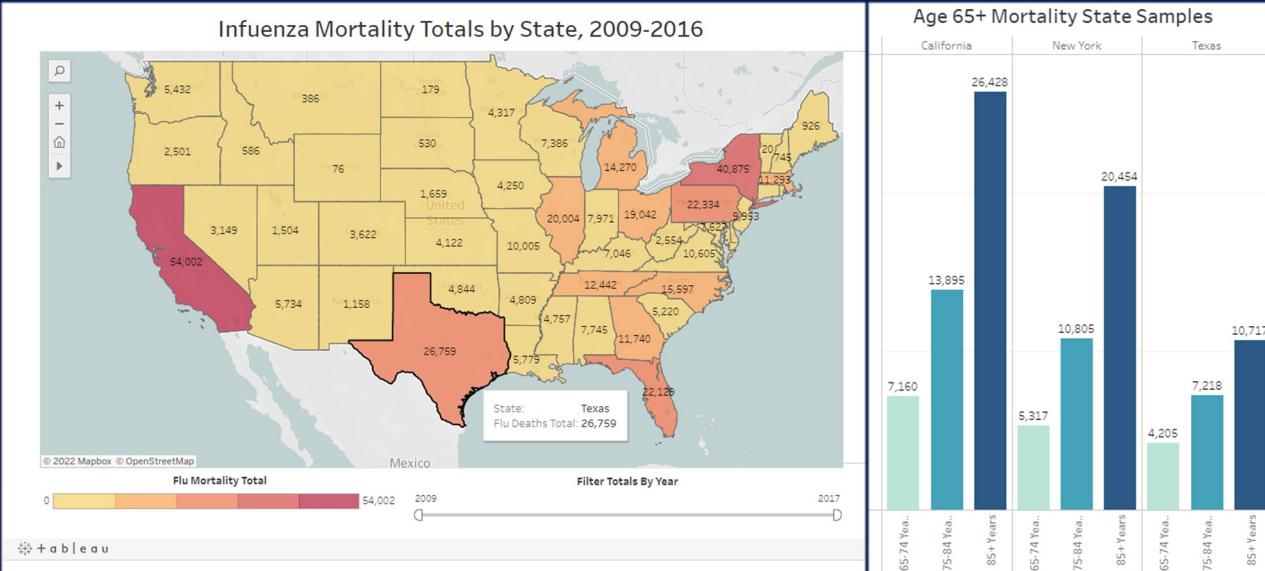
Excel

Tableau

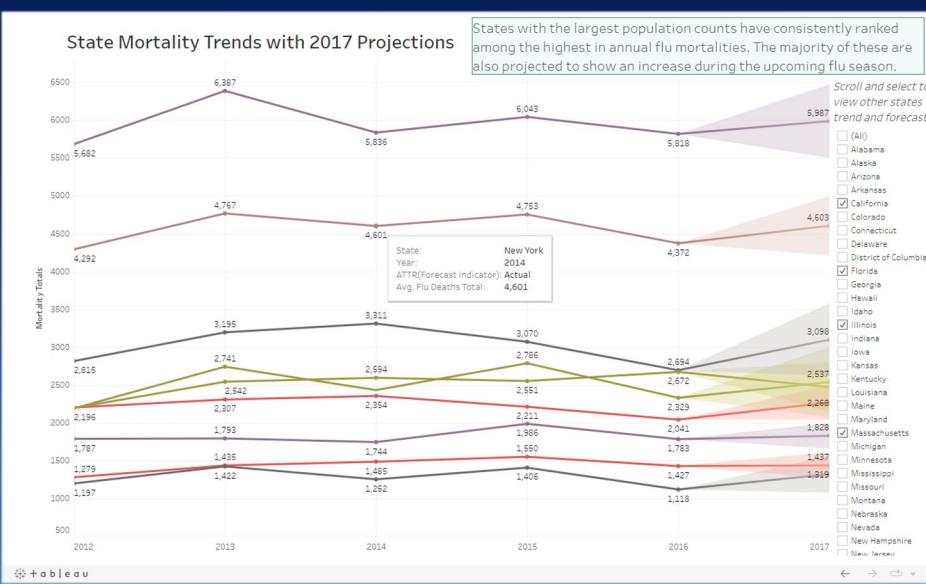
## INTERIM REPORT



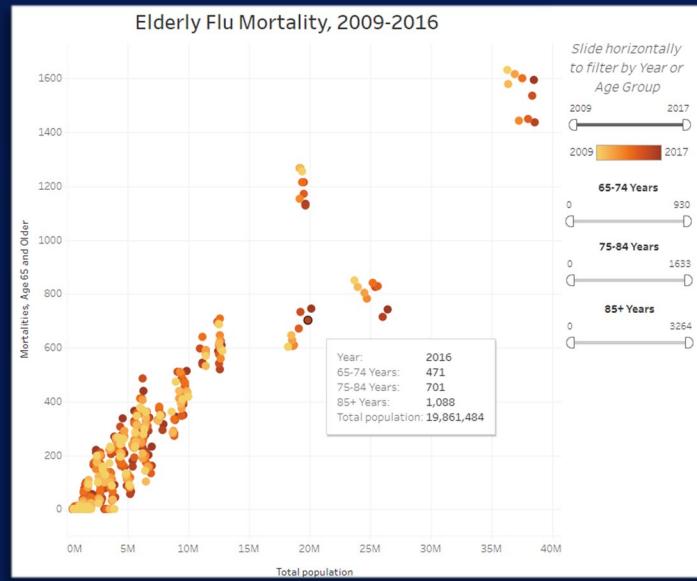
# Influenza Season Analysis



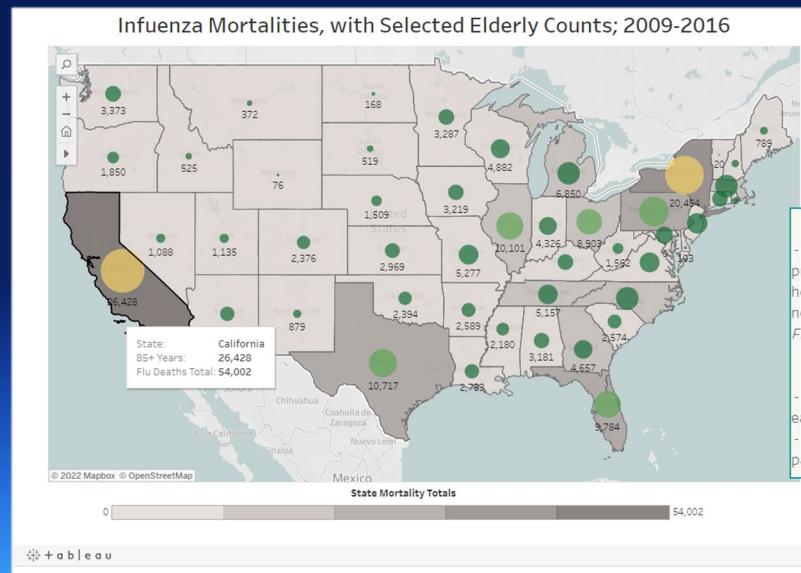
➤ Densely populated states tend to show much higher flu-related mortalities overall. These cases are notably highest among the vulnerable population, age 65 and older. This should justify increased hospital staffing to these regions for the upcoming flu season.



➤ States with the largest population counts have consistently ranked among the highest in annual flu mortalities. The majority of these are also projected to show an increase during the upcoming flu season.



- The plot shows a distinct correlation with increased influenza mortalities among all vulnerable age groups in the elderly population, relative to the total population, through the previous seven flu seasons.



- We clearly see a correlation in the US between densely populated states and increasing influenza mortality cases, especially among the elderly population.

# Summary and Proposals

## FINDINGS

There is a direct correlation in the United States between increasing influenza mortality cases and the densely populated states, particularly among the elderly population.

## RECOMMENDED ACTION

- ❖ Increase hospital staffing beyond that of previous flu seasons, among the most heavily populated states.
- ❖ Deploy staff members to these areas earlier where feasible, as budget allows.
- ❖ Place an emphasis on earlier vaccinations, particularly among the elderly population.

## FINAL REPORT



# Rockbuster Stealth Overview

				
OBJECTIVE	QUESTIONS	DATA	TOOLS	SKILLS
Apply a relational database analysis to a series of business questions with data-driven answers for use in the Rockbuster 2020 company strategy.	<ul style="list-style-type: none"><li>• Which movies contributed the most/least to revenue gain?</li><li>• What was the average rental duration for all videos?</li><li>• Which countries are Rockbuster customers based in?</li><li>• Where are customers with a high lifetime value based?</li><li>• Do sales figures vary between geographic regions?</li></ul>	<a href="#">Rockbuster Data Set</a> <a href="#">PostgreSQL Database</a>	PostgreSQL Tableau	Relational Databases Database Querying Filtering, Cleaning and Summarizing Data Table Joins and Subqueries in SQL Common Table Expressions

