



Grace An



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### About Lineage



The largest cold storage network in the world who is also playing a critical role in multiple global supply chains

### Problem Statement

Lineage Direct Labor Costs  
~ \$ ½ Billions  
Not Assigned to Customers



Dissect **direct labor cost** and quantify labor % for **each customer** at each Lineage warehouse

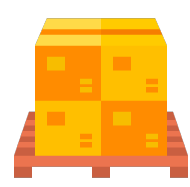
### Context & Data



**Product**  
Case Volume & Weight  
Catch Weight Information



**Transportation**  
Inbound & Outbound  
Mode of Transportation



**Volume**  
In & Out Bound Pallet (Full, Partial)  
Case Picking (Normal, Cherry)  
SKU; Blast Pallet



**RedPrairie Labor Minutes**  
Tracked Labor Minutes per Customer



**Dayforce Labor Minutes**  
Payroll Labor Minutes per Facility

### Challenges

- Not every facility have RedPrairie (Best source of truth)
- High variability among facilities and customers
- Data quality issues with RedPrairie labor data
- Model validation on facilities with no RedPrairie labor minutes (Only Dayforce labor minutes)
- Metrics generation

**Scope** PART 1: Can we make well-informed predictions when the ground truth is available? (30 Facilities with RedPrairie)  
PART 2: How can we use the model and extend it to the general dataset? (300 Other Facilities)

