Quality of Service Index (QSI)

Airports Council International
2018 Air Service & Data Planning Seminar
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Agenda

- Introduction
- QSI Overview
- Answering Questions with QSI
- Historical Development of QSI Methodologies
- Factors Affecting QSI Today vs. Pre-Deregulation
- Using QSI
- QSI Example
- Discussion / Q&A

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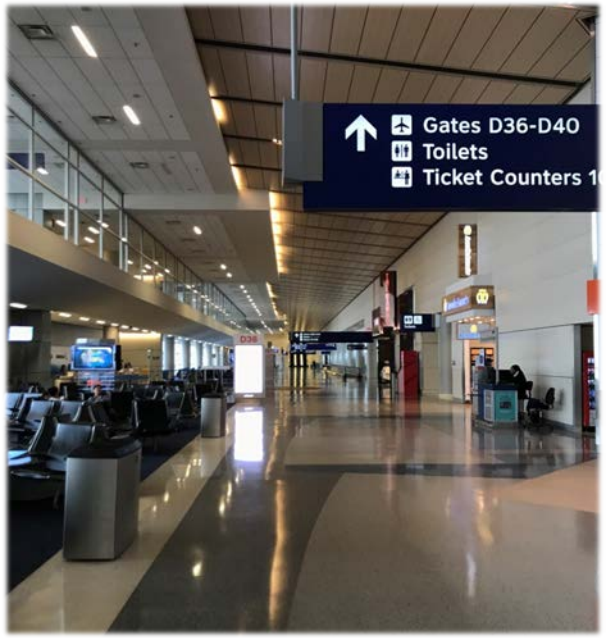

Introduction

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Airlines Place Emphasis on *Data* to Select New Markets

- Local & Connecting Demand + Potential
- Fare Environment
- Corporate Travelers
- Compatibility with Network Strategy
- Equipment Availability
- Point-of-Sale Mix
- Long-Term Prospects for Profitability

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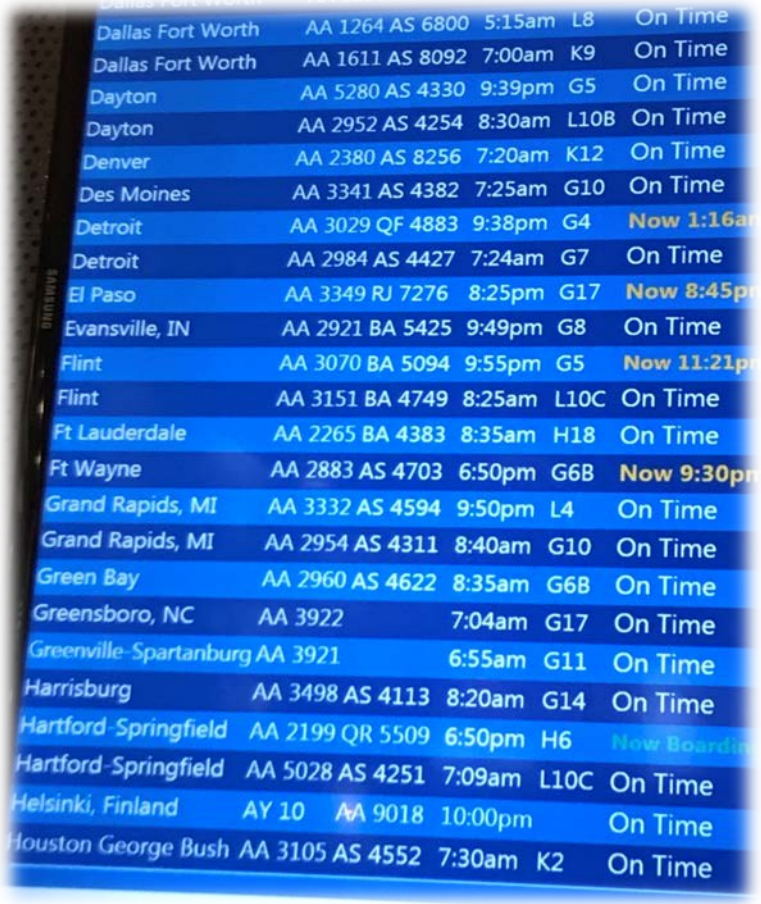
Good QSI is Essential to Good Market Forecasting

- Air service development is much more than data, but when you talk to airlines about new opportunities, you need to know how the data will help them predict success.
- This likelihood has long been measured by Quality of Service Index ("QSI") methodologies.
- QSI results help quantify market share, prognosticate predicted passenger traffic, and ultimately help forecast a route's likely profitability.
- Because each airline uses its own model to predict passenger behavior and traffic, having your own analysis gives you a basis to discuss your market's opportunities with network planners.



"You add 1 QSI apple to a basket of 2 existing QSI apples. You now have 3 QSI apples in the basket. The new QSI apple you added is 33% of the total QSI apples in the basket."