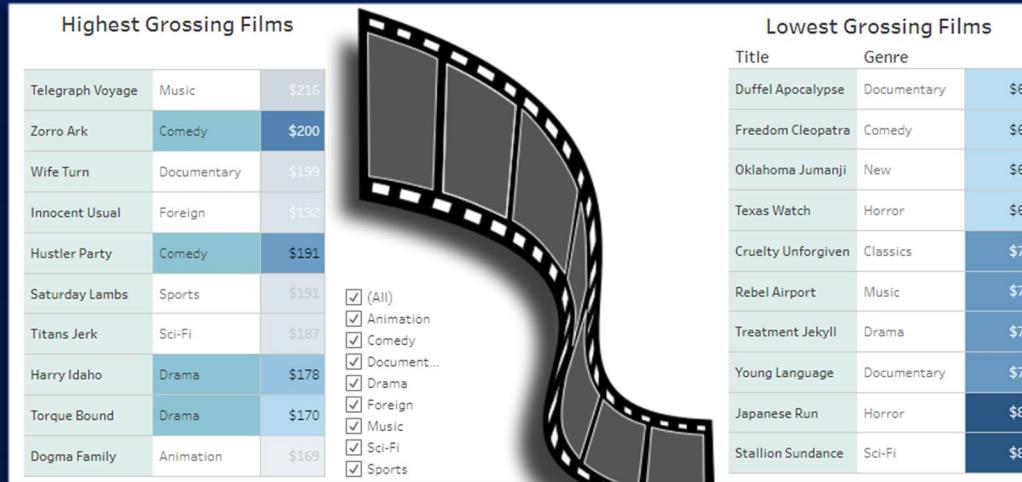


# Rockbuster Stealth Analysis

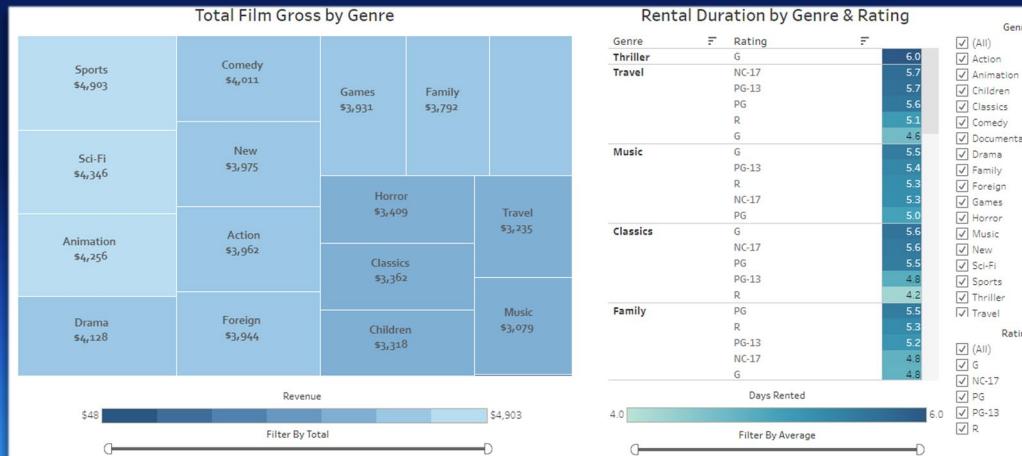
- Which movies contributed the most and least to revenue gain?

The movie which generated the most revenue was Telegraph Voyage, an outlier hit from the Music genre.

Note two appearances each from Comedy and Drama among the top grossing films. ==>



- Which film genres generated the highest revenue?
- What was the average rental duration for all videos?