### PART 1 : Customer Level Model

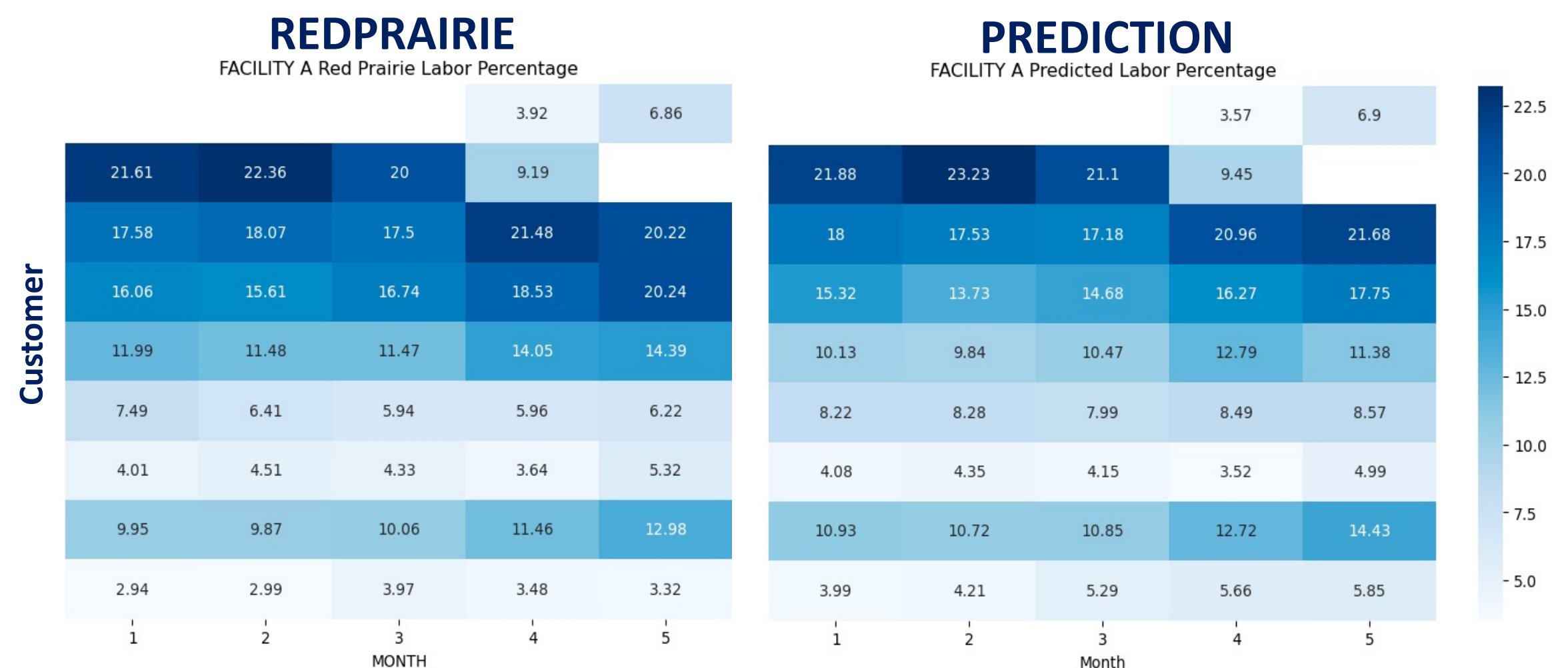
#### Feature Engineering

- Facility Level HHI Index
- Daily Volume Variabilities
- Customer size
- Customer-Volume interaction

#### Modeling

- **Linear Regression** (Selected)
- Random Forest
- XGBoost

#### Result



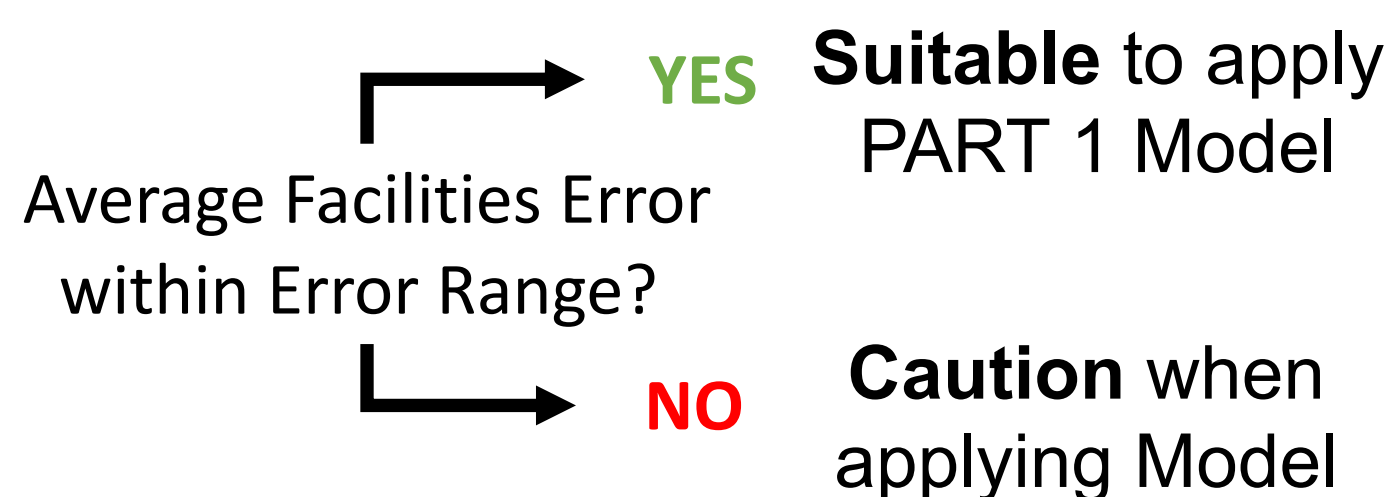
\* Only the customers with more than 3% of the total facility labor are shown on the graph