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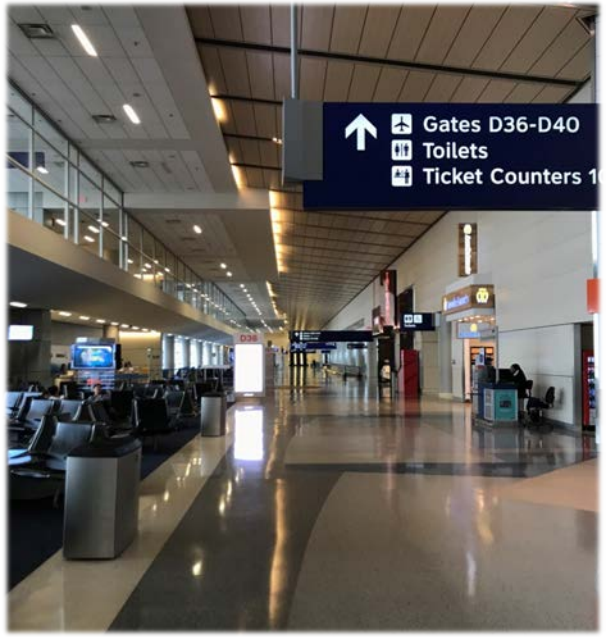

QSI Overview

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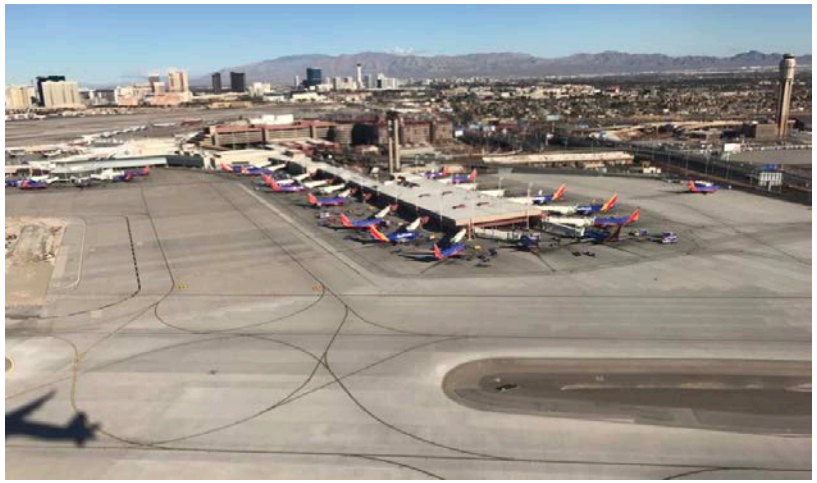
QSI Sounds Simple Enough, but then You Have to Build It…

- Determine the often-subjective factors that passengers consider when choosing flights.
- Incorporate these factors in quantitative weighting system.
- Calibrate the coefficients based on hard empirical data.
- Apply coefficients to predict how traffic will divide between competing airlines and services.



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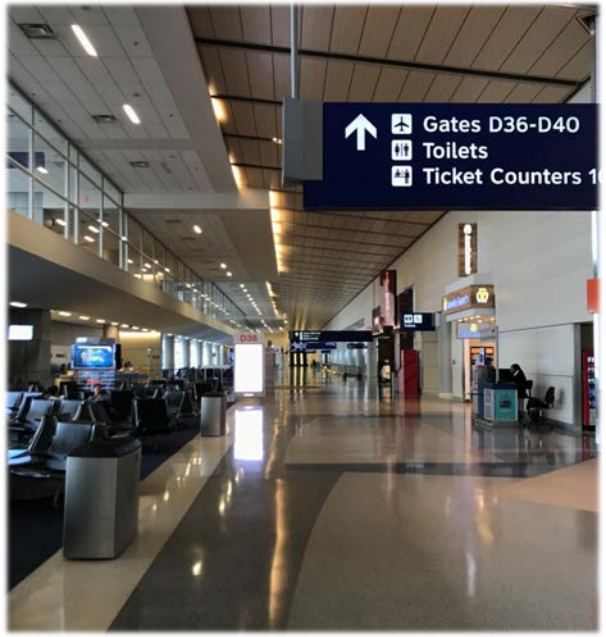

