Delivery Standardization Group 1

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Balancing Cost Efficiency with Growth Potential

Sales Volume

1% Increase

Revenue

-5% Decrease

1. **Goal:** Transition low-volume customers to ARTM using white truck deliveries
2. **Risk:** Moving to ARTM prematurely could hinder revenue growth
3. **Plan**: Use data driven insights to identify customers that should remain on red truck

Descriptive Analytics: Tableau Dashboard

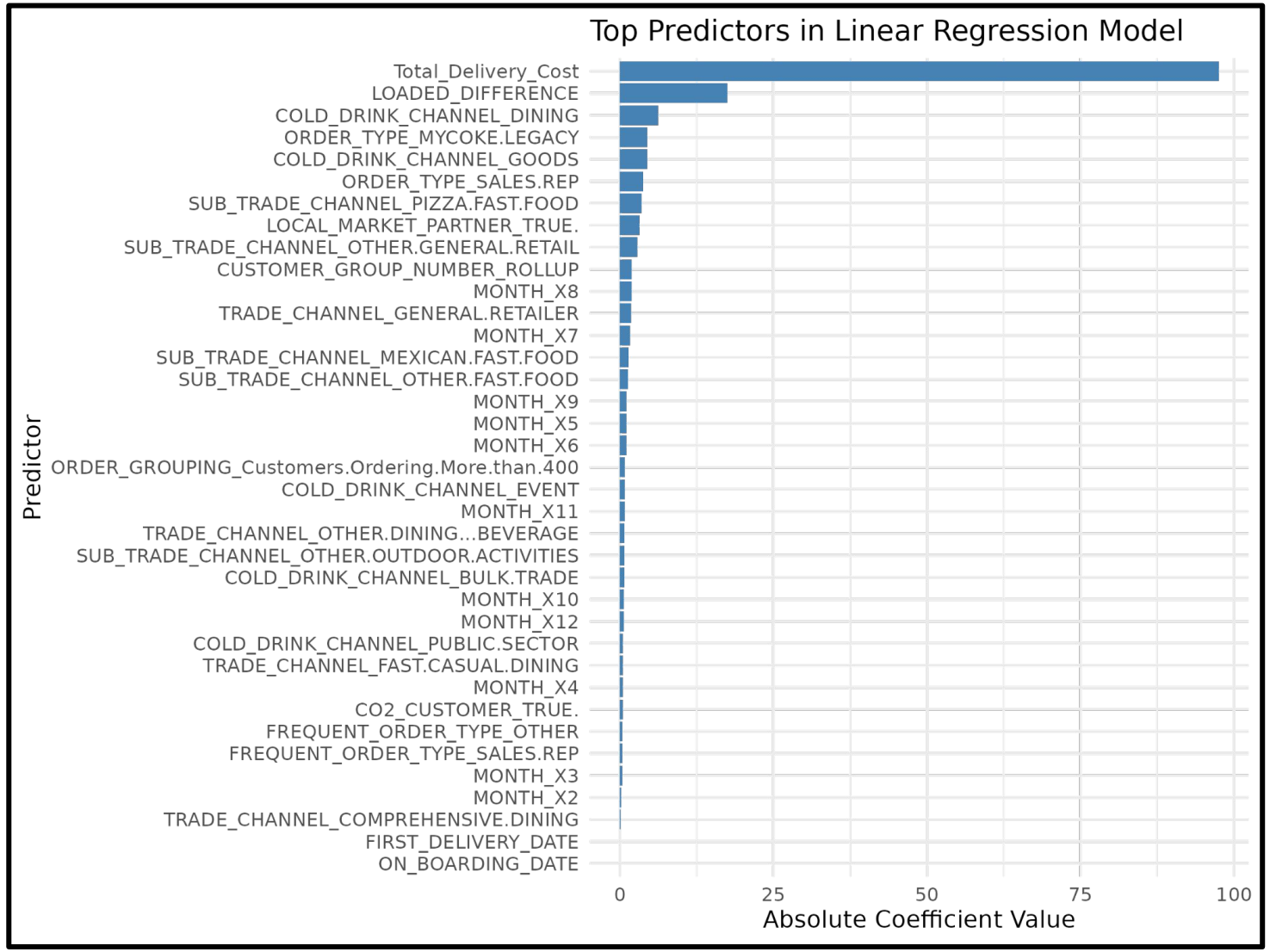
Predictive Analytics: Regression Model

Modeling Approach

- Response Variable: Total Units Ordered
- Multicollinearity present in the data
- Attempted a variety of models
- Decided on linear regression for a balance of performance and interpretability