### PART 2 : Facility Level Model

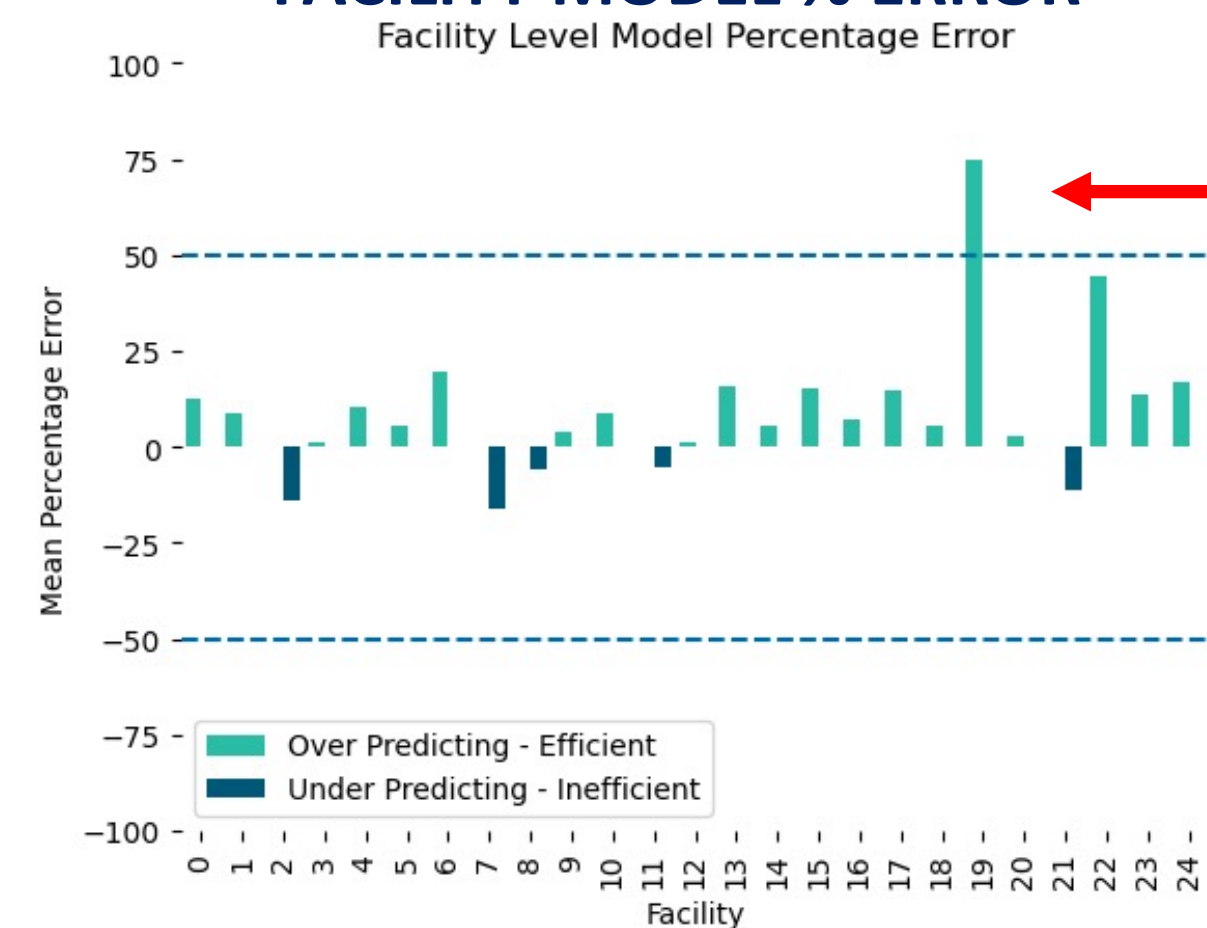
#### MODELING

- Same methodology as part 1, but trained on a **Facility Level**
- **Dayforce labor minutes** (available at all facilities) as y-variable instead of RedPrairie

#### FACILITY ERROR



#### FACILITY MODEL % ERROR

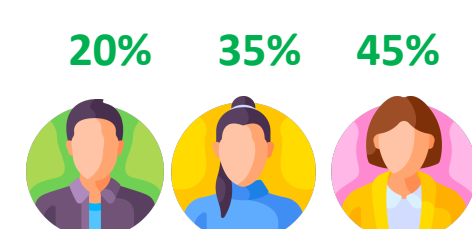


This facility has high facility level model error also doesn't perform well with customer level model

**WHY?** The customer level model is only suitable to Facility with no anomaly data & similar characteristics as the average facilities