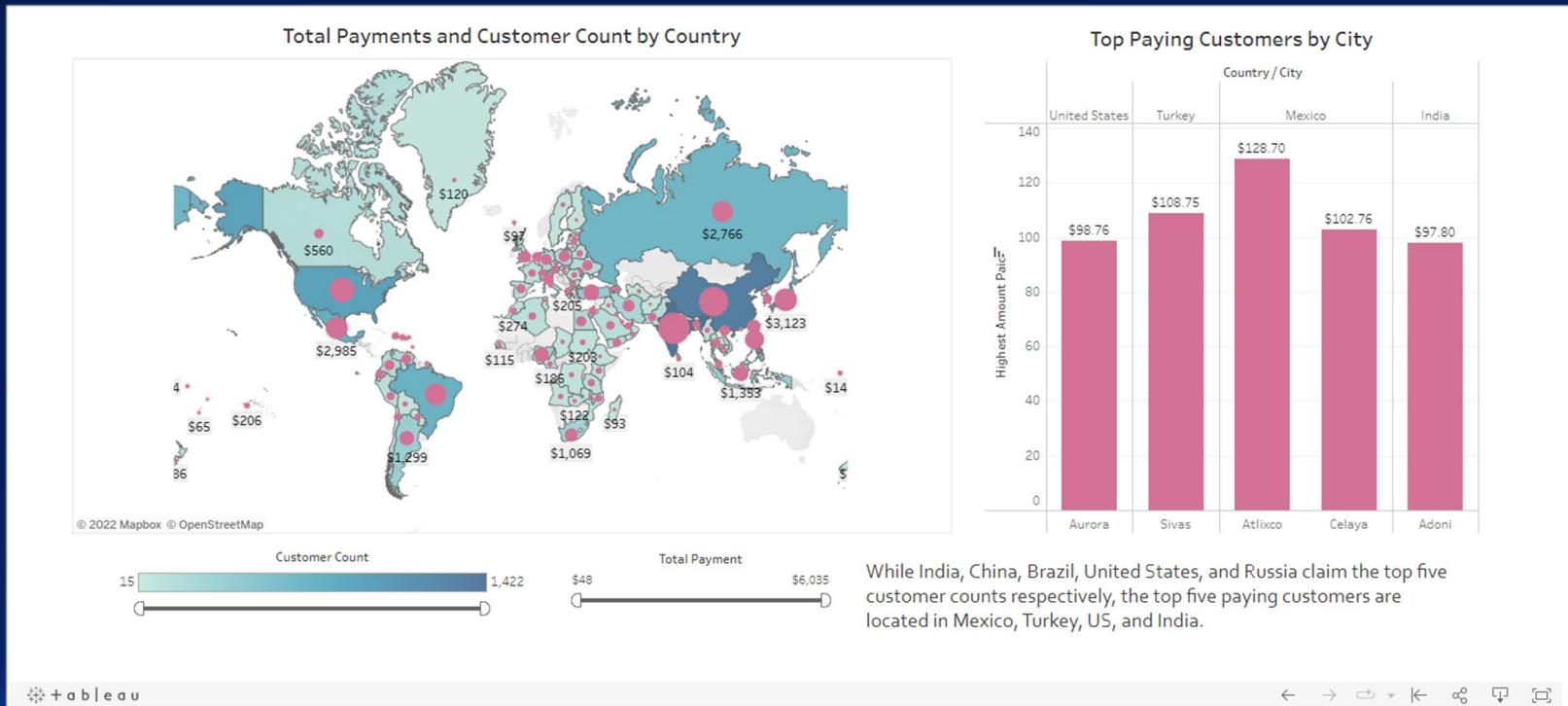


➤ Several movies of various genres were among the lowest grossing.

➤ Overall average rental duration is 5 days. While longer durations will generate greater revenue per title, there is no direct correlation with the higher grossing genres.

Sports, Sci-fi, Animation, Drama, and Comedy are clearly the top grossing categories. Therefore, expanding the Rockbuster Stealth catalog of films from these genres should lead to an increase in revenue.

- Which countries are Rockbuster Stealth customers based in?
- Do sales figures vary between various geographic regions?
- Where are customers with a high lifetime value based?



While there is no distinct correlation between high value customers and countries with high customer counts, both India and the US are home to one of the top five customers, and rank in the top five for customer count as well.

# Summary and Proposals

## FINDINGS

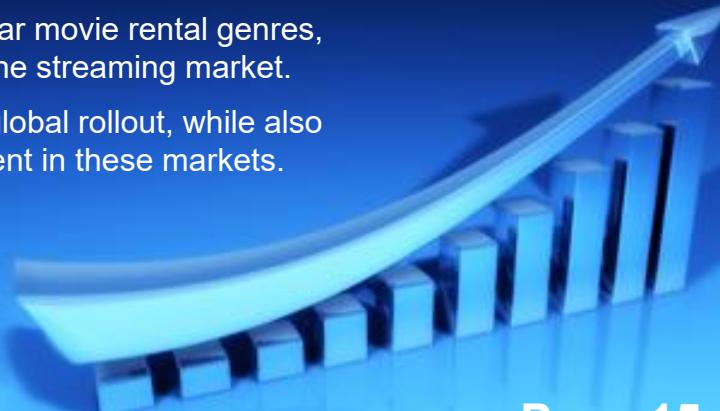
- ❖ Rockbuster Stealth has established a diverse International customer base, among the strongest being India, China, Brazil, United States, and Russia. These regions also rank the highest in overall revenue, and claim two of the top paying customers.
- ❖ Globally popular genres such as Sci-Fi, Drama, and Comedy are also among our highest grossing movie rental categories. This is ideal for the high-profile streaming market.
- ❖ These factors put Rockbuster Stealth in an ideal position to launch a highly successful online platform.



## RECOMMENDED ACTION

- ❖ In preparation to launch the online platform, we should concentrate our marketing strategy towards targeting the top five countries, in an effort to capitalize on their existing customer base.
- ❖ With Sports, Sci-fi, Animation, Drama, and Comedy being the most popular movie rental genres, increasing our film roster accordingly will optimize our strength in the online streaming market.
- ❖ Consider test marketing to the strongest International markets prior to a global rollout, while also considering any potential government restrictions regarding internet content in these markets.

## FINAL REPORT



# Instacart Overview



## OBJECTIVE

Instacart wants to target customers with applicable marketing to gauge sales of their products. Perform an exploratory analysis of Instacart data to derive insights and suggest strategies based on provided criteria.



## QUESTIONS

- What are the busiest days of the week and hours of the day?
- Are there particular times of the day when people spend the most money?
- Marketing and sales want to use simpler price range groupings to help direct their efforts.
- Are there certain types of products that are more popular than others?
- What are the different types of customers and how do their ordering behaviors differ?



