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A Revenue Management Analysis of a High Speed Rail Fare System using a Transaction Data Based Network Simulation Model
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By

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EXECUTIVE SUMMARY

Overview

Demand for high-speed rail (HSR) within OpCity has been growing consistently over the past few years. The short travel time previously only associated with the airline industry is now a benefit shared by the OpCity HSR system operated by the company OpRail. In addition, OpRail offers consistently on-time, fast service without the delays and security-related hassles of air travel. These factors have made HSR travel a convenient and reliable choice for travelers, and have led to an increase in market share for OpRail; however, this rise in passenger demand has also made efficient fare class and seat allocation policies increasingly important for these operators. As a result, OpRail has begun to invest additional resources in revenue management, a field devoted to analyzing and influencing customer behavior through asset allocation and pricing policies. This study is focused on using transaction data extracted from OpRail Information Systems to perform a revenue management analysis of OpRail’s new fare structure and to help make recommendations on implementing similar fare structures.

Approach

Transaction data from the month of February 2009 was used to estimate the demand profile for the various fare classes offered by OpRail. The scenario chosen was the OpCityA-OpCityE corridor, as this was the most mature corridor at the time of the study. These numbers were then modified using a special algorithm to estimate the primary demand, meaning the demand that would have occurred without capacity and fare class availability constraints. These two demand types, observed and primary, were then used to determine the optimal seat allocations policies. A seat allocation policy refers to the number of seats that are sold for a specific fare class. This quantity is typically called the booking limit, as it represents the limit on the number of bookings allowed. A comparison of the optimal calculated policies to the existing policies at OpRail provided insight into how the company could better perform.

Results

Based upon the analyses conducted using the approach mentioned, there were many critical findings that showed key areas to focus in when developing and analyzing fare structures. Analysis of the booking profiles showed that many of the fare class offerings were reaching capacity earlier than expected, while others were not close to their associated booking limits by the end of their period of availability. In addition, cancellation restrictions had a major impact on
the number of both bookings and cancellations seen for the fare classes. Lastly, capacity decisions often led to poor capacity utilization across OpRail trains.

**Recommendations**

**Lengthen Booking Period**
The length of the booking period determines both when customers can start purchasing tickets and when a train will start generating revenue. Unless there is a specific reason to prevent customers from reserving tickets for a train months in advance, such as uncertainty in train schedules or capacity, this activity should be allowed as soon as a train schedule is published.

**Link Fare Class Availability and Booking Limits**
The period of availability of a fare class determines when customers can actually purchase within the fare class. The booking limit determines the number of purchases customers can make when the fare class is available. If the period of availability of a fare class does allow ample time for the established booking limit to be reached, either the booking limit should be minimized or the period should be lengthened.

**Anticipate Ticket Cancellations**
Ticket cancellations can have a major impact, both negative and positive, on revenues. Instead of treating these events like they are inevitable and uncontrollable, fare systems should be designed based upon expectations of customer cancellation and change rates. Of course, a fare system with no cancellation and change rates can remove the negatives associated with these events, as is seen in much of the airline industry; however, supplemental revenue through cancellations and changes can be a great enhancement to a company's balance income. In addition, harsh ticket restrictions may actually deter potential customers from making purchases, which is worse than a cancelled ticket.

**Control Capacity Decisions**
In the transport industry, customer demand can influence schedules, but it should not control them. Capacity should not only be allocated to meet customer needs, but to also minimize losses associated with unused seats. Before making decisions about adding a new train or increasing the capacity of an existing train, current capacity utilization amongst trains within the same period should be analyzed to see if such additions can be avoided.