Answering Questions with QSI

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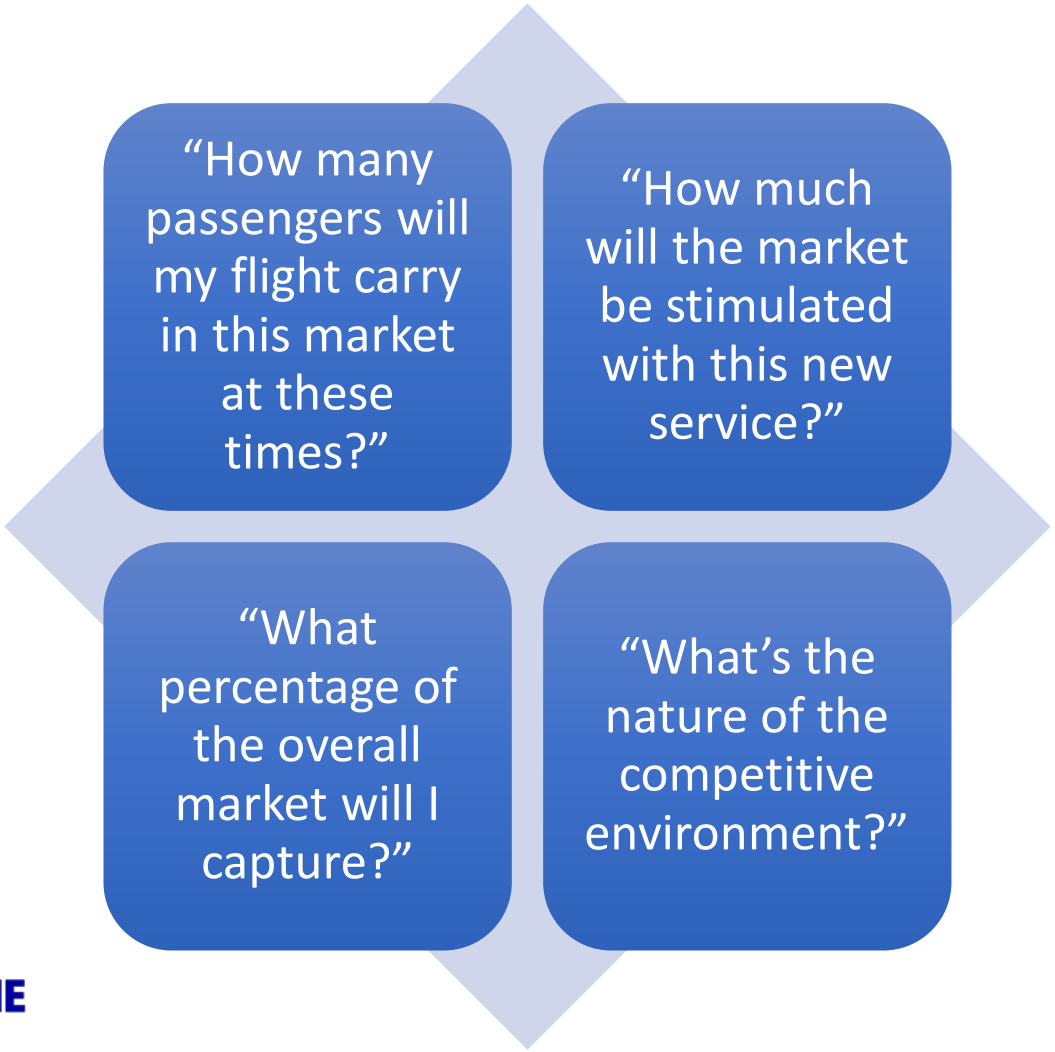
Using QSI = Asking Questions About the Future



- Will we "steal" market share from another airline?
- Do we want to compete with that carrier?
- We will cannibalize traffic off one of our existing flights?
- If yes, is that worth it?

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QSI Helps Planners Weed Out the Good from the Not-So-Good

- How much money will this flight make?
- If it's going to make money, how profitable will it be?
- How will local and onboard passenger mix impact that revenue?
- Does it contribute positively to my network?
- We have limited resources. How does this flight's performance compare to the other flights that are possible with this aircraft?

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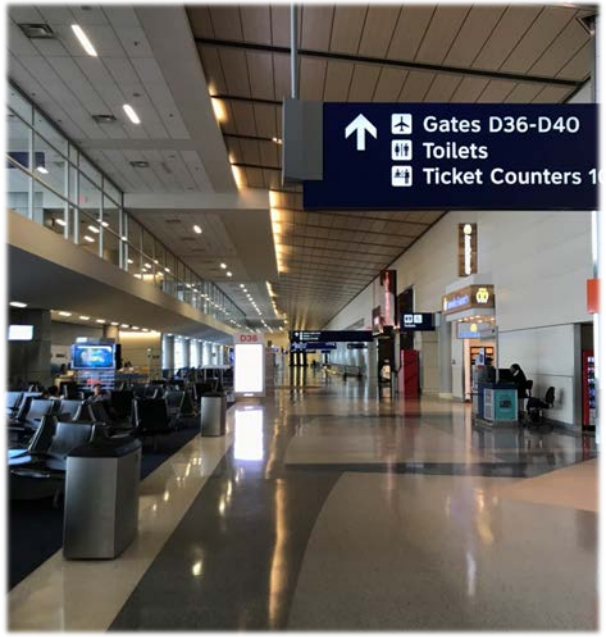

Historical Development of QSI Methodologies

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Where Does Today's QSI Methodology Have Its Roots?