## DATA

[Customers Data Set](#)

[Data Dictionary](#)

Citation (required in final report)

Source: [Instacart](#)



## TOOLS

Jupyter Notebooks

Python

Excel



## SKILLS

Data Wrangling and Consistency Checks

Combining and Exporting Data

Deriving New Variables

Grouping and Aggregating Data

Visualizing with Python

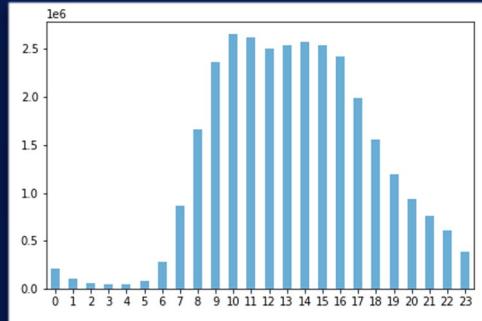
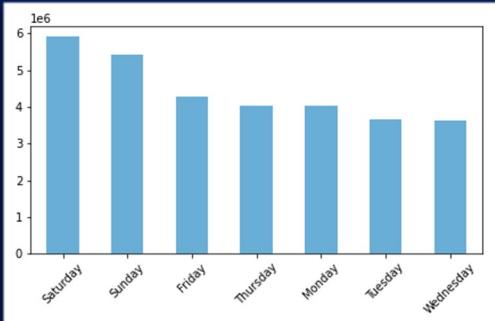
Reporting with Excel



# instacart

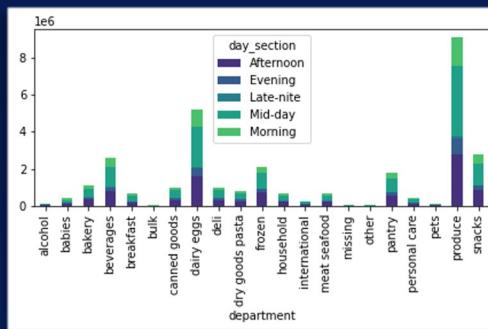
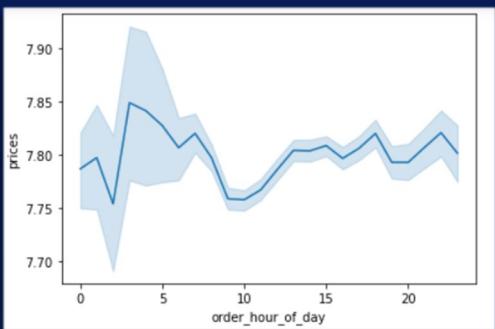
# Instacart Analysis

- The sales team needs to know what the busiest days of the week and hours of the day are in order to schedule ads at times when there are fewer orders.



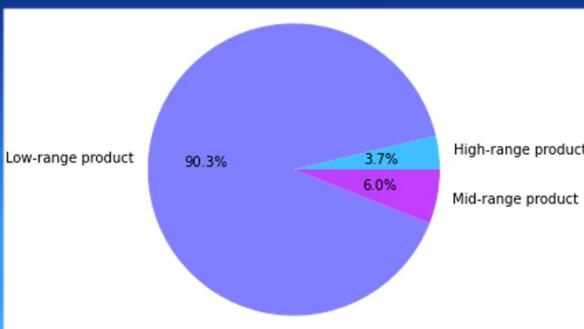
- The busiest days of the week are Saturday and Sunday, as shown in the bar chart to the left. The busiest hours are 10am to 4pm, shown as 10-16 respectively, in the chart to the right.

- They also want to know whether there are particular times of the day when people spend the most money, as this might inform the type of products they advertise at these times.



- Interestingly, we can see in the graph to the left a very slight peak in average pricing occur during the least busiest hours of the day, between 3 and 4am. While the chart on the right clearly shows a majority of Mid-day and Afternoon orders, among all of the major product departments.

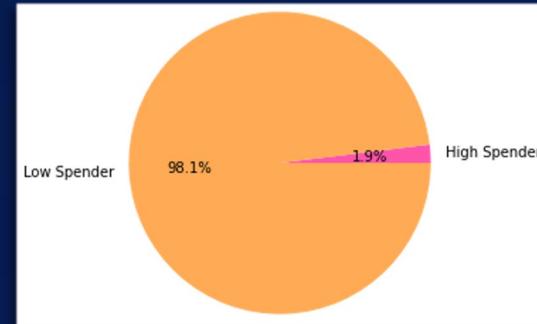
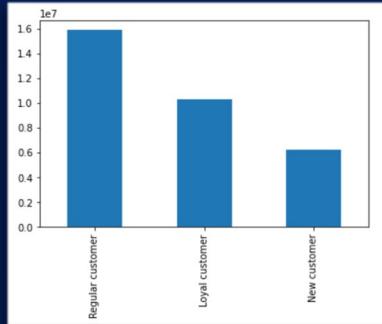
- Marketing and sales want to use simpler price range groupings to help direct their efforts.



- Clearly, the Instacart inventory is dominated by lower priced items. Both the Mid- and High-range products combined only encompass 9.7% of the entire product line.

