Key Findings: 2014 ATRS Global Airport Performance
Benchmarking Project

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2014 ATRS Global Airport Performance Benchmarking Project

Key Findings

ATRS Global Airport Benchmarking Task Force:
Asia Pacific: P. 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: Tae Oum, Bijan Vasigh, Jia Yan, Chunyan Yu
Middle East: Paul Hooper

Prof. Tae Hoon Oum, Dr. Sam Choo, Prof. Chunyan Yu
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
Airport Database

2014 ATRS Global Airport Performance Benchmarking Project
200 MAJOR AIRPORTS AROUND THE WORLD

N. America, 78
Europe, 69
Asia Pacific, 53

- United States (66)
- Canada (12)
- Oceania Countries (16)
- Asia (37)

2 new airports

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Airport Characteristics Methodology Efficiency & Cost User Charge
26 AIRPORT GROUPS

- Asia Pacific (9)
- Europe (17)
ATRS AIRPORT DATABASE, FY 2002-2012 (11 years)

- 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.
Airport Characteristics

2014 ATRS Global Airport Performance Benchmarking Project
PASSENGERS TRAFFIC, FY2012
(IN ’000 PASSENGERS)
AIRCRAFT MOVEMENTS, FY 2012 ('000 ATM)

<table>
<thead>
<tr>
<th>Region</th>
<th>Airports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia Pacific</td>
<td>PEK, HKG, NRT, SIN, CGK, TPE, HND</td>
</tr>
<tr>
<td>Europe</td>
<td>CDG, FRA, LHR, AMS, MUC, IST, FCO, BCN, ZRH, VIE</td>
</tr>
<tr>
<td>North America</td>
<td>ORY, OSL, BRU, DUS, ARN, HEL, PMI, TXL, MXP, MAN, GVA, NCE, DUB, ATH, HAM, LIS, STN, PRG, LED, CGN</td>
</tr>
</tbody>
</table>

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# PASSENGERS PER AIRCRAFT MOVEMENTS, FY 2012

## Figure

The figure shows the number of passengers per aircraft movements for different regions: Asia Pacific, Europe, and North America. The data is represented over the fiscal year 2012, with a trend line indicating the overall movement of passengers per aircraft movement.

### Table

<table>
<thead>
<tr>
<th>Region</th>
<th>FY 2012</th>
<th>FY 2011</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia Pacific</td>
<td></td>
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<tr>
<td>Europe</td>
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<tr>
<td>North America</td>
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</tr>
</tbody>
</table>

### Graph Details

- **X-axis**: Fiscal Year (2010-2012)
- **Y-axis**: Number of Passengers
- **Legend**: Asia Pacific, Europe, North America

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**Objective**

To analyze passenger movement trends and identify areas for improving efficiency and cost.

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### Methodology

Data was collected from airport records and analyzed using statistical methods to determine trends and patterns.

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### Efficiency & Cost

Efficiency improvements were identified through the analysis, resulting in cost savings.

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### User Charge

User charges were adjusted based on the efficiency improvements, leading to a more cost-effective service.

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**Axes:**

- **X-axis**: Fiscal Year (2010-2012)
- **Y-axis**: Number of Passengers

**Legend:**

- Asia Pacific
- Europe
- North America
AIR CARGO TRAFFIC, FY 2012
(’000 METRIC TONS)

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Asia Pacific

Europe

North America
% NON-AERO REVENUE, FY 2012

Asia Pacific

Europe

North America
Methodology

2014 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]

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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)

ASIAN AIRPORTS
(HKG=1.0), FY 2012
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: ASIA (HKG=1.0), FY 2012
2014 ATRS Global Airport Performance Benchmarking Project

Key Results on Efficiency & Cost
RESIDUAL (NET) VARIABLE FACTOR PRODUCTIVITY (VFP): ASIA (HKG=1.0), FY 2012

Busan Gimhae, Jeju, Hong Kong
GROSS VARIABLE FACTOR PRODUCTIVITY VS RESIDUAL VFP: Europe Large Airports (CPH=1.0), FY 2012
RESIDUAL (NET) VARIABLE FACTOR PRODUCTIVITY (VFP):
EUROPE LARGE AIRPORTS (CPH=1.0), FY 2012

Copenhagen Kastrup, Zurich, Oslo

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GROSS VARIABLE FACTOR PRODUCTIVITY VS RESIDUAL VFP: Europe Small & Medium Airport (CPH=1.0), FY 2012
RESIDUAL (NET) VARIABLE FACTOR PRODUCTIVITY (VFP):
EUROPE SMALL & MEDIUM AIRPORTS (CPH=1.0), FY 2012

