2013 ATRS Global Airport Performance Benchmarking Project

Key Findings
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OUTLINE

Objective of the ATRS Benchmarking Study

Airports Included and ATRS Database

Some Characteristics of Sample Airports

Methodology

Key Results on Efficiency and Costs

User Charge Comparisons
OBJECTIVE OF THE BENCHMARKING STUDY

- To provide a comprehensive, unbiased comparison of airport performance focusing on
  - Productivity and Operating/Mgt Efficiency
  - Unit Cost Competitiveness
  - Airport User Charges
- Our study does not treat service quality differentials across airports because of our research resource constraints
2013 ATRS Global Airport Performance Benchmarking Project

Airport Database
195 MAJOR AIRPORTS AROUND THE WORLD

- N. America, 77
- United States (65)
- Canada (12)
- Pacific, 51
- Asia (35)
- Oceania Countries (16)
- Europe, 67

12 new airports

Objective
Data
Airport Characteristics
Methodology
Efficiency & Cost
User Charge
26 AIRPORT GROUPS

- Asia Pacific (9)
- Europe (17)

1 new
The ATRS Database contains historic information (since FY 2002) including financial data, traffic and capacity data for the major airports and airport groups in the following geographic regions:

- Asia Pacific including Oceania; Europe; North America
- Limited data on S. America and Africa

The data in each continent is segregated into:

- Traffic statistics and composition
- Airport characteristics (runways, terminals, ownership form, etc)
- Aeronautical Activities and Revenue
- Non-Aeronautical Activities and Revenue
- Labor input and other Operating Expenses
- Financial info obtained from Balance Sheets

Visit [http://www.atrsworld.org/Database.html](http://www.atrsworld.org/Database.html) for more details and to purchase.
PASSENGERS TRAFFIC, FY2011
(IN ’000 PASSENGERS)
AIRCRAFT MOVEMENTS, FY 2010
(’000 ATM)

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PASSENGERS PER AIRCRAFT MOVEMENTS, FY 2011
AIR CARGO TRAFFIC, FY 2010
(’000 METRIC TONS)

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% NON-AERO REVENUE, FY 2011

Asia Pacific
Europe
North America
2013 ATRS Global Airport Performance Benchmarking Project

Methodology
AIRPORT PRODUCTIVITY INDEX

**Outputs**
- Aircraft movement
- Passenger
- \{Cargo tonnes\}
- Non-aeronautical revenue output

**Inputs**
- Labour
- Other non-capital (soft-cost) input
- [Runways, terminal size, \# of gates]

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Objective | Data | Airport Characteristics | Methodology | Efficiency & Cost | User Charge
METHODOLOGY: EFFICIENCY MEASUREMENT

- Variable Factor Productivity (VFP) Index
  - Impossible - Total Factor Productivity (TFP) because of capital input cost accounting problem (comparable across different countries)

- Unit Operating Cost Competitiveness Index:
  Combines VFP and Input Price Index
MULTILATERAL AGGREGATION METHOD

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

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

\[
\ln \frac{X_i}{X_j} = \sum \frac{W_{ki} + \bar{W}_k}{2} \ln \frac{X_{ki}}{\bar{X}_k} - \sum \frac{W_{kj} + \bar{W}_k}{2} \ln \frac{X_{kj}}{\bar{X}_k}
\]
GROSS VARIABLE FACTOR PRODUCTIVITY (VFP)
NORTH AMERICA LARGE AIRPORTS
(YVR=1.0), FY 2011
POTENTIAL REASONS FOR THE MEASURED PRODUCTIVITY (GROSS VFP) DIFFERENTIALS

Factors Beyond Managerial Control:

• Airport size (Scale of aggregate output)
• Average aircraft size using the airport
• Share of international traffic
• Share of air cargo traffic
• Extent of capacity shortage - congestion delay
• Connecting/transfer ratio

We compute residual (Net) Variable Factor Productivity (RVFP) after removing effects of these Factors
GROSS VARIABLE FACTOR PRODUCTIVITY VS RESIDUAL VFP: NORTH AMERICA (YVR=1.0), FY 2011

ATL MSP CLT TPA MCO YVR SFO FLL LGA MDW SLC SEA HNL PHX EWR BOS JFK DTW PHL LAS SAN DCA BWI IAD DFW ORD IAH DEN MIA

Gross VFP
Residual VFP

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We explored Alternative approaches:

- Data Envelopment Analysis (DEA)
- Econometric Cost Function Approach including Stochastic Frontier methods (SFA)

The rankings for top and bottom ranked airports are consistent despite using VFP, DEA or SFA.

