

2020 Airport Benchmarking Team

2020

AIRPORT BENCHMARKING REPORT

Global Standards for Airport Excellence

Information Package

©Air Transport Research Society

Project Founding Director:

Professor Tae H. OUM

Air Transport Research Society

Research Director:

Professor Chunyan Yu

Embry-Riddle Aeronautical University

North America:

Professor Bijan VASIGH
(United States of America)

Embry-Riddle Aeronautical University

Professor Jia YAN
(United States of America)

Washington State University

Asia Pacific:

Professor Peter FORSYTH
(Australia)

Monash University

Professor Japhet Law
(Hong Kong)

Chinese University of Hong Kong

Professor Yuichiro YOSHIDA
(Japan)

International University of Japan

Professor Yeong-Heok LEE
(Korea)

Hankuk Aviation University

Professor Shinya HANAOKA
(japan)

Tokyo Institute of Technology

Professor Xiaowen Fu
(Australia)

The University of Sydney

Europe:

Professor Jaap de WIT
(The Netherlands)

University of Amsterdam

Professor Eric PELS
(The Netherlands)

Free University of Amsterdam

Professor Hans-Martin
NIEMEIER (Germany)

University of Applied Science

Professor Nicole ADLER
(Israel)

Hebrew University of Jerusalem

Headquarters Staff:

Jiahe Tian
Ila P. Toppo
Luman Liu
Nate P. Pham

Research Assistant, Air Transport Research Society
Research Assistant, Air Transport Research Society
Research Assistant, Air Transport Research Society
Research Assistant, Air Transport Research Society

Asia Pacific			
Code	Airport Name	City, Country	
1	ADL	Adelaide International Airport	Adelaide, Australia
2	AKL	Auckland International Airport	Auckland, New Zealand
3	BKK	Suvarnabhumi Airport	Bangkok, Thailand
4	BNE	Brisbane Airport	Brisbane, Australia
5	BOM	Chhatrapati Shivaji International Airport	Mumbai, India
6	CAN	Bai Yun Airport	Guangzhou, China
7	CEI	Mae Fah Luang-Chiang Rai International Airport	Chiang Rai, Thailand
8	CGK	Jakarta Soekarno-Hatta International Airport	Jakarta, Indonesia
9	CJU	Jeju International Airport	Jeju, Korea
10	CHC	Christchurch International Airport	Christchurch, New Zealand
11	CMB	Bandaranaike International Airport	Colombo, Sri Lanka
12	CNS	Cairns International Airport	Cairns, Australia
13	CNX	Chiang Mai International Airport	Chiang Mai, Thailand
14	DEL	Indira Gandhi International Airport	New Delhi, India
15	DRW	Darwin International Airport	Darwin, Australia
16	DUD	Dunedin International Airport	Dunedin, New Zealand
17	DXB	Dubai International Airport	Dubai, UAE
18	GMP	Seoul Gimpo International Airport	Seoul, South Korea
19	GUM	Antonio B. Won Pat International Airport	Hagatna, Guam
20	HAK	Meilan International Airport	Haikou, China
21	HDY	Hat Yai International Airport	Hat Yai, Thailand
22	HKG	Hong Kong International Airport	Hong Kong, China
23	HKT	Phuket International Airport	Phuket, Thailand
24	HND	Haneda Airport	Tokyo, Japan
25	ICN	Incheon International Airport	Incheon, Korea
26	KIX	Kansai International Airport	Osaka, Japan
27	KUL	Kuala Lumpur International Airport	Kuala Lumpur, Malaysia
28	MAA	Chennai International Airport	Chennai, India
29	MEL	Melbourne Airport	Melbourne, Australia
30	MFM	Macau International Airport	Macau, China
31	MNL	Ninoy Aquino International Airport	Manila, The Philippines
32	NAN	Nadi International Airport	Nadi, Fiji
33	NGO	Central Japan International Airport	Nagoya, Japan
34	NRT	Tokyo Narita International Airport	Tokyo, Japan
35	NTL	Newcastle Airport	Newcastle, Australia
36	OOL	Gold Coast Airport	Gold Coast, Australia
37	PEK	Beijing Capital International Airport	Beijing, China
38	PEN	Penang International Airport	Penang, Malaysia
39	PER	Perth International Airport	Perth, Australia
40	PNH	Phnom Penh International Airport	Phnom Penh, Cambodia
41	PUS	Gimhae International Airport	Busan, Korea
42	PVG	Shanghai Pudong International Airport	Shanghai, China
43	REP	Siem Reap International Airport	Siem Reap, Cambodia
44	SHA	Shanghai Hongqiao International Airport	Shanghai, China
45	SIN	Singapore Changi International Airport	Singapore, Singapore
46	SUB	Juanda International Airport	Sidoarjo, Indonesia
47	SYD	Sydney Airport	Sydney, Australia
48	SZX	Shenzhen Bao'an International Airport	Shenzhen, China
49	TPE	Taiwan Taoyuan International Airport	Taipei, Taiwan
50	TSV	Townsville Airport	Townsville, Australia
51	WLG	Wellington International Airport	Wellington, New Zealand
52	XMN	Xiamen Gaoqi International Airport	Xiamen, China
53	ZQN	Queenstown Airport	Frankton, New Zealand

