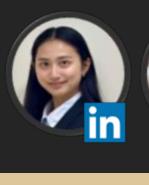
Data-Driven Strategies for Operational Growth Real-Time E-Commerce Dashboard & Automated Scenario Modeling for Production Efficiency





















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BUSINESS PROBLEM

Background

Facing market decline and a shrinking customer base, we are collaborating with industry partners to analyze the competitive landscape and internal operations to develop advertising and production strategies for growth.



Pain Issues

Advertising Aspect:

- Shift from BnM to Amazon
- Retailers' shift to other cagotries

Business Objectives



Advertising Aspect: Develop ad strategies to increase brand exposure, attract new customers, boost sales, and enhance customers satisfaction and loyalty

Expected Benefits















Production Aspect:

Production Aspect:

production scenarios

Underutilized production factory

Low margins & customer

contribution on products

Optimize production efficiency

and reduce costs by analyzing

outsourcing vs. in-house

Attract more Customers

■ Profit ■ Retail Units

DATA AT HAND

Data Sources



Sales, Profit, Cost (Data Points: 70,000+)



Ad Performance Metrics



Category level (50⁺ Categories)

High sales don't always equal high profits focus on optimizing margins

Data Insights

Strategic Outsourcing:

Margin Management:

Independent product categories enable outsourcing without impacting overall profits

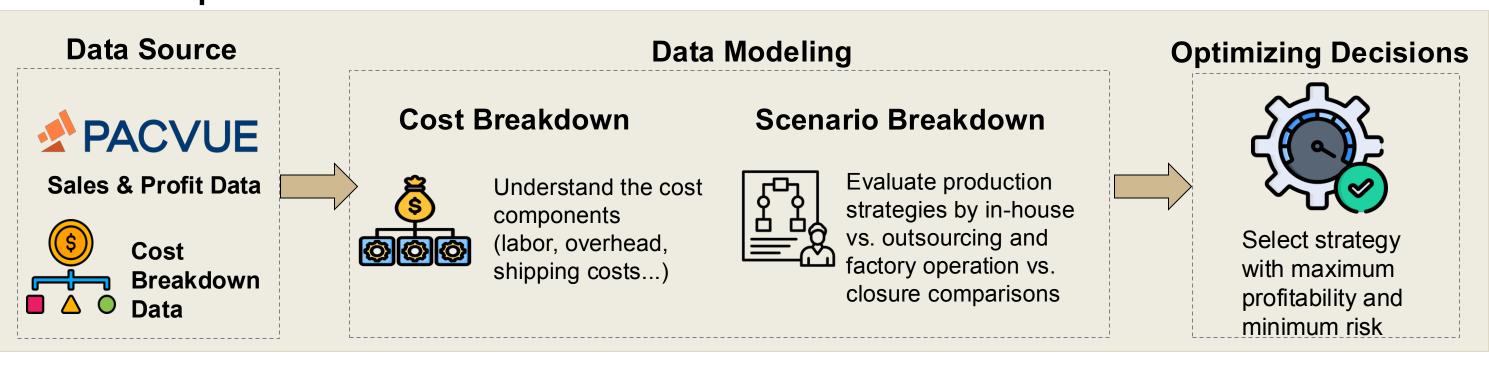
Brand Focus:

Prioritize high-performing brands within each category to maximize profitability

ANALYTICS FRAMEWORK

Advertising Aspect Predictive Modeling Data Source Ad Strategies Linear Regression Model ♣ PACVUE Identify the best product categories for Sales & Profit Data Profitero **XGBoost & LSTM Model** Ad strategies aligned with budget and Predict ad sales and clicks based on **Ad Data** optimal ad timing previous stats

Production Aspect



METHODOLOGY





• Underutilized • Shift from BnM to factory Amazon

Data Understanding

· Data Sources: Pacvue,

Granularity: Category

Material. Ad Metrics, etc.