1) The original Civil Aeronautics Board (CAB) QSI methodology was initially developed to predict passenger traffic changes due to changes in airline service.
2) Pre-deregulation, it forecasted the expected traffic gain or loss in transferring routes from the original 11 **Trunk Carriers** to a host of **Local Service** airlines.
3) Later refined to evaluate airline service proposals in route cases involving new or additional competitive services.
4) Original QSI methodology used weighting factors for aircraft type and number of stops, and were applied only to direct flights.
5) CAB Staff conducted many analyses of traffic stimulation associated with increased QSI.

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The Original Approach Has Evolved, but the Basic DNA is the Same

- **Still primarily based on published industry schedules.**
  - ✓Refinements to measure relative value of different connection-types
    - *Online, Interline, Codeshare*
  - ✓Elapsed trip time
  - ✓Circuity

- **Models are more customized – and more complicated.**
  - ✓Impact of different fares
  - ✓Traffic Spill and Yield Management-based factors
  - ✓Adaption to international markets
  - ✓Weighting for airline and airport preferences

- **Used by airlines worldwide.**
  - ✓All are similar in logic/structure, but cater to a carrier's specific needs.

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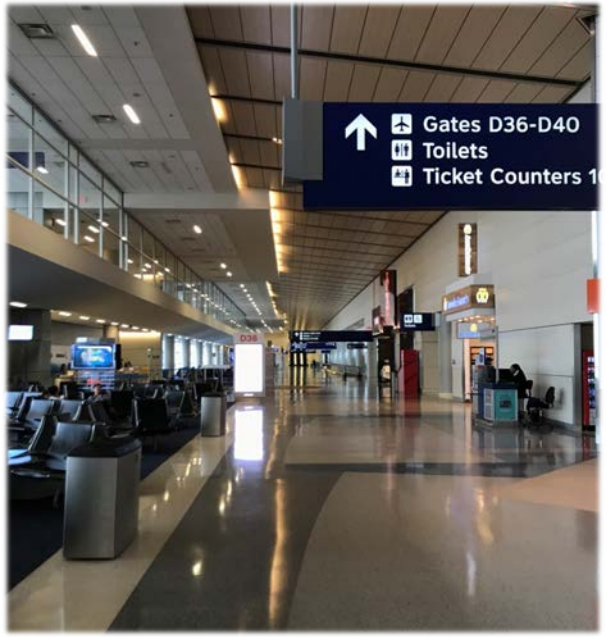

Factors Affecting QSI Today vs. Pre-Deregulation

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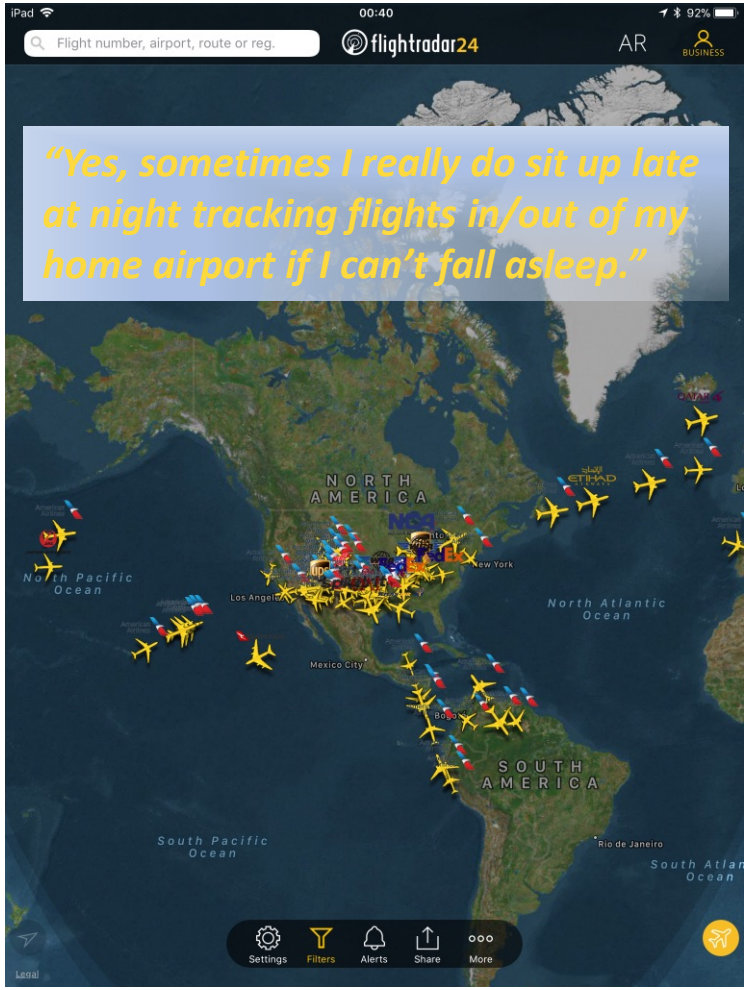
Emergence of Airline Networks and Connecting Opportunities

- In many O&D market combinations, connecting routings carry a significant share of the traffic.
  - Required creating a weighting system for connecting flights.

