Quality of Service Index

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Session Outline

QSI Defined
• What is QSI?
• What is it Used For?

QSI Methodology
• Four Basic Steps
• Understanding Factors & Coefficients

QSI Analysis
• Inputs and outputs
• Defining the scope of your analysis
• Sample analysis and discussion

QSI Software Advantages and Cautions

Other Uses of QSI: Service Benchmarking

Summary and Q&A
QSI Defined
What is QSI?

• A powerful tool that is used extensively in the industry – the basic function is to forecast market share

• Method of assessing the relative quality of different services

• A Quality of Service Index is a way of quantifying a concept which is qualitative (service quality)

• In the case of air travel, quality is measured from the perspective of the passenger
  • What aspects do consumers value when booking air travel?
  • Based on the characteristics of different flight options, which ones are consumers most likely to choose?

• QSI attempts to forecast consumer behavior by quantifying the relative attractiveness of different flight options
QSI Defined

What is it Used For?

• QSI is used to predict the future

• It can help airlines answer questions such as:
  • What market share will a new flight capture?
  • How many passengers will it carry, and what will the load factor be?
  • How many of these passengers will be local, and how many will be connecting?
  • How many of the onboard passengers will we take from our competitors? From our existing flights?
  • What revenue will the flight achieve?
  • What network contribution will it provide?
  • Will the new service be profitable?
QSI Defined

What is it Used For?

• For airport marketers, QSI is used to:
  • Identify and evaluate new route opportunities for the airport
  • Improve the accuracy and credibility of business case presentations to airlines

• So how does it work?
QSI Methodology
QSI Methodology

QSI involves four basic steps:

• Step 1: Determine which factors passengers consider when choosing a flight among several options

• Step 2: Apply coefficients to each factor, for each flight option

• Step 3: Multiply the coefficients to calculate a QSI score for each flight option

• Step 4: Compare the relative QSI scores to estimate the market share that each flight option will achieve
### Basic methodology example:

#### Step 1: Factors

<table>
<thead>
<tr>
<th>Factors</th>
<th>Flight Options</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Airline A (1 Non-stop Flight/Day)</td>
</tr>
<tr>
<td>Aircraft Type</td>
<td>1.00</td>
</tr>
<tr>
<td>Stops</td>
<td>1.00</td>
</tr>
<tr>
<td>Frequency</td>
<td>1.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1.00</td>
</tr>
</tbody>
</table>

#### Step 2: Coefficients

- **Step 3: QSI Score**
- **Step 4: Market Share**

<table>
<thead>
<tr>
<th></th>
<th>Airline A</th>
<th>Airline B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry Total</td>
<td>1.75</td>
<td>1.75</td>
</tr>
<tr>
<td>Forecast Market Share</td>
<td><strong>57%</strong></td>
<td><strong>43%</strong></td>
</tr>
</tbody>
</table>
QSI Methodology
Understanding Factors & Coefficients:

- Factors: what factors do passengers consider when choosing between different flight options?
  - Number of stops
  - Aircraft type
  - Flight frequency
  - Travel time
  - Airfare
  - Time of day
  - Day of week
  - Others?
- Do all passengers consider the same factors?
Understanding Factors & Coefficients:

• How are coefficients determined?
  • Should a non-stop flight score twice as high as a connecting flight? Ten times as high?
  • How attractive is a Boeing 777 relative to an Airbus A320?