· Metrics: Overheads,

- Outsourcing Some products are failing
- Retailers' shift from current category to other categories
- Exploratory Data Analysis • Feature Selection: Key features impacting ad performance

Data Modeling

Model Selection: Linear

cost modeling

Regression, LSTM, XG

Boost, Scenario-based

and testing sets (80 vs.

Model Training: training

- Trend Analysis: Visualize past trends in ad sales and ad clicks
- Pattern Identification: Evaluate ad optimal timing by month & week

Data Preprocessing

Feature Engineering

One-hot Encoding

Calculated profit

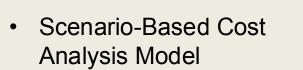
Identified holidays

Time-based Segmentation

Data Cleaning

Model Operationalization · Dashboards for ad





Model Evaluation

Evaluation Metrics

• Linear regression:

XG Boost & LSTM:

(MSE), R² score

Feature importance

Mean Squared Error

Implementation of Automated **Dashboards**

Deploy Tableau/PowerBI to track real time performance of the changing market



Integration with Business Operations

Implement data pipelines connecting cost data and sales volume for dynamic decision making



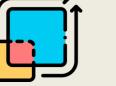
Risk Mitigation & Future

contingency strategy for different budgets



Model Monitoring Establish model performance tracking and

periodic retraining to further fine tune models



Extend existing models to new product categories and provide predictive alerts for future overruns across different regions

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Model Purpose

MODELLING & RESULTS



Model Purpose

Predict ad sales

and clicks using

inform future ad

and off-peak

periods

historical data to

investment at peak

Model Purpose

Identify the most

cost-effective and

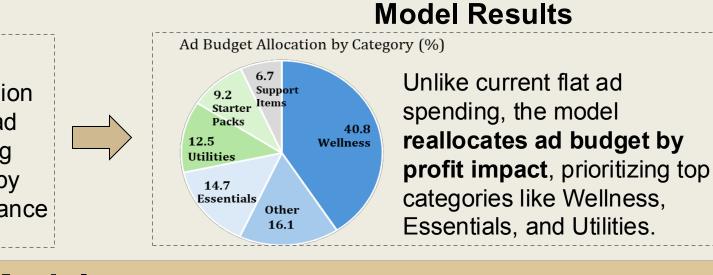
analyzing sales,

costs, and profit

scenario by

strategically viable

Model Building Linear regression Ordered Revenue revealed key ad features driving Organic Sales profit, ranked by feature importance



Dynamic Ad Return Model

Targeted Ad Product Model



2025-02-01 2025-02-08 2025-02-15 2025-02-22 2025-03-0

XGBoost Model: Identify key drivers LSTM Model: Capture time series patterns and predict short-term performance—and predict future Ad Sales & Ad Clicks

MSE measures prediction error - lower is better. R² Score reflects how well it explains variance- closer to 1 is better XGBoost outperforms LSTM with lower error and better fit

Model Results

Both Models: Higher prediction error in March 2025 likely stems from limited recent data, as the model was trained just before that period.

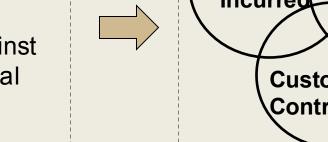
Scenario-based Cost Analysis Model Model Building

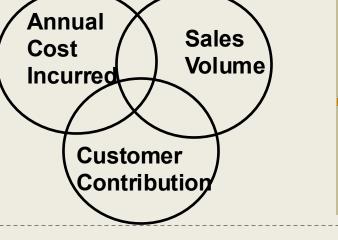
Conducted analysis to estimate Compared estimated figures against the status quo to evaluate financial

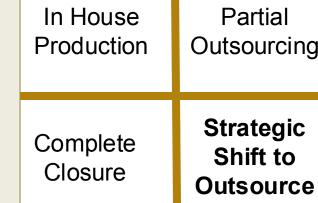
DEPLOYMENT & LIFE CYCLE MANAGEMENT

and strategic viability

potential costs for each scenario







Model Results

