Key Findings: 2015 ATRS Global Airport Performance Benchmarking

Chunyan Yu
Embry-Riddle Aeronautical University, yuc@erau.edu

Follow this and additional works at: https://commons.erau.edu/publication

Part of the Business Administration, Management, and Operations Commons, Finance and Financial Management Commons, and the International Business Commons

Scholarly Commons Citation

This Presentation without Video is brought to you for free and open access by Scholarly Commons. It has been accepted for inclusion in Publications by an authorized administrator of Scholarly Commons. For more information, please contact commons@erau.edu.
Key Findings

Chunyan Yu
Air Transport Research Society (ATRS)

www.atrsworld.org

ATRS Global Airport Performance Benchmarking Task Force:
Founding Chairman – Tae Oum; Coordinator - Chunyan Yu
Asia Pacific: Peter Forsyth, Xiaowen Fu, Yeong-Heok Lee, Yuichiro Yoshida, Japhet Law, Shinya Hanaoka
Europe: Nicole Adler, Jaap de Wit, Hans-Martin Niemeier, Eric Pels
North America: Bijan Vasigh, Jia Yan, Chunyan Yu
Middle East: Paul Hooper
Outline

Objective of the ATRS Benchmarking Study

Airports Included and ATRS Database

Characteristics of Sample Airports

Methodology

Key Results on Efficiency and Cost Competitiveness

Cost Efficiency from Airline Perspective
Objective of the Benchmarking Study

- To provide a comprehensive, unbiased comparison of airport performance focusing on
  - Productivity and Operating/Mgt Efficiency
  - Unit Cost Competitiveness
  - Comparison of Airport Charge Levels

- Limitation: Service Quality is not considered
### Airports included in the 2015 Report

<table>
<thead>
<tr>
<th>Region</th>
<th>Number of Airports</th>
<th>Number of Airport Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada-US</td>
<td>88</td>
<td>16</td>
</tr>
<tr>
<td>Europe</td>
<td>70</td>
<td>16</td>
</tr>
<tr>
<td>Asia Pacific</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>38 Asian airports</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15 Oceania airports</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>211</td>
<td>25</td>
</tr>
</tbody>
</table>
The ATRS Database

- The ATRS Database contains historic information (FY 2002-2013) including financial data, traffic and capacity data of the major airports and airport authorities (groups) in the following geographic regions:
  - Asia Pacific
  - Europe
  - North America

- The data in each region is segregated into:
  - Airport Information (capacity, type of ownership etc)
  - Traffic
  - Aeronautical Revenue
  - Non-Aeronautical Revenue
  - Operating Expense
  - Balance Sheet

Airport Characteristics

- Number of passengers ranges from 860,438 at Dunedin (New Zealand) to 94.4 million at Atlanta (United States) in 2013.
- 40 airports with only 1 runway, and 7 runways at DFW and 8 at ORD.
- Number of Employees ranges from 20 (Queenstown) to 19,009 (Frankfurt).
- 13 airports serve only international passengers, and international passengers account for less than 10% of total traffic at 62 airports.
Passenger Traffic, 2013

Largest Five and Smallest Five (‘000)

Asia Pacific

Europe

North America
Passengers per Aircraft Movement, 2013

Highest Five and Lowest Five

Asia Pacific

Europe

North America
% OF Non-Aeronautical Revenue, 2013

Highest Five and Lowest Five

Asia Pacific

Europe

North America
• **Variable Factor Productivity (VFP) Index**
  - Total Factor Productivity (TFP) - Impossible because of capital input cost accounting problem

• VFP is essentially the ratio of **total (aggregate) output index** divided by **total (aggregate) variable input index**, namely labor and soft cost input (total non-labor variable inputs).

• VFP is computed using the **multilateral index** procedure proposed by Caves, Christensen and Diewert (1982).
Multilateral Index Procedure

• This multilateral output (input) index procedure uses the revenue (cost) shares to aggregate output (inputs)

\[
\ln \frac{Y_i}{Y_j} = \sum \frac{R_{ki} + \bar{R}_k}{2} \ln \frac{Y_{ki}}{\bar{Y}_k} - \sum \frac{R_{kj} + \bar{R}_k}{2} \ln \frac{Y_{kj}}{\bar{Y}_k}
\]

\[
\ln \frac{X_i}{X_j} = \sum \frac{W_{ki} + \bar{W}_k}{2} \ln \frac{X_{ki}}{\bar{X}_k} - \sum \frac{W_{kj} + \bar{W}_k}{2} \ln \frac{X_{kj}}{\bar{X}_k}
\]
Methodology

**Inputs**

- Labour
- Other non-capital (soft-cost) input

**Outputs**

- Aircraft movement
- Passenger
- Non-aeronautical revenue
- (Cargo)

**Gross Variable Factor Productivity**
Factors Beyond Managerial Control:

- Airport size (Scale of aggregate output)
- Average aircraft size
- Share of international traffic
- Share of air cargo traffic
- Extent of capacity shortage - congestion delay
- etc