- Today, aircraft size alone isn't an accurate predictor of new flight's future market share.
  - Network carriers are often competing against point-to-point carriers, so adding capacity rarely equates to a 1:1 market share ratio.
  - Network carrier capacity is frequently diluted by connecting traffic from other O&D markets within its own network.
  - Both phenomenon are handled by adjusting aircraft size weighting in the model or assigning premiums to point-to-point carriers, if needed.



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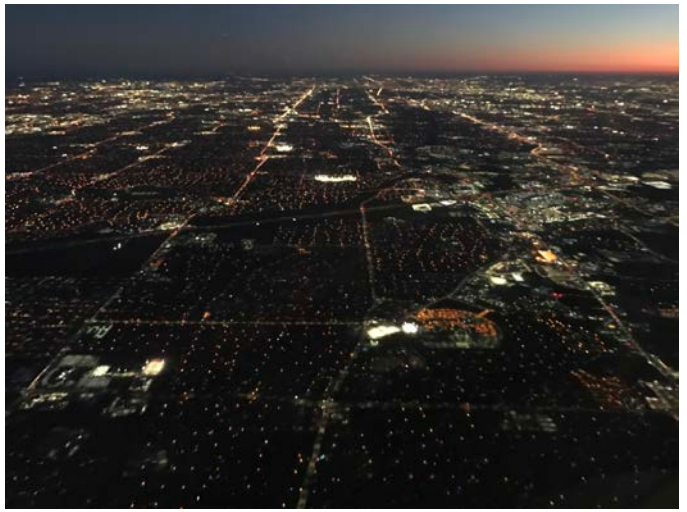
Co-Terminal Markets

- Since deregulation, multi-airport markets have played prominent roles as congestion and delays have constrained service growth at the legacy, primary airports serving many major cities.
  - NYC, LA Basin, SF Bay, Washington/Baltimore, Chicago, etc.
- New traffic forecasts, therefore, needed to reflect airport choice on a market-by-market basis.
  - Ground access, average fares, and flight availability all influence passengers' decision to use one airport over another.
- Even route forecasts using solid QSI models should take into account this empirical data by asking (and adjusting model outputs, as needed): "How has traffic distribution changed with service additions in existing markets?"



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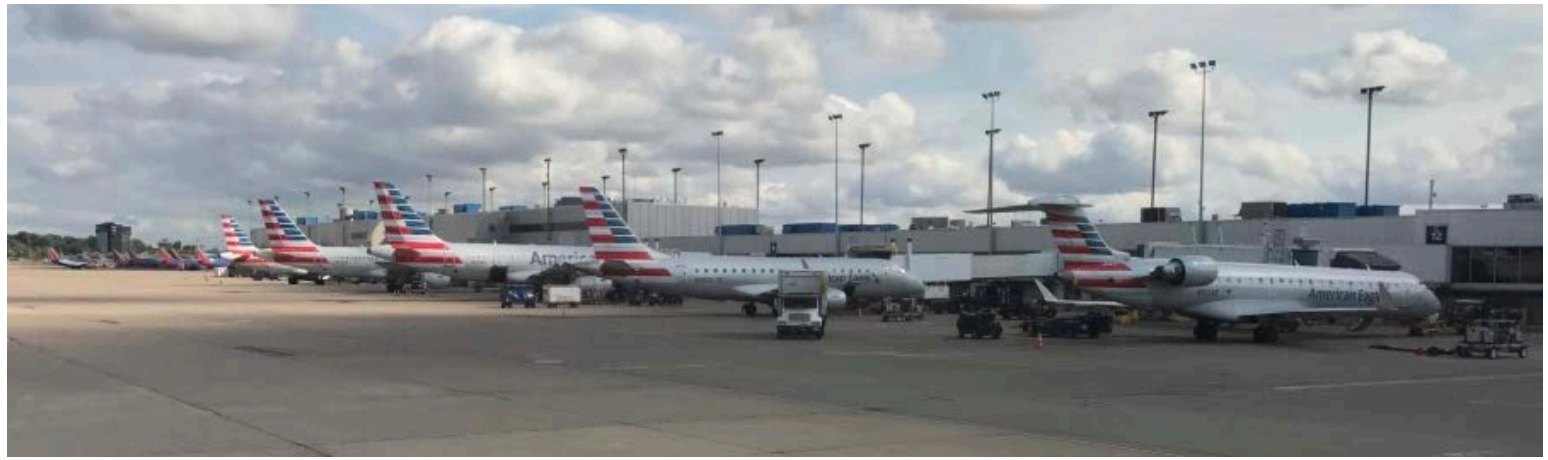
Industry Fare Segmentation

- More so than ever before, carriers are competing in a world where service unbundling and market segmentation have redefined the entire airline industry.
  - ✓QSI doesn't generally reflect fare differences, so forecasting requires "tweaking the dials" to account for these variables.
  - ✓One approach is to assign a QSI premium to ULCC/LCCs to account for the impact their fares have on demand, although many route forecasting models can account for this outside the QSI metric.