• The best indication is past behavior
  • Calibration of coefficients is based on millions of observations

• Determining proper coefficients is a huge job, but vitally important!
Understanding Factors & Coefficients:

- Coefficients may be:
  - Relative (e.g., non-stop flight =1, single cnx = 0.25)
  - Absolute (e.g., flight frequency)

- Weightings: the greater the variation in possible coefficients, the greater the influence of the factor

- For example, if:

  - Flight coefficients range from 1.0 for a non-stop to 0.05 for a double connection to (lowest is 5% of the highest), and
  - Aircraft coefficients range from 0.70 for a CRJ-900 to 1.05 for an A321 (lowest is 66% of the highest), then
  - Flight routing will have a much greater impact on QSI score than aircraft type
QSI Analysis

Inputs and Outputs:

- Model inputs – what data is required?
  - Flight schedules (OAG)
  - City pair market sizes (DOT or other research)
  - Airfares (DOT or other research)
  - Stimulation factors (research and carrier input)
QSI Analysis

Inputs and Outputs:

- Model output – interpreting the results
  - A QSI model will provide market share for local and connecting markets
  - Combined with the data above, this can be used to calculate:
    - Flight load factor
    - Traffic spill
    - Self diversion
    - Flight revenue
- What you get out is only as good as what you put in!
  - Accurate data is absolutely critical
QSI Analysis
Defining the Scope of Your Analysis:

- Which flights should be considered?
  - Non-stop, single connect, double connect?
  - Online connections, interline connections?
  - Circuity considerations

- Which airports are relevant?
  - Defining your catchment area
  - Determining which airports to include
    - Does leakage occur in both directions?
    - How do we account for surface access differences?

- Which factors should be included?
  - Are all factors relevant?
QSI Analysis

Defining the Scope of Your Analysis:

Aguadilla

San Juan
Sample Analysis and Discussion:

- QSI analysis for New Orleans – Denver
  - United Airlines
    - 3 flights/day
    - A320 aircraft
  - What share of the MSY-DEN market will United get?
  - How much of this traffic is UA already carrying?
  - What share of the MSY-PDX market will United get via DEN?
  - What is the projected load factor of these flights?
QSI Software: Advantages and Cautions
Advantages and Cautions:

- QSI calculations can be done manually

- However, as the complexity of the analysis increases, this can become impractical

- Even determining the competitive flight options can be time consuming

- There are significant advantages to using computer software designed for airline QSI analysis
QSI Software: Advantages and Cautions

Schedule Advantages:

• The software is designed to identify and build appropriate competitive air services

• Min/max connect times

• Codeshare and interline agreements

• Circuity
QSI Software: Advantages and Cautions

SEA-MSY: 21 Single Connect Points
QSI Software Advantages and Cautions

SEA-MSY: 33 Double Connect Points
Market Advantages:

• As with identifying competitive flights, QSI models can build appropriate passenger itineraries for inclusion in the analysis

  • These will differ by route and by airline

  • When single and double connect markets are included, the options can easily be in the hundreds

• Consider the following example:

  • What origin/destination passenger markets does American Airlines serve with a London-Chicago flight?
QSI Software: Advantages and Cautions
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QSI Software: Advantages and Cautions

• Market Advantages:
  • On a London-Chicago flight, AA would serve
    • The non-stop market (i.e., LHR-ORD)
    • Single connects behind London (e.g., MAD-LHR-ORD)
    • Single connects beyond Chicago (e.g., LHR-ORD-DEN)
    • Double connects behind London (e.g., TFN-MAD-LHR-ORD)
    • Double connects beyond Chicago (e.g., LHR-ORD-DFW-MEX)
    • Double connect bridge traffic (e.g., MAD-LHR-ORD-DEN)
  • To evaluate a AA flight from London to Chicago requires assessing:
    • 1,775 city pairs
    • Tens of thousands of flight itineraries
  • This can only be done with sophisticated software
QSI Software: Advantages and Cautions

• Other Advantages:
  • Speed and efficiency
  • Accuracy
  • Consistency
    • Over time
    • With airlines’ own analysis
  • Credibility

• Cautions:
  • Results must always be interpreted, and may need to be adjusted
  • Calibration and geographic limitations
Other Uses of QSI: Service Benchmarking
Other Uses of QSI: Service Benchmarking

- QSI can also be used to evaluate changes in quality of air service
  - Over time
  - Against other airports
- Example, a new nonstop London service:
  - Service 1: Charter service
  - Service 2: British Airways
- Both flights serve the local market
- However, the British Airways service will provide connectivity to hundreds of markets beyond London.
  - The QSI score for the BA service will be much larger than that of the charter service.
### Other Uses of QSI: Service Benchmarking