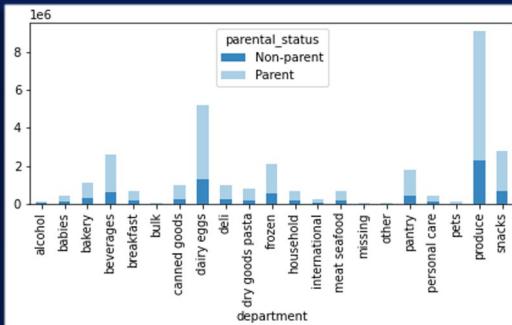
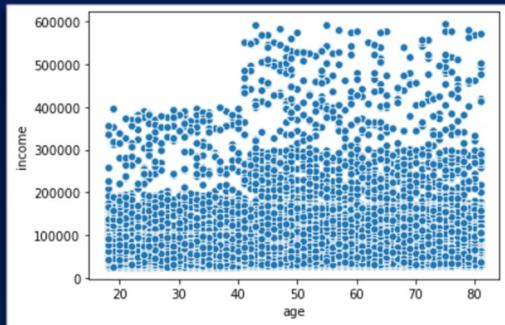


- What's the distribution among users in regards to their brand loyalty (i.e., how often do they return to Instacart)? Are there differences in ordering habits based on a customer's loyalty status?



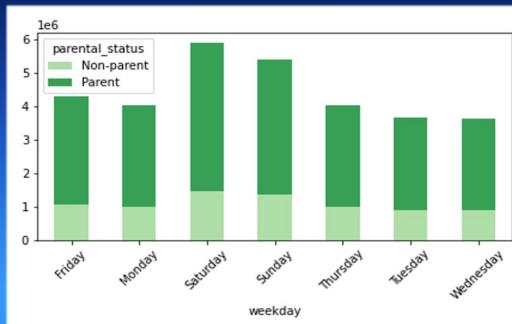
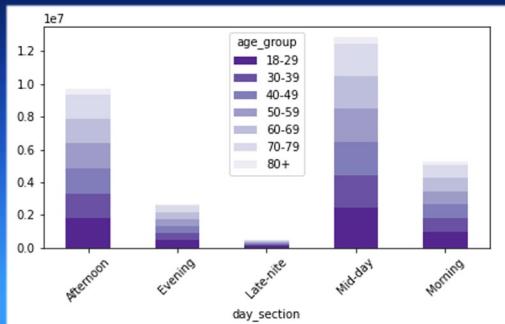
➤ As the pie chart to the left displays the data from the bar chart in clearer detail, the most returning or loyal customers make up a third of the overall customer base, at 33.2%, while regular customers are slightly over half the customer base, at 51.3%.

- What different classifications does the demographic information suggest? Age? Income? Certain types of goods? Family status?



➤ We can see in the scatterplot to the left, a distinct increase in middle and higher income ranges after the age of 40. The chart on the right clearly shows a minority of non-parent customers across virtually every product department.

- What differences in ordering habits are seen among different customer profiles?



➤ While ordering habits among the middle and older age groups show an even distribution across each section of the day, we can see a slight dominance with the youngest 18-29 group, particularly during the busiest times of day. Again there is also an obvious majority of parents, by contrast to non-parents, distinctly shown across every day of the week.

# Summary and Proposals

## FINDINGS

- ❖ The busiest days of the week are Saturday and Sunday. The busiest hours are 10am to 4pm.
- ❖ Orders are most frequent during Mid-day and Afternoon, among all of the major product departments.
- ❖ Instacart inventory is dominated by lower priced items.
- ❖ Most returning or loyal customers make up a third of the overall customer base, while regular customers are slightly over half the customer base.
- ❖ There is an increase in middle and higher income ranges after the age of 40, and a minority of non-parent customers across virtually every product department.
- ❖ Ordering habits among the middle and older age groups show an even distribution across each section of the day, with a slight dominance among the youngest 18-29 group, particularly during the busiest times of day. There is also an obvious majority of parents, by contrast to non-parents, distinctly shown across every day of the week.

## RECOMMENDED ACTION

- ❖ Run ad campaigns during weekdays, specifically Monday through Thursday, focused on increasing orders in the late-night and evening hours.
- ❖ With Produce, Dairy, Beverages, and Snacks claiming the majority of sales, increased advertising for higher priced perishables such as Meat & Seafood, as well as higher profit margin products such as Personal Care items, could potentially increase overall profits.
- ❖ It may be more appropriate to combine the Mid- and High-range products, designating these as High-range, while dividing the Low-range products somewhat proportionately, to create more equal ranges of Low- and Mid-range products.
- ❖ While there is always a marketing push to increase the count of new customers, increased incentives such as discounts and/or product promotions, would keep the regular customers returning, in effect converting them to loyal customers.
- ❖ Consider an increase in marketing towards the older age groups, as they would likely benefit highly from the Instacart business model, as well as non-parents.

## FINAL REPORT



# Pig E. Bank Overview



## OBJECTIVE

To increase customer retention, the sales team wants to identify the leading indicators that a customer will leave the bank.