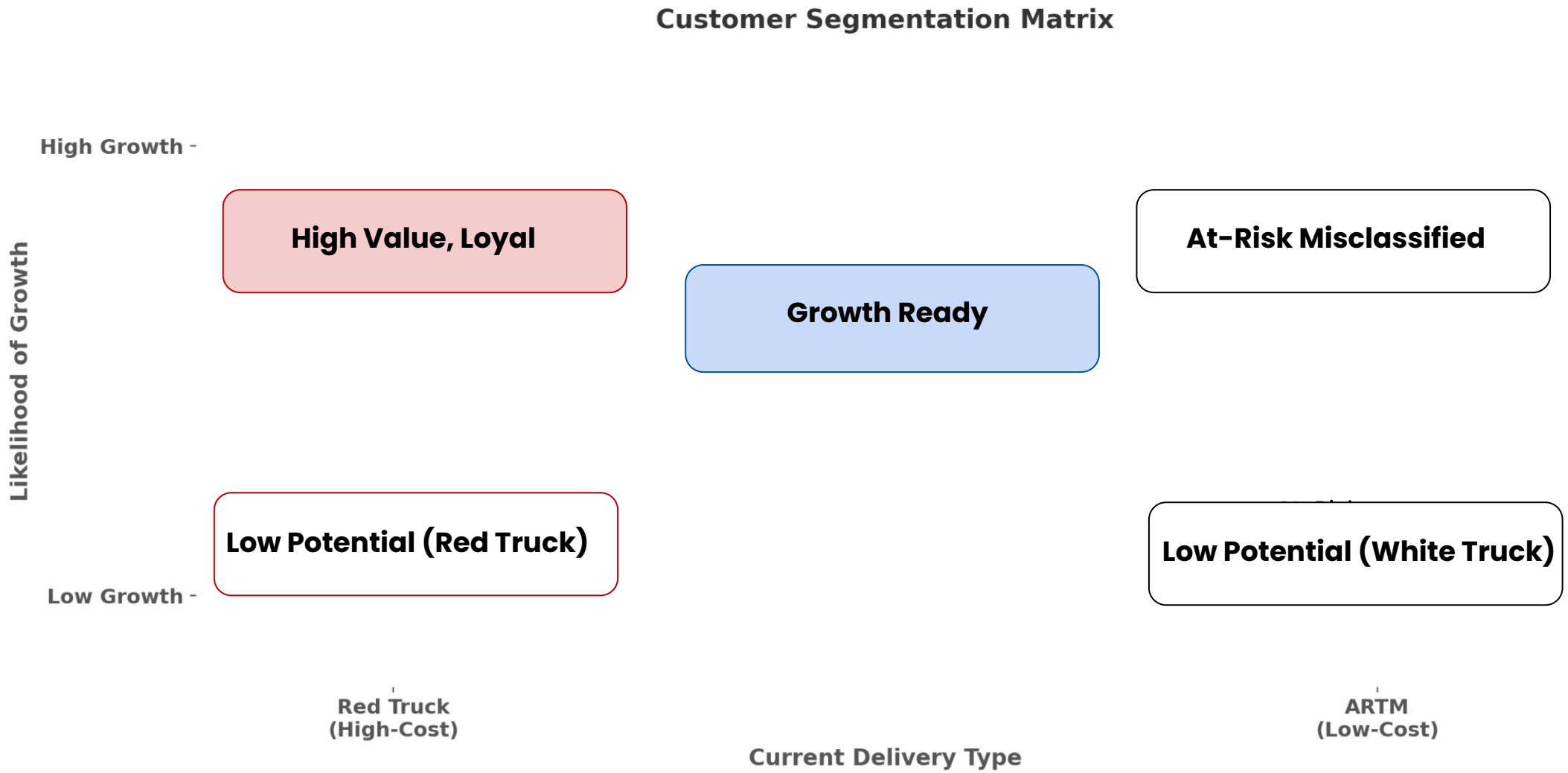
Regression Insights

- **Runtime**
  - 2.20 hours using full datasets on a high capacity server
- **Test 2023**
  - Adjusted R-squared 0.6
  - R-squared 0.56
  - RMSE is 81.90
- **Test 2024**
  - R-squared 0.57
  - RMSE is 92.6
  - Time lag present



Prescriptive Analytics: Insights

Routing Actions to Maximize Growth



Customer Example

Routing Actions to Maximize Growth

Recommendation	Insight Source & Next Step
✅ **Retain Growth-Ready & At-Risk Misclassified on Red Truck**	• Identified through segmentation matrix & regression trends • Retain red truck access to support volume lift
🔄 **Refine White Truck Routing Criteria**	• Tableau dashboard shows sub-400 gal/year accounts trending up • Move beyond fixed threshold — incorporate growth slope
👀 **Monitor Low Potential Accounts on White Truck**	• Regression & dashboard show flat/no growth • Reassess quarterly to validate classification
🚩 **Flag Near-Threshold Movers**	• Regression slope > 0 for borderline accounts • Add a flag to Tableau for proactive review

Insights powered by regression modeling, Tableau dashboard, and customer segmentation.

What's Next?

What's Next

- Regression forecasting with additional data
- Tableau Dashboard
- Clustering
- Black Box Machine Learning Models

THANK YOU

Questions?

Appendix

How to access the Tableau Dashboard

1. Download & Install Tableau Reader

   https://www.tableau.com/products/reader

2. Download the packaged Tableau dashboard

   Packaged Tableau Workbook

3. Open the packaged Tableau dashboard in Tableau Reader

Data Cleaning

- Factored categorical variables