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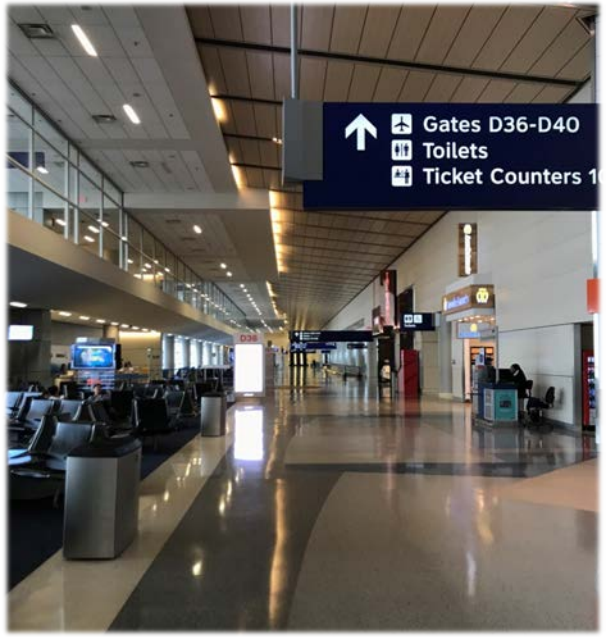

Using QSI

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Building QSI is Generally a Two-Step Process

1) Baseline QSI Estimates

- Service frequency.
- Aircraft type /seat capacity.
- Number of stops.
- Connection penalty (online vs. interline).
- Elapsed time factor.
- Routing circuity.

2) Calibration

- Airline preference (e.g., hub dominance, loyalty programs, low or high fares).
- Airport preference (primary versus secondary).
- Time-of-day.
- Fewer seats for local passengers due to RM algorithms giving preference to more valuable connecting passengers.
- Demand “spill” due to high load factors.
- Inferior connections unduly influencing QSI share, even after accounting for variables like circuity and elapsed time.

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Help! I'm at a Cocktail Hour Being Hosted by Airline Planners. What Else Should I Know About the QSI Calibration Process?

- The QSI calibration process is based on the notion of identifying "share premiums" and "share gaps" in comparable markets where empirical data is available.
  - For example, look at real-life market shares by carrier in comparable markets versus the "out-of-the box" QSI share predictions.
- Determine the magnitude and pattern of these variances.
- Next, develop logical assumptions to account for these share "premium" or "gap" variances, and the make adjustments to QSI weighting factors.
  - *Keep adjustments as simple as possible.*
- Ability to calibrate ultimately depends on the available data.
  - Ideally, you want a combination of general industry data and as much carrier-level detail as you can incorporate.

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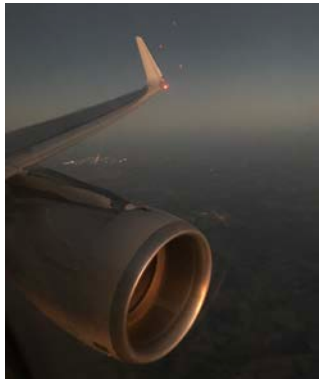
Typical QSI Adjustments in the Real World

Problem: Many poor connections pick up too much weight in total market QSI.

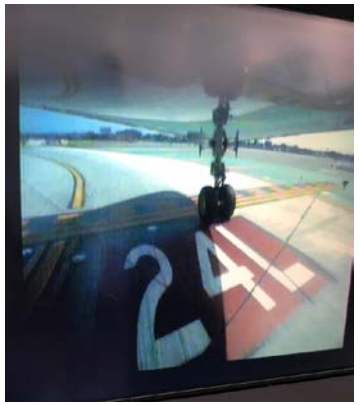
Adjustment: Tighten rules for including flights (e.g., circuity, elapsed times, minimum share for inclusion, roundtrip requirement, etc.).



Problem: ULCC/LCC carrier traffic share is consistently above its QSI share.

Adjustment A: Check fare differential versus legacy carriers – add carrier preference factor or share adjustment outside of QSI model.

Adjustment B: Check amount of connecting passengers for legacy carriers – adjust legacy carriers' aircraft capacity value downward.



Problem: Share variance of legacy carriers in hub markets are consistently high or low.

Adjustment: Apply an airline premium or penalty factor to a carrier's baseline QSI.