Athens, Geneva, Basel
GROSS VARIABLE FACTOR PRODUCTIVITY VS RESIDUAL VFP: N. American Large Airports (YVR=1.0), FY 2012
RESIDUAL (NET) VARIABLE FACTOR PRODUCTIVITY (VFP): NORTH AMERICA LARGE AIRPORTS (YVR=1.0), FY 2012

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GROSS VARIABLE FACTOR PRODUCTIVITY VS RESIDUAL VFP: N. American Small & Medium Airport (YVR=1.0), FY 2012
RESIDUAL (NET) VARIABLE FACTOR PRODUCTIVITY (VFP):
N. AMERICA SMALL & MEDIUM AIRPORTS (YVR=1.0), FY 2012

Objective Data Airport Characteristics Methodology Efficiency & Cost User Charge

Oklahoma City, Calgary, Raleigh-Durham
GROSS VARIABLE FACTOR PRODUCTIVITY VS RESIDUAL VFP: Oceanian Airports (SYD=1.0), FY 2012
RESIDUAL (NET) VARIABLE FACTOR PRODUCTIVITY (VFP): OCEANIA (SYD=1.0), FY 2012

Sydney, Dunedin, Melbourne
TOP EFFICIENCY PERFORMERS (2014)
(based on Net VFP index=operating/management efficiency)

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

Europe:
- **Large Airports (> 15 million pax):**
  - Copenhagen Kastrup, Zurich, Oslo
- **Small/Medium Airports (< 15 millions Pax):**
  - Athens, Geneva, Basel
TOP EFFICIENCY PERFORMERS (2014)
(based on Net VFP index=operating/management efficiency)

North America:

- **Large Airports (> 15 million pax):**
  - Atlanta, Charlotte, Minneapolis St Paul

- **Small/Medium Airports (< 15 millions Pax):**
  - Oklahoma City, Calgary, Raleigh-Durham
PAST AIRPORT EFFICIENCY EXCELLENCE
TOP PERFORMERS, 2009 - 2013

North America
- Hartsfield-Jackson Atlanta International Airport

Europe
- Copenhagen Kastrup International Airport
- Large Airport Category: Oslo International Airport
  Small/Medium Airport Category: Geneve Cointrin International Airport
- Large Airport Category: Copenhagen Kastrup International Airport
  Small/Medium Airport Category: Genève Aéroport

Asia-Pacific
- Hong Kong International Airport
- Large Airport Category: Hong Kong International Airport
  Small/Medium Airport Category: Seoul Gimpo International Airport

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COST COMPETITIVENESS = NET VFP AND INPUT PRICE EFFECT

ASIA (HKG=0.0) – THE HIGHER THE BETTER

Haikou, Busan Gimhae, Jakarta
COST COMPETITIVENESS = NET VFP AND INPUT PRICE EFFECT

EUROPE - LARGE AIRPORTS (CPH=0.0)

Copenhagen, Lisbon, Istanbul Ataturk
COST COMPETITIVENESS = NET VFP AND INPUT PRICE EFFECT
EUROPE - SMALL & MEDIUM AIRPORTS (CPH=0.0)

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

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

Oklahoma City, Raleigh-Durham, Richmond (Virginia)
COST COMPETITIVENESS = NET VFP AND INPUT PRICE EFFECT
OCEANIA (SYD=0.0)

Dunedin, Auckland, Sydney
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User Charge Comparison
LANDING CHARGES
FOR AIRBUS 320, 2013 (IN US$)

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ASIA PACIFIC: COMBINED LANDING AND PASSENGER CHARGES FOR AIRBUS 320, 2013 (IN US$)

Lowest charges: **Taipei Taoyuan, New Delhi**

Highest charges: **Osaka Kansai, Nagoya**

Objective Data Airport Characteristics Methodology Efficiency & Cost User Charge
EUROPE: COMBINED LANDING AND PASSENGER CHARGES FOR AIRBUS 320, 2013 (IN US$)

Lowest charges: Luxembourg, Riga (Latvia)
Highest charges: London Heathrow, London Gatwick- Peak

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NORTH AMERICA: COST PER ENPLANED PASSENGER, 2012 (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, Washington Dulles
LANDING CHARGES
FOR BOEING 737-800, 2013 (IN US$)
EUROPE: COMBINED LANDING AND PASSENGER CHARGES FOR BOEING 737-800, 2013 (IN US$)

Lowest charges: Luxembourg, Riga (Latvia)
Highest charges: London Heathrow, London Gatwick- Peak
NORTH AMERICA: COST PER ENPLANED PASSENGER, 2012 (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, Washington Dulles

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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
Thank You

See you at 2015 ATRS World Conference in Singapore!
ATRS AIRPORT DATA

Up to 30% discount for student and academic researcher

- 200 major airports and 26 airports around the world.
- FY 2002-FY2012 (11 years data)
- More details at http://www.atrsworld.org/Database.html
- Download Database Manual and order form from the above website.