## TASKS

- Use predictive analysis to identify top client loss risk factors
- Model the findings in a decision tree



## DATA

[Pig E. Bank Client Data Set](#)



## TOOLS

Excel

PowerPoint

GitHub



## SKILLS

Data Ethics

Data Mining and Cleaning

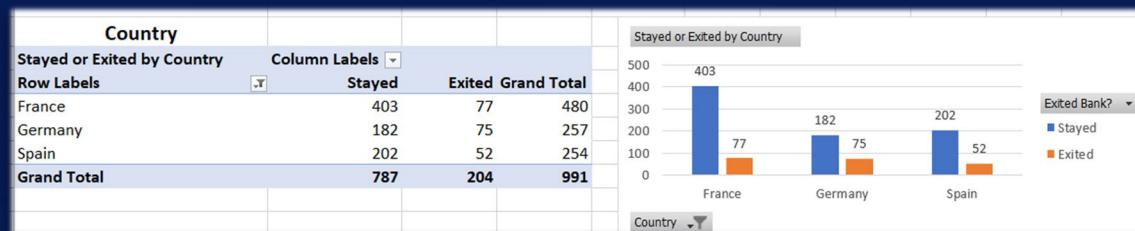
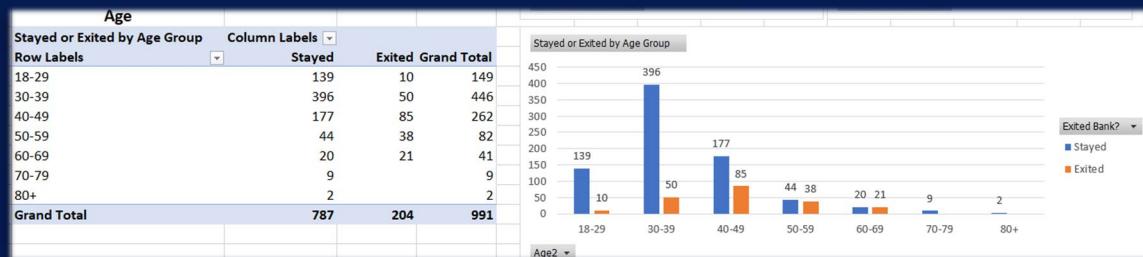
Predictive Analysis

Time-Series Analysis and Forecasting

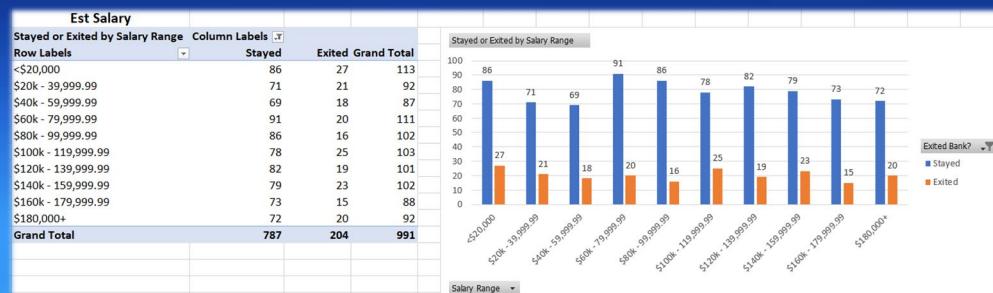
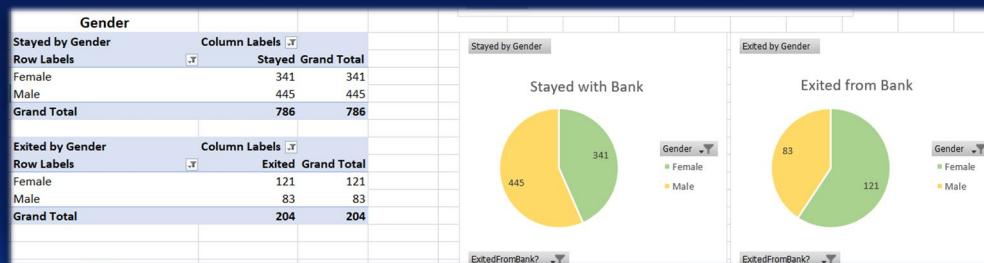


# Pig E. Bank Analysis

Nearly half the customers age 50-59 and 60-69 have exited. The likelihood of exiting the bank clearly starts to increase within the 40-49 age group, indicating a high exit risk. ======>

