Trojan Airline

Pricing Optimization Strategy

DSO 570 Assignment Business Report for Case- Simulation Modeling: Pricing a Single Flight

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Executive Summary

Trojan Airlines is examining its policy in pricing its LAX to SFO departure on Thursday evenings in order to optimize the revenue. The current pricing strategy is one constant price throughout 180 days before departure. Alternative pricing strategies can be a) Increase the price for the last 14 days or b) Increase the price after a certain number of tickets have been sold.

Optimization models were built within Python and projected revenue, as well as parameters used in the models, were calculated for each of the pricing strategies. Based on the models and calculation, we recommend Trojan Airlines take the following approach: set the initial price at $230, and increase the price to $320 when 59 tickets are sold. The expected revenue was $3647. This expected revenue is 48.60% higher than the expected revenue of current policy, and 12.50% higher than that of the RM policy 1, and is likely due to the flexibility allowed in this strategy.

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Situation Analysis

Trojan Airlines is examining its policy in pricing its LAX to SFO departure on Thursday evenings. The current pricing strategy is one constant price throughout the selling horizon, which is 180 days before departure. There are 100 seats on this flight (all economy class) and the fixed cost for operating each time is about $20,000.

Target Market Segment

There are two main customer segments: **business customers** and **leisure customers**. The differences are listed below:

- ***Leisure customers***
  - Plan ahead when buying tickets
  - Willingness to pay is low
- ***Business customers***
  - Purchase tickets promptly
  - Willingness to pay is high

Objectives

To optimize the revenue by finding the best pricing strategy among the three possible approaches.

- ***Current Strategy:*** constant price
- ***RM policy 1:*** increase the price for the last 14 days.
- ***RM policy 2:*** increase the price after a certain number of tickets have been sold.

Methodology

For each of the three pricing strategies, optimization models were built to run 100 iterations on the simulated dataset with all uncertain values. Revenue was calculated based on the simulation results. The following assumptions were used for the modeling. Comparison between the three models was done with the expected revenue calculated for all three pricing strategies.

Assumptions

- For each pricing policy, the price is a multiple of 5 dollars, and that the optimal such price is used.
- For both market segments, sizes of customer segments and willingness to pay both follow a normal distribution, times of purchase follow a uniform distribution.

UNCERTAIN VALUE	DISTRIBUTION	PARAMETER 1	PARAMETER 2
SIZE OF LISURE CUSTOMERS	Normal Distribution	Mean =200	Standard Deviation = 60
WILLINGNESS TO PAY: LISURE	Normal Distribution	Mean =200	Standard Deviation = 80
TIME OF PURCHASE: LISURE	Uniform Distribution	Length=180	
SIZE OF BUSINESS CUSTOMERS	Normal Distribution	Mean =60	Standard Deviation = 20
WILLINGNESS TO PAY: BUSINESS	Normal Distribution	Mean =350	Standard Deviation = 120
TIME OF PURCHASE: BUSINESS	Uniform Distribution	Length=14	

Model Building

- ***Model Running Platform: Python***
- ***Current Strategy: Constant Price***
  - Uncertainty: Price, willingness to pay
  - Capacity: 100 tickets
  - Tradeoff: High price: high profit margin but low customer volume (can't fill the capacity);
    Low price: low profit margin but high customer volume (go over the capacity)
  - Model Logic: Simulate and find the price that there is a minimal waste of capacity

- ***RM policy 1: increase the price for the last 14 days.***
  - Uncertainty: Price before change, Price after change, willingness to pay, purchase time
  - Capacity: 100 tickets
  - Tradeoff: high initial price: saving capacity for business customers (the high profit margin segment), but demand for business customers is low (can't fill the capacity);
    low initial price: appeal to leisure customers with high customer volume, might go over the capacity before business segments' needs are satisfied (lose profit)
  - Model Logic: sell the right amount of the tickets at the first stage so that demand for business customers can be meet (no waste of capacity, high profit)

- ***RM policy 2: increase the price after a certain number of tickets have been sold.***
  - Uncertainty: Price before change, Price after change, willingness to pay, purchase time
  - Capacity: 100 tickets
  - Tradeoff: high initial price: saving capacity for business customers (the high profit margin segment), but demand for business customers is low (can't fill the capacity);
    low initial price: appeal to leisure customers with high customer volume, might go over the capacity before business segments' needs are satisfied (lose profit)
  - Model Logic: sell the right amount of the tickets at the first stage so that demand for business customers can be meet (no waste of capacity, high profit)

Results

Current Strategy

- For current constant price strategy, the optimal strategy:
  - The constant price is $245 dollars,
  - The expected profit is $2454.25

RM policy 1: increase the price for the last 14 days

- For RM Policy 1, the optimal strategy:
  - The initial price is $235 dollars,
  - The adjusted price is $310 dollars,
  - The expected profit is $3241.85

RM policy 2: increase the price after a certain number of tickets have been sold

- For RM Policy 2, the optimal strategy:
  - The initial price is $230 dollars,
  - The adjusted price is $320 dollars,
  - The adjustment happens when 59 tickets are sold,
  - The expected profit is $3647.0

Conclusions & Recommendations

The simulations model shows that the best performing strategy will be the PM policy 2 with the expected revenue being $3647, 48.60% higher than the expected revenue of current policy, and 12.50% higher than that of the RM policy 1. The performance of the PM policy 2 makes sense as it allows the most uncertainty within the three models and therefore can yield the best performance.

Based on the results, the recommendation is to switch to the RM Policy 2 and set the initial price as $230 dollars, and when 59 tickets are sold, increase the price to $320 dollars.