- Transformed dates
- Removed columns with near zero variance

Feature Engineering

- Total Units Ordered: Ordered Gallons + Ordered Cases
- Total Units Loaded: Loaded Gallons + Loaded Cases
- Total Units Delivered: Delivered Gallons + Delivered Cases
- Loaded Difference: Total Units Ordered - Total Units Loaded
- Shipment Difference: Total Units Loaded - Total Units Delivered

Multicollinearity

Without accounting for multicollinearity:

- Unrealistic and inflated r-squared values

How we addressed it:

- Removed aliased coefficients
- Removed high variance inflation factors
  - Predictors with a VIF greater than 10 were removed to improve model stability.

Forecasting

We were unable to forecast future sales because of time constraints.

Possible Methodology:

- Create a simulated dataset
  - Predict predictor variables to forecast the response variable
- Feed dataset into the existing regression model

Data Improvements for Swire

Consider:

- **Customer-Level Data:** More granular insights into purchasing patterns and preferences would enable better segmentation of customers by the defined threshold. This could improve marketing efforts and help forecast demand more accurately.
- **Order-Level Data:** The data is currently aggregated by date and not Order ID. Adding additional columns such as Order IDs and timestamps to better track fulfillment trends and delivery performance.
- **Zip Code-Level Data:** Instead of blinded full addresses and zip codes, removing full addresses and having accurate zip codes would allow for demographic comparisons while maintaining data privacy.