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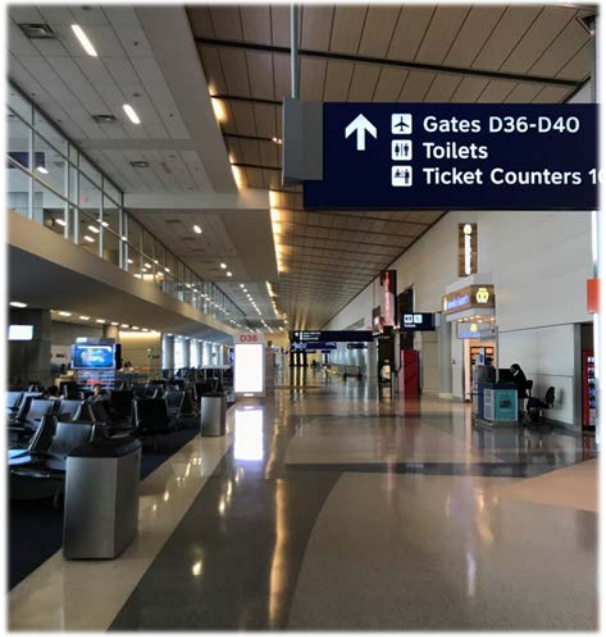

QSI Example

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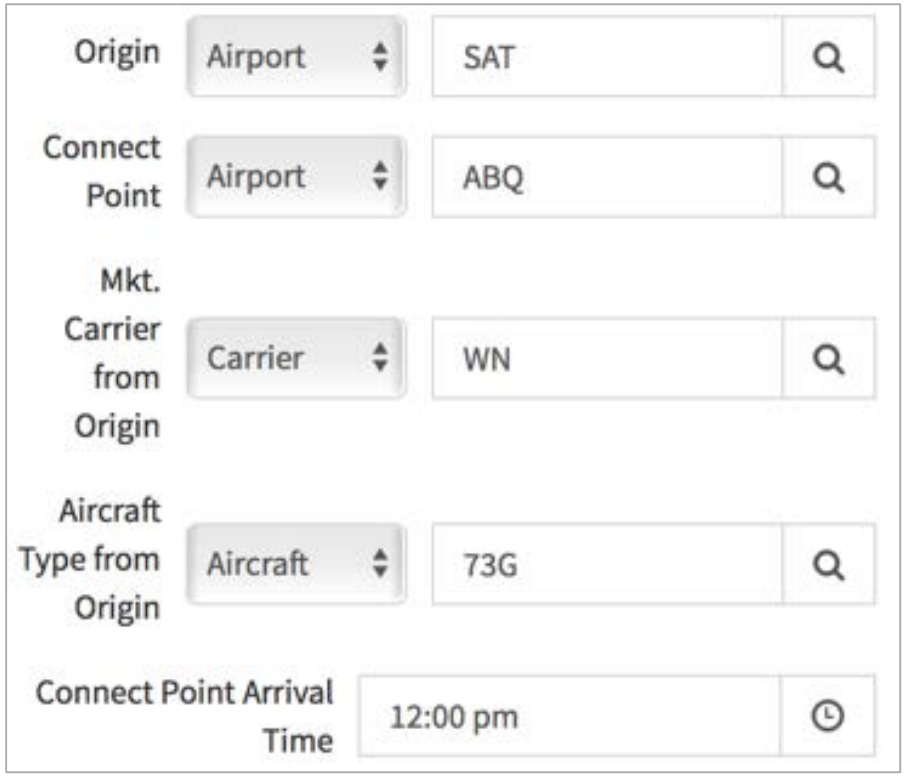
Example of a Basic QSI Analysis for an Unserved Market