Note: Industry acceptance of our report using more advanced/sophisticated methods is one of our major concern.
RESIDUAL RANKING COMPARISON OF TOP 15 AIRPORTS IN US

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RESIDUAL RANKING COMPARISON OF BOTTOM 15 AIRPORTS IN US

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RESIDUAL RANKING COMPARISON OF MID-RANKED 15 AIRPORTS IN US

Objective  Data  Airport Characteristics  Methodology  Efficiency & Cost  User Charge
2013 ATRS Airport Benchmarking

Key Results on Efficiency & Cost
RESIDUAL (NET) VARIABLE FACTOR PRODUCTIVITY (VFP): ASIA (HKG=1.0), FY 2011

Gimpo, Incheon, Guam

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RESIDUAL (NET) VARIABLE FACTOR PRODUCTIVITY (VFP): OCEANIA (SYD=1.0), FY 2011

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RESIDUAL (NET) VARIABLE FACTOR PRODUCTIVITY (VFP):
EUROPE LARGE AIRPORTS (CPH=1.0), FY 2011

Copenhagen Kastrup, Athens, Zurich

Airport Groups

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RESIDUAL (NET) VARIABLE FACTOR PRODUCTIVITY (VFP): EUROPE SMALL & MEDIUM AIRPORTS (CPH=1.0), FY 2011

Geneva, Basel, Nice
RESIDUAL (NET) VARIABLE FACTOR PRODUCTIVITY (VFP): NORTH AMERICA LARGE AIRPORTS (YVR=1.0), FY 2011

Atlanta, Minneapolis St. Paul, Charlotte
RESIDUAL (NET) VARIABLE FACTOR PRODUCTIVITY (VFP): N. AMERICA SMALL & MEDIUM AIRPORTS (YVR=1.0), FY 2011

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TOP EFFICIENCY PERFORMERS (2013)
(based on Net VFP index=operating/management efficiency)

Asia Pacific:

• **Asian Airports**: 
  - **Gimpo**, Incheon, Guam

• **Oceania Airports**: 
  - **Sydney**, Auckland, Townsville

Europe:

• **Large Airports (> 15 million pax)**: 
  - **Copenhagen Kastrup**, Athens, Zurich

• **Small/Medium Airports (< 15 millions Pax)**: 
  - **Geneva**, Basel, Nice
TOP EFFICIENCY PERFORMERS (2013)
(based on Net VFP index=operating/management efficiency)

North America:
• Large Airports (> 15 million pax):
  • {Atlanta (Globally Most Efficient Airport)}
  • Minneapolis St Paul, Charlotte, Tampa

• Small/Medium Airports (< 15 millions Pax):
  • Oklahoma City, Richmond, Raleigh-Durham

Global (10th Global Excellence Award)
• Hartsfield-Jackson Atlanta International Airport
# PAST AIRPORT EFFICIENCY EXCELLENCE
## TOP PERFORMERS, 2008 - 2012