Europe			
Airport Code	Airport Name	City, Country	
54	AGP	Malaga-Costa del Sol Airport	Malaga, Spain
55	ALC	Alicante Airport	El Altet - Torrellano, Spain
56	AMS	Amsterdam Airport Schiphol	Amsterdam, The Netherlands
57	ARN	Stockholm-Arlanda Airport	Stockholm, Sweden
58	ATH	Athens International Airport	Athens, Greece
59	BCN	Barcelona El Prat Airport	Barcelona, Spain
60	BEG	Belgrade Nikola Tesla Airport	Belgrade, Serbia
61	BGY	Bergamo-Orio al Serio Airport	Bergamo, Italy
62	BHX	Birmingham Airport	Birmingham, England
63	BLQ	Bologna Airport	Bologna, Italy
64	BRS	Bristol Airport	Lulsgate Bottom, England
65	BRU	Brussels Airport	Brussels, Belgium
66	BSL	EuroAirport Basel-Mulhouse-Freiburg	Basel, Switzerland
67	BTS	Bratislava Milan Rastislav Stefanik Airport	Bratislava, Slovakia
68	BUD	Budapest Ferenc Liszt International Airport	Budapest, Hungary
69	CDG	Paris Charles de Gaulle Airport	Paris, France
70	CGN	Cologne/Bonn Konrad Adenauer Airport	Cologne, Germany
71	CIA	Rome Ciampino Airport	Rome, Italy
72	CPH	Copenhagen Airport Kastrup	Copenhagen, Denmark
73	DUB	Dublin Airport	Dublin, Ireland
74	DUS	Düsseldorf International Airport	Düsseldorf, Germany
75	EDI	Edinburgh Airport	Edinburgh, Scotland
76	FCO	Rome Leonardo Da Vinci/Fiumicino Airport	Rome, Italy
77	FRA	Frankfurt Airport	Frankfurt, Germany
78	GLA	Glasgow Airport	Renfrewshire, Scotland
79	GVA	Genève Aéroport	Geneva, Switzerland
80	HAJ	Hannover Airport	Langenhagen, Germany
81	HAM	Hamburg Airport	Hamburg, Germany
82	HEL	Helsinki Vantaa Airport	Helsinki, Finland
83	IST	Istanbul Atatürk Airport	Istanbul, Turkey
84	KBP	Kiev Boryspil International Airport	Kiev, Ukraine
85	KEF	Keflavik International Airport	Reykjanesbaer, Iceland
86	LED	Pulkovo Airport	Saint Petersburg, Russia
87	LGW	London Gatwick International Airport	London, England
88	LHR	London Heathrow Airport	London, England
89	LIN	Milan Linate Airport	Milan, Italy
90	LIS	Lisbon Portela Airport	Lisbon, Portugal
91	LJU	Ljubljana Jože Pučnik Airport	Ljubljana, Slovenia
92	LPA	Gran Canaria Airport	Teldi, Spain
93	LTN	London Luton Airport	London, England
94	LUX	Luxembourg Airport	Findel, Luxembourg
95	LYS	Lyon-Saint Exupery Airport	Colombier-Saugnieu, France
96	MAD	Madrid Barajas Airport	Madrid, Spain
97	MAN	Manchester Airport	Manchester, England
98	MLA	Malta International Airport	Valletta, Malta
99	MUC	Munich Airport	Munich, Germany
100	MPX	Milan Malpensa Airport	Milan, Italy
101	NAP	Naples International Airport	Naples, Italy
102	NCE	Nice Cote D'Azur Airport	Nice, France
103	OPO	Porto Airport	Porto, Portugal

Airports included in the ATRS Airport Benchmarking Report (Cont.)

