Key Findings: 2016 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
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 Charges

- Limitation: Service Quality is not considered
## Airports included in the 2016 Report

<table>
<thead>
<tr>
<th>Region</th>
<th>Airports</th>
<th>Airport Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada-US</td>
<td>82</td>
<td></td>
</tr>
<tr>
<td>Europe</td>
<td>70</td>
<td>15</td>
</tr>
<tr>
<td>Asia Pacific</td>
<td>9</td>
<td>38 Asian</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15 Oceania</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>205</strong></td>
<td><strong>24</strong></td>
</tr>
</tbody>
</table>
The ATRS Database

- The ATRS Database contains historic information (FY 2002-2014) 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 853,097 at Dunedin (New Zealand) to 96.2 million at Atlanta (United States) in 2014.
- 40 airports with only 1 runway, and 7 runways at DFW and 8 at ORD.
- Number of Employees ranges from 19 (Queenstown) to 19,919 (Frankfurt).
- 12 airports serve only international passengers, and international passengers account for less than 10% of total traffic at 60 airports.
Passenger Traffic, 2014

Largest Five and Smallest Five (‘000)

Asia Pacific

Europe

North America

© Air Transport Research Society (ATRS)
Passengers per Aircraft Movement, 2014

Highest Five and Lowest Five

Europe
Asia Pacific
North America
Highest Five and Lowest Five

% OF Non-Aeronautical Revenue, 2014

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

Figure 4.5.2a1 Residual Variable Factor Productivity (2014), Asia, HKG=1.0

Hong Kong, Jeju, Busan

Airports

Airport Groups

Residual VFP

Mean
Figure 4.5.2a2 Residual Variable Factor Productivity (2014), Oceania, SYD = 1.0

Sydney, Auckland, Australia Pacific Airports Corporation
Key Results

Figure 4.5.2b1 Residual Variable Factor Productivity (2014), Europe Large Airports, CPH=1.0

Copenhagen, Schiphol, AENA
Key Results

Figure 4.5.2b2 Residual Variable Factor Productivity (2014), Europe
Small and Medium Airports, CPH=1.0

Athens, Alicante Airport, EuroAirport
Key Results

Figure 4.5.2c1 Residual Variable Factor Productivity (2014), North America Large Airports, YVR=1.0

Atlanta, Charlotte, Minneapolis/St. Paul

Residual VFP  Mean
**Key Results**

*Figure 4.5.2c2 Residual Variable Factor Productivity (2014), North America Small and Medium Airports, YVR=1.0*

Omaha, Victoria, Calgary

© Air Transport Research Society (ATRS)
Top Efficiency Performers (2016)

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

**Europe:**
- **Large Airports (> 15 million pax):**
  - Copenhagen, Amsterdam, AENA
- **Small/Medium Airports (< 15 millions Pax):**
  - Athens, Alicante Airport, EuroAirport

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

• Cost Competitiveness
Key Results

Figure 5.4a1 Cost Competitiveness 2014- Asia
HKG=0.0

Jeju (S. Korea), Haikou (China), Soekarno–Hatta (Indonesia)
Key Results

Figure 5.4a2 Cost Competitiveness 2014 - Oceania
SYD=0.0

Queensland Airports Ltd, Sydney, Auckland
Key Results

Figure 5.4b1 Cost Competitiveness 2014 - Europe
Large Airports, CPH =0.0

AENA, ANA, Copenhagen
Figure 5.4b2 Cost Competitiveness 2014 - Europe
Small and Medium Airports, CPH =0.0

Bratislava, Athens, Malta
Key Results

Figure 5.4c1 Cost Competitiveness 2014- North America
Large Airports, YVR=0.0

Atlanta, Charlotte, Tampa
Key Results

Figure 5.4c2 Cost Competitiveness 2014 - North America
Small and Medium Airports, YVR=0.0

Omaha, Oklahoma, Victoria

Cost Competitiveness
Mean
Top Cost Competitiveness Performers

Asia-Pacific:

- **Oceania:**
  - Queensland Airports, Sydney
- **Asia:**
  - Jeju, Haikou

Europe:

- **Large Airports (> 15 million Pax):**
  - AENA, ANA, Copenhagen
- **Small/Med Airports (< 15 million Pax):**
  - Bratislava, Athens

N. America:

- **Large Airports (> 15 million Pax):**
  - Atlanta, Charlotte
- **Small/Med Airports (< 15 million Pax):**
  - Omaha, Oklahoma
The ATRS Global Airport Performance Benchmarking Report: 3 volumes, over 600 pages of valuable data and analysis.

ATRS Airport Database (2002-2014)

Details at

www.atrsworld.org

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