<table>
<thead>
<tr>
<th>Year</th>
<th>North America</th>
<th>Europe</th>
<th>Asia-Pacific</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>Hartsfield-Jackson Atlanta International Airport</td>
<td>Copenhagen Kastrup International Airport</td>
<td>Hong Kong International Airport</td>
</tr>
<tr>
<td>2009</td>
<td>Hartsfield-Jackson Atlanta International Airport</td>
<td>Copenhagen Kastrup International Airport</td>
<td>Hong Kong International Airport</td>
</tr>
</tbody>
</table>
| 2010 | Hartsfield-Jackson Atlanta International Airport | Large Airport Category: 
Oslo International Airport 
Small/Medium Airport Category: 
Geneva Cointrin International Airport | Large Airport Category: 
Hong Kong International Airport 
Small/Medium Airport Category: 
Seoul Gimpo International Airport |
| 2011 | Hartsfield-Jackson Atlanta International Airport | Large Airport Category: 
Oslo International Airport 
Copenhagen Kastrup International Airport 
Small/Medium Airport Category: 
Geneva Aéroport | Asian Airport Excellence Award: 
Hong Kong International Airport 
Oceania Excellence Award: 
Sydney Airport |
| 2012 | Hartsfield-Jackson Atlanta International Airport | Large Airport Category: 
Copenhagen Kastrup International Airport 
Small/Medium Airport Category: 
Geneva Aéroport | Asian Airport Excellence Award: 
Seoul Gimpo International Airport 
Oceania Excellence Award: 
Sydney Airport |

### Objective, Data, Methodology, Efficiency & Cost, User Charge

*Note: The diagram includes a timeline and a table summarizing the top performers for each year from 2008 to 2012, along with categories and awards.*
COST COMPETITIVENESS = NET VFP AND INPUT PRICE EFFECT

ASIA (HKG=0.0) – THE HIGHER THE BETTER

Haikou, Seoul Gimpo, Airport Authority of India
COST COMPETITIVENESS = NET VFP AND INPUT PRICE EFFECT

OCEANIA (SYD=0.0)

Queensland Airport Limited (QAL), Auckland, Dunedin (NZ)
COST COMPETITIVENESS = NET VFP AND INPUT PRICE EFFECT
EUROPE - LARGE AIRPORTS (CPH=0.0)

**Athens, Lisbon, ANA (Aeroportos de Portugal)**
COST COMPETITIVENESS = NET VFP AND INPUT PRICE EFFECT
EUROPE - SMALL & MEDIUM AIRPORTS (CPH=0.0)

Ljubljana (Slovenia), Basel, Tallinn (Estonia)
COST COMPETITIVENESS = NET VFP AND INPUT PRICE EFFECT
N. AMERICA - LARGE AIRPORTS (YVR=0.0)

Atlanta, Charlotte, Orlando
COST COMPETITIVENESS: = NET VFP AND INPUT PRICE EFFECT
N. AMERICA - SMALL & MEDIUM AIRPORTS (YVR=0.0)

Oklahoma City, Richmond (Virginia), Raleigh-Durham
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User Charge Comparison
LANDING CHARGES
FOR BOEING 767-400, 2012 (IN US$)

Asia Pacific
Europe
North America
ASIA PACIFIC: COMBINED LANDING AND PASSENGER CHARGES FOR BOEING 767, 2012 (IN US$)

Lowest charges: Taipei Taoyuan, Dunedin (New Zealand)

Highest charges: Osaka Kansai, Tokyo Narita
EUROPE: COMBINED LANDING AND PASSENGER CHARGES FOR BOEING 767, 2012 (IN US$)

Lowest charges: Riga (Latvia), Luxembourg

Highest charges: London Heathrow, Ben Gurion (Tel Aviv)
NORTH AMERICA: COST PER ENPLANED PASSENGER, 2011 (IN US$)

Canada:
Lowest CPE: Victoria, Regina
Highest CPE: Toronto, Montreal

United States:
Lowest CPE: Charlotte, California Bob Hope (Burbank,CA)
Highest CPE: New York JFK, Newark Liberty
ATRS AIRPORT BENCHMARKING REPORT

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

- Can be purchased by visiting www.atrsworld.org

- Report sale finances our annual benchmarking research project
ACKNOWLEDGEMENT OF APPRECIATION

Gold Corporate Members

- Houston Airport System

Corporate Members

- Vancouver Airport Authority
- Gatwick Airport Ltd
- Copenhagen International Airport
- Istanbul Sabiha Gockcen International Airport
- Korea Airports Corporation
- Kazan international airport, Russia
- German Aerospace Center
- Airbus
- Boeing
Thank You

2014 ATRS World Conference
(Bordeaux, France, July 17-20, 2014)