### Business Impact

Assigned Labor cost to Customers



Identify & Replace Unprofitable Customers:  
~ \$50M increase in EBITDA

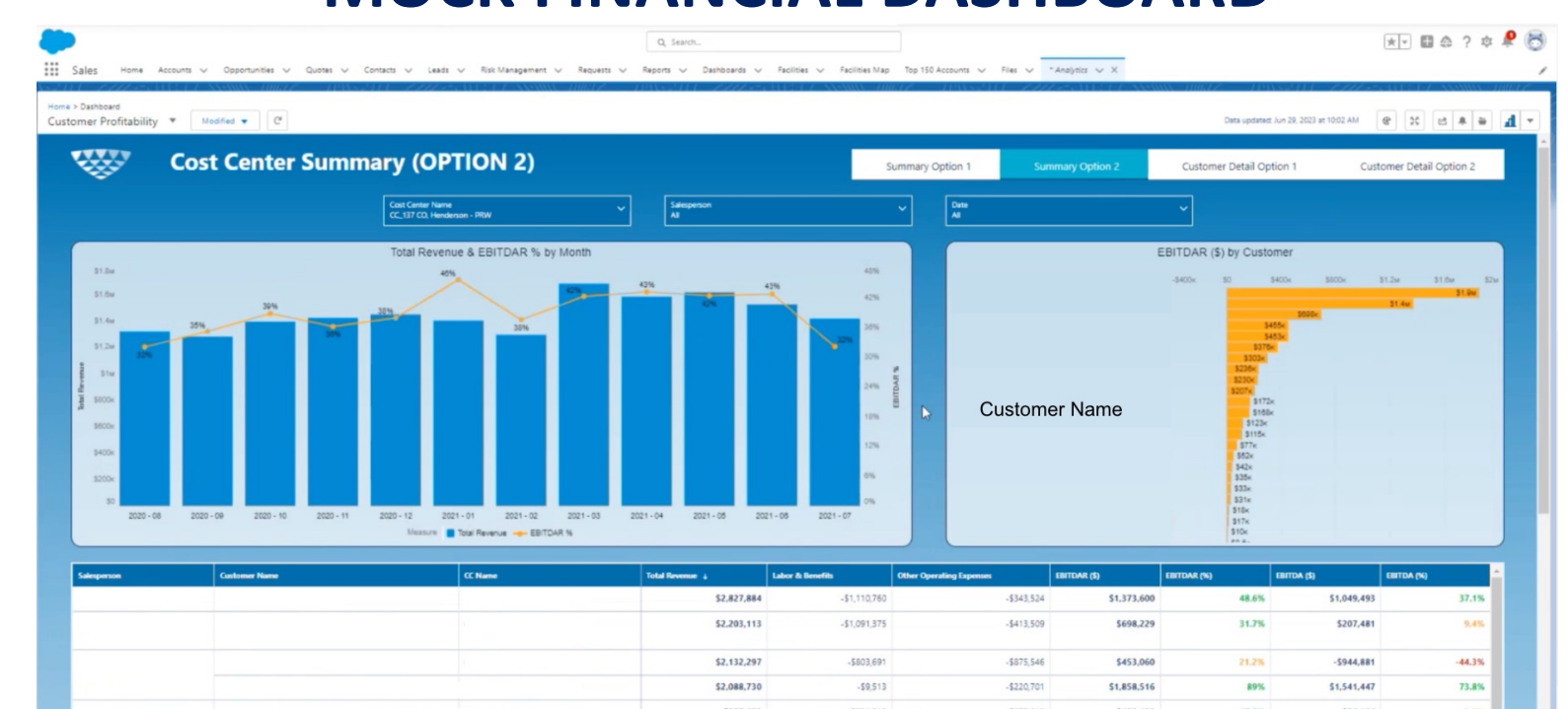
**Save Cost:** Labor tracking system (e.g. Red Prairie) Cost ~ 50K to 1M to install per facility

**Save Labor:** Save time used to manually map costs to customers

### Next Step

1. Feed prediction into Finance dashboard
2. Apply model to more facilities
3. Develop a feedback loop for model iteration to prevent model drift

#### MOCK FINANCIAL DASHBOARD



Mock finance dashboard where profitability by customers is clearly displayed