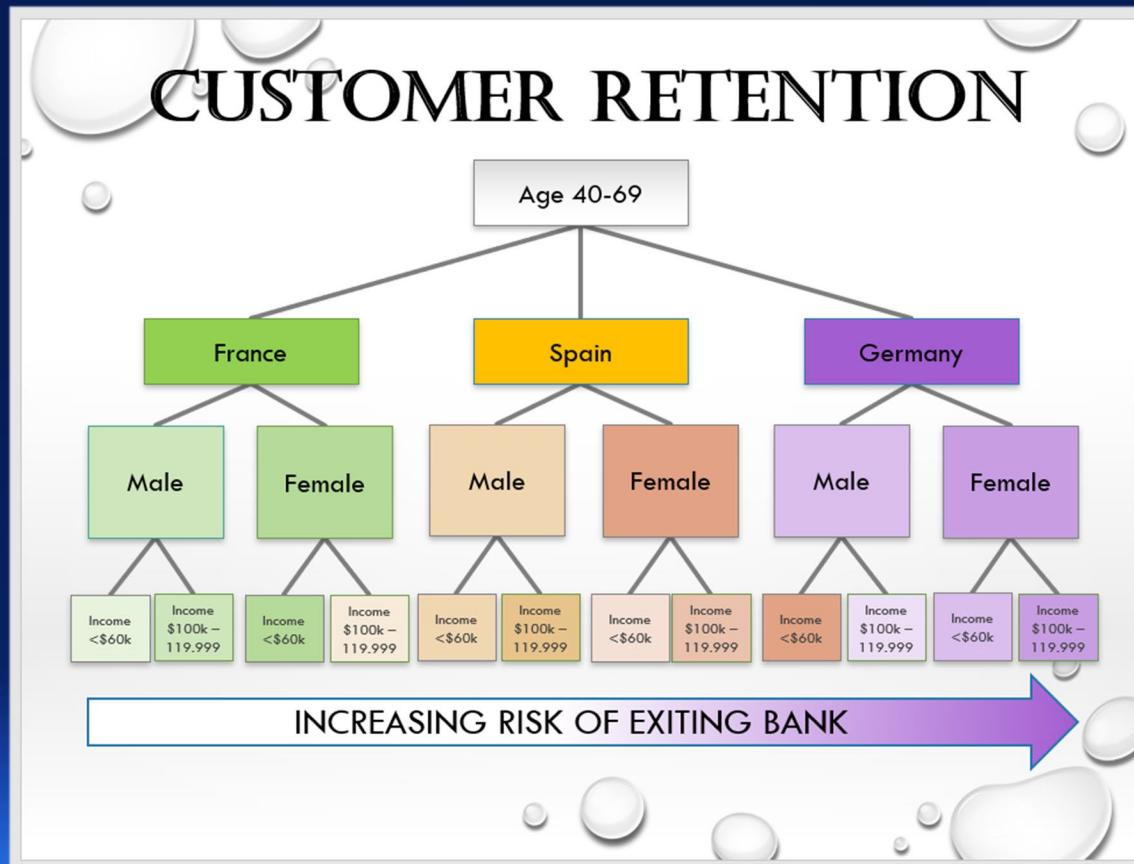


- The highest ratio of Germany's total population has exited, followed by Spain and France, respectively.



- We can generalize this data for the purpose of the analysis, stating the \$100k bracket as the highest exit risk, followed by income less than \$60k.

As indicated by the chart findings above, customers aged 40-69 show the overall highest likelihood of exiting, followed by customers based in Germany. All three countries are shown in the **decision tree**, by order of risk, in effect including the entire 40-69 population. These higher risk factors are further expanded by gender, and finally according to the two higher risk income brackets. These show higher exit by a narrow margin, although still significant.



# Statistics and Conclusion

## Age

Exited		Stayed	
Mean	45	Mean	38
Median	45	Median	36
Max	69	Max	82
Min	22	Min	18

Notably higher mean and median age indicated among those who exited.

## Balance

Exited		Stayed	
Mean	\$90,239.22	Mean	\$74,830.87
Median	\$112,433.97	Median	\$93,147.00
Max	\$213,146.20	Max	\$197,041.80
Min	\$0.00	Min	\$0.00

Mean, median, and max balance are somewhat higher with exited customers.

## Credit Score

Exited		Stayed	
Mean	637	Mean	652
Median	644	Median	657
Max	850	Max	850
Min	376	Min	411

Slightly lower mean, median and min credit scores found with exited customers.

- The highest ratio of Germany's total population has exited, followed by Spain and France, respectively.
- Clearly a higher percentage of exited customers are female, concurring with the higher male percentage among those who stayed.
- Close to half the total population of customers age 50-59 and 60-69 have exited. While the total of these age groups is notably smaller by comparison, the likelihood of exiting the bank clearly starts to increase within the 40-49 age group. This indicates a high exit risk.
- There appears to be no correlation with credit card status, among customers who stayed or exited, as the ratio of credit card holders is nearly identical among both customers who stayed or exited.
- While most stayed to exited ratios are comparable among the various income brackets, the highest exit percentages are as follows: \$100k - 24.2%; <\$20k - 23.2%; \$20k - 22.8%; \$40k - 20.6%; We can generalize this data for the purpose of the analysis, stating the \$100k bracket as the highest exit risk, followed by income less than \$60k.

## Salary

Exited		Stayed	
Mean	\$97,155.20	Mean	\$98,942.45
Median	\$100,375.40	Median	\$98,368.24
Max	\$199,725.39	Max	\$199,661.50
Min	\$417.41	Min	\$371.05

Only slight salary variations indicated between those who stayed or exited.

## FINAL REPORT





# Thank You

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