Key Findings of 2013 ATRS Global Airport Performance Benchmarking project

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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
Airports Included in the 2012 Report

Canada (12)+US(65) 77 airports

Europe 77 airports
17 airport groups

Asia Pacific 35 Asian airports
16 Oceania airports
9 airport groups

---------------------------------------------
Total 195 airports
26 airport groups
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.
Data Sources: FY 2002-2011

- Airport’s Financial Statements, Annual Reports and direct data requests;
- US FAA, DOT statistics;
- Association of European Airlines (AEA) Statistics
- ICAO Digest of Statistics:
  - annual and monthly traffic data
  - annual financial data - not for all airports
- ACI; IATA
  - annual traffic statistics; capacity information; airport charges
  - general information surveys (Asia Pacific and Europe) occasional and not complete
- IMF and World Bank – various price indices including GDP deflators for service sectors and PPP
- US Census Bureau, Statistics Canada – regionally based Cost of Living Index
PASSENGERS TRAFFIC, FY2011
(IN ’000 PASSENGERS)
## PASSENGER TRAFFIC (’000)
### TOP 10 AIRPORTS:
#### FY 2007, 2009, 2011

<table>
<thead>
<tr>
<th>Objective</th>
<th>Data</th>
<th>Efficiency &amp; Cost</th>
<th>User Charge</th>
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### Chart Description
- **Asia Pacific**: PEK, HND, HKG, DXB, CGK, SIN, BKK, CAN, PVG, KUL
- **Europe**: LHR, CDG, FRA, AMS, MAD, FCO, MUC, IST, BCN, LGW
- **North America**: ATL, ORD, LAX, DFW, DEN, JFK, SFO, IAH, PHX, CLT

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AIRCRAFT MOVEMENTS, FY 2010
(’000 ATM)
PASSENGERS PER AIRCRAFT MOVEMENTS, FY 2011
% NON-AERO REVENUE, FY 2011
Methodology

2013 ATRS Global Airport Performance Benchmarking Project
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]
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)

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

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

- 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

Rank

ATL  RDU  RNO  CLT  PBI  BNA  MSP  JAX  LGA  SAT  TPA  SNA  MCO  MKE  FLL

Residual VFP Ranking  Residual DEA Ranking  Residual SFA Ranking
RESIDUAL RANKING COMPARISON OF BOTTOM 15 AIRPORTS IN US
RESIDUAL RANKING COMPARISON OF MID-RANKED 15 AIRPORTS IN US
2013 ATRS Airport Benchmarking

Key Results on Efficiency & Cost
RESIDUAL (NET) VARIABLE FACTOR PRODUCTIVITY (VFP):
EUROPE LARGE AIRPORTS (CPH=1.0), FY 2011

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

Geneva, Basel, Nice
RESIDUAL (NET) VARIABLE FACTOR PRODUCTIVITY (VFP): ASIA (HKG=1.0), FY 2011

Gimpo, Incheon, Guam

Objective Data Airport Characteristics Methodology Efficiency & Cost User Charge

Residual VFP Mean

Airports
- ICN
- GUM
- HAK
- HKG
- SIN
- CGK
- PEK
- HDY
- CAN
- CXN
- PVG
- PEN
- XMN
- HKT
- BKK
- SZX
- NRT
- KUL
- CMB
- NGO
- KIX

Airport Groups
- KAC
- AAI
- APII
- AOT
- MAHB
RESIDUAL (NET) VARIABLE FACTOR PRODUCTIVITY (VFP): OCEANIA (SYD=1.0), FY 2011
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

Oklahoma City, Richmond, Raleigh-Durham
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

2008
- North America: Hartsfield-Jackson Atlanta International Airport
- Europe: Copenhagen Kastrup International Airport
- Asia-Pacific: Hong Kong International Airport

2009
- North America: Hartsfield-Jackson Atlanta International Airport
- Europe: Copenhagen Kastrup International Airport
- Asia-Pacific: Hong Kong International Airport

2010
- North America: Hartsfield-Jackson Atlanta International Airport
- Europe: Large Airport Category: Oslo International Airport
  Small/Medium Airport Category: Geneva Cointrin International Airport
- Asia-Pacific: Large Airport Category: Hong Kong International Airport
  Small/Medium Airport Category: Seoul Gimpo International Airport

2011
- North America: Hartsfield-Jackson Atlanta International Airport
- Europe: Large Airport Category: Oslo International Airport
  Copenhagen Kastrup International Airport
- Asia-Pacific: Asian Airport Excellence Award: Hong Kong International Airport
  Oceania Excellence Award: Sydney Airport

2012
- North America: Hartsfield-Jackson Atlanta International Airport
- Europe: Large Airport Category: Copenhagen Kastrup International Airport
  Small/Medium Airport Category: Genève Aéroport
- Asia-Pacific: Asian Airport Excellence Award: Seoul Gimpo International Airport
  Oceania Excellence Award: Sydney Airport
COST COMPETITIVENESS = NET VFP AND INPUT PRICE EFFECT
EUROPE - LARGE AIRPORTS (CPH=0.0)

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**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

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
N. AMERICA - LARGE AIRPORTS (YVR=0.0)

Atlanta, Charlotte, Orlando

Objective | Data | Airport Characteristics | Methodology | Efficiency & Cost | User Charge
COST COMPETITIVENESS: = NET VFP AND INPUT PRICE EFFECT
N. AMERICA - SMALL & MEDIUM AIRPORTS (YVR=0.0)

Oklahoma City, Richmond (Virginia), Raleigh-Durham
2013 ATRS Airport Benchmarking

User Charge Comparison
LANDING CHARGES
FOR BOEING 767-400, 2012 (IN US$)

Objective
Data
Airport Characteristics
Methodology
Efficiency & Cost
User Charge
ASIA PACIFIC: COMBINED LANDING AND PASSENGER CHARGES FOR BOEING 737-800, 2012 (IN US$)

Lowest charges: **Taipei Taoyuan**, Dunedin (New Zealand)
Highest charges: **Osaka Kansai**, Tokyo Narita
EUROPE: COMBINED LANDING AND PASSENGER CHARGES FOR BOEING 737-800, 2012 (IN US$)

Lowest charges: **Riga** (Latvia), **Brussel South Charleroi**
Highest charges: **London Heathrow**, London Gatwick- Peak
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
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$)

**Objective**

**Data**

**Airport Characteristics**

**Methodology**

**Efficiency & Cost**

**User Charge**

Lowest charges: Riga (Latvia), Luxembourg

Highest charges: London Heathrow, Ben Gurion (Tal 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

**Objective**

- Data
- Airport Characteristics
- Methodology
- Efficiency & Cost
- User Charge
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
Thank You
2014 ATRS World Conference
(Bordeaux, France, end of June, 2014)