Origin Airport

Destination Airport

Proposed Carrier

Proposed Equipment

Destination Arrival Time

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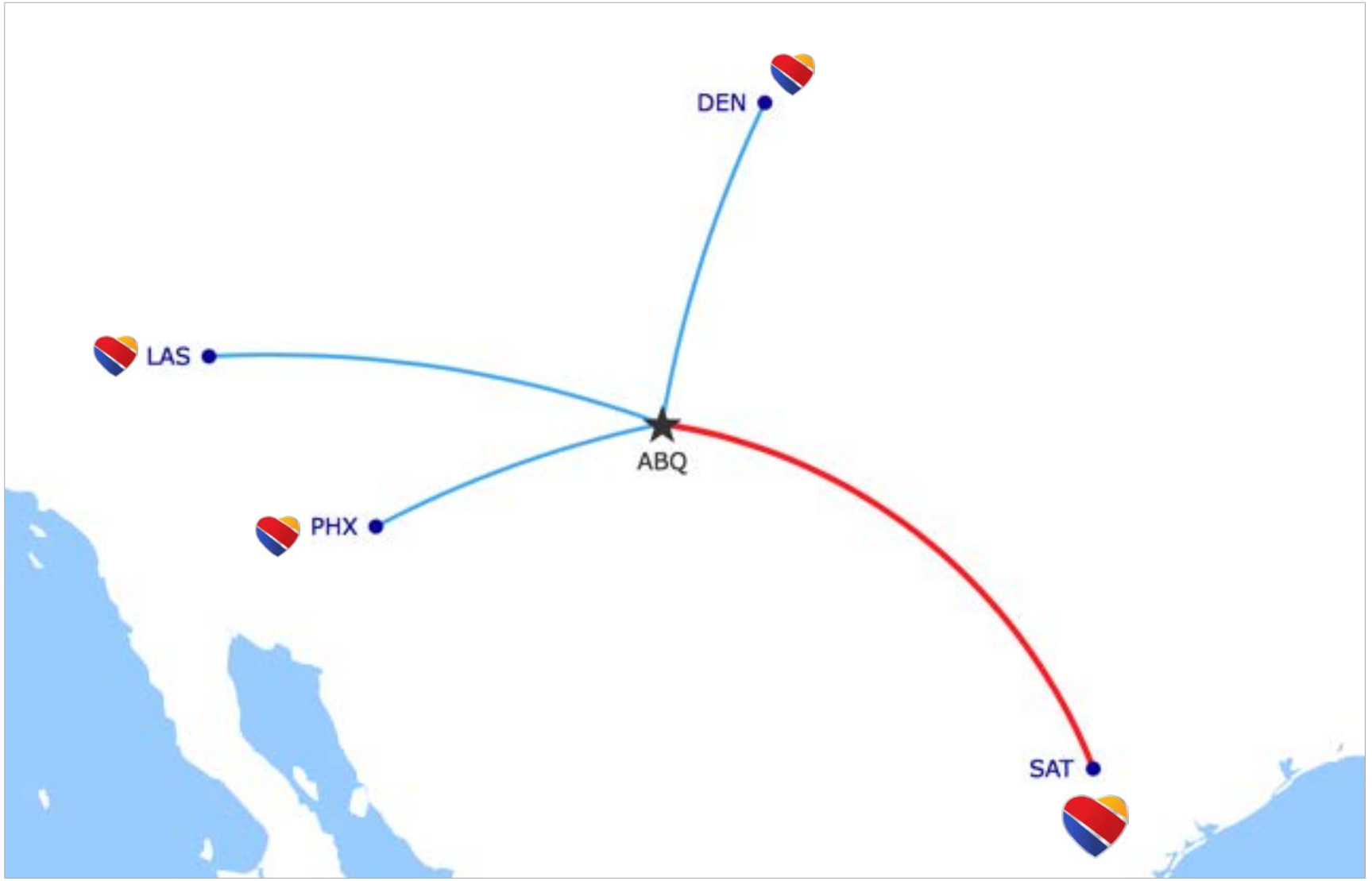
Model Proposes Local and Connecting Markets for QSI Calculation

- Model considers many factors, including:
  - ✓ *Published Schedules*
  - ✓ *Minimum Connect Times (MCTs)*
  - ✓ *Circuity*
  - ✓ *Aircraft Equipment*



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Take the Science of the Output, and Add the Art

Origin Airport Code	Destination Airport Code	Industry QSI	Forecast QSI	New QSI	% Total New QSI
SAT	ABQ	15.24800	0.77000	16.01800	0.04807
SAT	PHX	22.92250	0.43750	23.36000	0.01873
SAT	LAS	27.50850	0.38750	27.89600	0.01389

APPLYING ART

In real life, WN averages 70% market share in its SAT nonstop markets and around 80% share in its ABQ nonstop markets. QSI suggests the new flight would only get 5% based on existing industry capacity. Therefore, a network planner might instead assume a 75% local market share on the new flight.

USING SCIENCE

With multiple daily nonstops and innumerable connections available via multiple cities on multiple airlines, it seems reasonable that a new SAT-ABQ-LAS itinerary would only grab 1% of existing SAT-LAS demand.

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Relationship of QSI Methodology and Expected Traffic Stimulation

- *The QSI methodology measures changes in the quantity and quality of service; it does not directly estimate traffic changes.*
- Separate analyses within a route forecast can quantify and/or account for the stimulation in traffic due to changes in service.
  - ✓Average annual stimulation rates.
  - ✓Fare and service stimulation rates.
- The first new nonstop service in a market is often poorly predicted by QSI, so analyses based on a comparable market approach is always recommended.

Always start with the science, and then apply the art.

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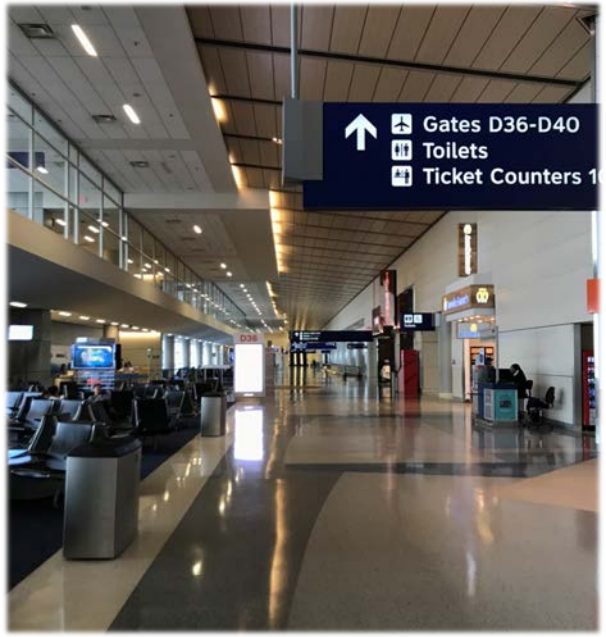

Discussion / Q&A

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Thank You

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