**Sample – YWG: Summer 2011 Summary**

<table>
<thead>
<tr>
<th>Sector</th>
<th>2010</th>
<th>2011</th>
<th>2010</th>
<th>2011</th>
<th>Absolute</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td>2,276.6</td>
<td>2,211.3</td>
<td>8</td>
<td>8</td>
<td>-65.3</td>
<td>-3%</td>
</tr>
<tr>
<td>Transborder</td>
<td>3,138.8</td>
<td>2,939.8</td>
<td>7</td>
<td>7</td>
<td>-198.9</td>
<td>-6%</td>
</tr>
<tr>
<td>International</td>
<td>767.9</td>
<td>771.8</td>
<td>8</td>
<td>8</td>
<td>3.8</td>
<td>0%</td>
</tr>
<tr>
<td>Total</td>
<td>6,183.3</td>
<td>5,922.9</td>
<td>7</td>
<td>8</td>
<td>-260.4</td>
<td>-4%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Market</th>
<th>Absolute Change</th>
<th>Percentage Change</th>
<th>Market</th>
<th>Absolute Change</th>
<th>Percentage Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saskatoon (YXE)</td>
<td>7.2</td>
<td>4942%</td>
<td>Denver (DEN)</td>
<td>-35.1</td>
<td>-100%</td>
</tr>
<tr>
<td>London (LHR)</td>
<td>7.1</td>
<td>2512%</td>
<td>Rankin Inlet (YRT)</td>
<td>-19.7</td>
<td>-100%</td>
</tr>
<tr>
<td>New Orleans (MSY)</td>
<td>7.1</td>
<td>602%</td>
<td>Washington (IAD)</td>
<td>-15.7</td>
<td>-100%</td>
</tr>
<tr>
<td>Minneapolis (MSP)</td>
<td>7.0</td>
<td>572%</td>
<td>Vancouver (YVR)</td>
<td>-13.8</td>
<td>-100%</td>
</tr>
<tr>
<td>Miami (MIA)</td>
<td>6.6</td>
<td>532%</td>
<td>Calgary (YYC)</td>
<td>-11.7</td>
<td>-100%</td>
</tr>
<tr>
<td>Rochester (ROC)</td>
<td>6.4</td>
<td>514%</td>
<td>Thompson (YTH)</td>
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<td>-100%</td>
</tr>
<tr>
<td>Raleigh (RDU)</td>
<td>5.4</td>
<td>410%</td>
<td>New York (EWR)</td>
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<td>-100%</td>
</tr>
<tr>
<td>Munich (MUC)</td>
<td>5.4</td>
<td>406%</td>
<td>Edmonton (YEG)</td>
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<td>-100%</td>
</tr>
<tr>
<td>Austin (AUS)</td>
<td>5.4</td>
<td>403%</td>
<td>San Fran. (SFO)</td>
<td>-9.3</td>
<td>-100%</td>
</tr>
<tr>
<td>Toronto (YTZ)</td>
<td>5.3</td>
<td>400%</td>
<td>Churchill (YYQ)</td>
<td>-8.0</td>
<td>-100%</td>
</tr>
</tbody>
</table>
Other Uses of QSI: Service Benchmarking

Sample – YWG: Summer 2011 Summary

Top 25 Markets by QSI % Change Year-Over-Year
Summary and Q&A
Summary and Q&A

• QSI is a powerful tool that is used extensively in the industry
• QSI attempts to forecast consumer behavior by quantifying the relative attractiveness of different flight options
• QSI analysis can:
  • Help airports improve their strategic ASD planning, and
  • Improve the accuracy and credibility of their business case presentations to airlines
  • Evaluate the change in air services over time and against other airports (benchmarking)
• The results of a QSI analysis are only as good as the data inputs – accurate data is critical!
• Don’t rely only on QSI – build a complete business case