Residual (Net) variable factor productivity (RVFP) is computed after removing effects of these Factors
Cost Competitiveness

• An airport enjoys lower unit costs than other airports when that airport is more efficient, or pays less for its inputs, or both

• A cost competitiveness indicator is constructed by summing the effects of variable input price and the effects of efficiency in using these variable inputs.
Key Results

• Residual VFP (Efficiency)
Key Results

Figure 4.5.2a1 Residual Variable Factor Productivity (2013), Asia, HKG=1.0

Jeju (S. Korea), Busan, Hong Kong
Key Results

Figure 4.5.2a2 Residual Variable Factor Productivity (2013), Oceania, SYD =1.0

Sydney, Dunedin (NZ)
Key Results

Figure 4.5.2b1 Residual Variable Factor Productivity (2013), Europe
Large Airports, CPH=1.0

Copenhagen, Zurich, Amsterdam
Key Results

Figure 4.5.2b2 Residual Variable Factor Productivity (2013), Europe Small and Medium Airports, CPH=1.0

Athens, Geneva
Key Results

Figure 4.5.2c1 Residual Variable Factor Productivity (2013), North America Large Airports, YVR=1.0

Atlanta, Charlotte, Minneapolis/St. Paul
Key Results

Figure 4.5.2c2 Residual Variable Factor Productivity (2013), North America Small and Medium Airports, YVR=1.0

Oklahoma, Raleigh-Durham, Calgary
Top Efficiency Performers (2015)

Asia Pacific:
- **Asian Airports:**
  - Jeju, Busan, Hong Kong
- **Oceania Airports:**
  - Sydney, Dunedin

Europe:
- **Large Airports (> 15 million pax):**
  - Copenhagen, Zurich, Amsterdam
- **Small/Medium Airports (< 15 millions Pax):**
  - Athens, Geneva

North America (Canada/US):
- **Large Airports (> 15 million pax):**
  - Atlanta, Charlotte, Minneapolis/St Paul
- **Small/Medium Airports (< 15 millions Pax):**
  - Oklahoma, Raleigh-Durham, Calgary
Key Results

• Cost Competitiveness
Key Results

Haikou (China), Busan, Jeju (S. Korea)
Key Results

Figure 5.4a2 Cost Competitiveness 2013 - Oceania
SYD=0.0

Dunedin (NZ), Sydney
Figure 5.4b1 Cost Competitiveness 2013 - Europe
Large Airports, CPH =0.0

Istanbul, Copenhagen, Palma de Mallorca (Spain)
Key Results

Figure 5.4b2 Cost Competitiveness 2013 - Europe
Small and Medium Airports, CPH =0.0

Athens, Tallinn (Estonia), Malta
Key Results

Figure 5.4c1 Cost Competitiveness 2013- North America
Large Airports, YVR=0.0

Atlanta, Charlotte, Tampa

Cost Competitiveness

Mean

© Air Transport Research Society (ATRS)
Key Results

Figure 5.4c2 Cost Competitiveness 2013 - North America
Small and Medium Airports, YVR=0.0

Oklahoma, Raleigh-Durham
Top Cost Competitiveness Performers

Asia-Pacific:

- **Oceania:**
  - Dunedin, Sydney
- **Asia:**
  - Haikou, Busan

Europe:

- **Large Airports (> 15 million Pax):**
  - Istanbul Ataturk, Copenhagen
- **Small/Med Airports (< 15 million Pax):**
  - Athens, Tallinn

N. America:

- **Large Airports (> 15 million Pax):**
  - Atlanta, Charlotte
- **Small/Med Airports (< 15 million Pax):**
  - Oklahoma, Raleigh-Durham
Cost Efficiency from Airline Perspective

• **Airports invest in infrastructure, facilities and management skills to provide the services at the least overall costs to airlines**

• **Cost per Enplanement (CPE) in the United States**
  – All fees and Charges airlines pay to airports per enplaned passenger
  – Commonly accepted measure for comparing airline costs amongst airports

• **Average Aeronautical Revenue per Passenger**
Aeronautical Revenue per Passenger

Asia

Jeju (S.Korea), Haikou (China)
Aeronautical Revenue per Passenger

Dunedin (NZ), Christchurch (NZ)
Aeronautical Revenue per Passenger

EuroAirport Basel, Turin
Costs per Enplanement (CPE)

Burbank (CA), Charlotte, Atlanta
Top Performers in Cost Efficiency to Airlines

**Asia-Pacific:**
- **Oceania:**
  - Dunedin, Christchurch
- **Asia:**
  - Jeju, Haikou

**Europe:**
- EuroAirport Basel, Turin

**N. America:**
- Burbank, Charlotte
The ATRS Global Airport Performance Benchmarking Report: 3 volumes, over 600 pages of valuable data and analysis.

ATRS Airport Database (2002-2013)

Details at www.atrsworld.org

Report and Database sale finances benchmarking research project
Thank You!
谢谢！
Thank You

See you at the 2016 ATRS Conference
in Rhodes Island, Greece