Europe			
Airport Code	Airport Name		City, Country
104	ORY	Paris Orly Airport	Paris, France
105	OSL	Oslo Airport Gardermoen	Oslo, Norway
106	PMI	Palma de Mallorca Airport	Palma de Mallorca, Spain
107	PRG	Prague International Airport	Prague, Czech Republic
108	RIX	Riga International Airport	Riga, Latvia
109	SAW	Istanbul Sabiha Gökçen International Airport	Istanbul, Turkey
110	SOF	Sofia Airport	Sofia, Bulgaria
111	STN	London Stansted Airport	London, England
112	STR	Stuttgart Airport	Stuttgart, Germany
113	SVO	Sheremetyevo International Airport	Moscow, Russia
114	SXF	Berlin Schönefeld Airport	Berlin, Germany
115	SZG	Salzburg W.A. Mozart Airport	Salzburg, Austria
116	TLL	Lennart Meri Tallinn Airport	Tallinn, Estonia
117	TLV	Ben Gurion International Airport	Tel Aviv, Israel
118	TRN	Turin Caselle Airport	Turin, Italy
119	TXL	Berlin Tegel Airport	Berlin, Germany
120	VCE	Venice Marco Polo Airport	Venice, Italy
121	VI	Vienna International Airport	Vienna, Austria
122	WAW	Warsaw Chopin Airport	Warsaw, Poland
123	ZAG	Zagreb Airport	Zagreb, Croatia
124	ZRH	Zurich Airport	Zurich, Switzerland

North America - United States			
Code	Airport Name		City, State
125	ABQ	Albuquerque International Sunport	Albuquerque, New Mexico
126	ALB	Albany International Airport	Albany, New York
127	ANC	Ted Stevens Anchorage International Airport	Anchorage, Alaska
128	ATL	Hartsfield-Jackson Atlanta International Airport	Atlanta, Georgia
129	AUS	Austin Bergstrom Airport	Austin, Texas
130	BDL	Bradley International Airport	Windsor Locks, Connecticut
131	BNA	Nashville International Airport	Nashville, Tennessee
132	BOS	Boston Logan International Airport	Boston, Massachusetts
133	BUF	Buffalo Niagara International Airport	Cheektowaga, New York
134	BUR	Bob Hope Airport	Burbank, California
135	BWI	Baltimore Washington International Airport	Baltimore, Maryland
136	CLE	Cleveland-Hopkins International Airport	Cleveland, Ohio
137	CLT	Charlotte Douglas International Airport	Charlotte, North Carolina
138	CMH	Port Columbus International Airport	Columbus, Ohio
139	CVG	Cincinnati/Northern Kentucky International Airport	Cincinnati, Ohio
140	DAL	Dallas Love Field Airport	Dallas, Texas
141	DCA	Ronald Reagan Washington National Airport	Washington, DC
142	DEN	Denver International Airport	Denver, Colorado
143	DFW	Dallas Fort Worth International Airport	Dallas, Texas
144	DTW	Detroit Metropolitan Wayne County Airport	Detroit, Michigan
145	EWR	Newark Liberty International Airport	Newark, New Jersey
146	FLL	Fort Lauderdale Hollywood International Airport	Ft. Lauderdale, Florida
147	HNL	Honolulu International Airport	Honolulu, Hawaii
148	HOU	William P. Hobby Airport	Houston, Texas
149	IAD	Washington Dulles International Airport	Washington, DC
150	IAH	George Bush Intercontinental Airport	Houston, Texas
151	IND	Indianapolis International Airport	Indianapolis, Indiana

North America - United States			
Code	Airport Name		City, State
152	JAX	Jacksonville International Airport	Jacksonville, Florida
153	JFK	New York-John F. Kennedy International Airport	New York, New York
154	LAS	Las Vegas McCarran International Airport	Las Vegas, Nevada
155	LAX	Los Angeles International Airport	Los Angeles, California
156	LGA	LaGuardia International Airport	New York, New York
157	MCI	Kansas City International Airport	Kansas City, Missouri
158	MCO	Orlando International Airport	Orlando, Florida
159	MDW	Chicago Midway Airport	Chicago, Illinois
160	MEM	Memphis International Airport	Memphis, Tennessee
161	MIA	Miami International Airport	Miami, Florida
162	MKE	General Mitchell International Airport	Milwaukee, Wisconsin
163	MSP	Minneapolis/St. Paul International Airport	Minneapolis, Minnesota
164	MSY	Louis Armstrong New Orleans International Airport	New Orleans, Louisiana
165	OAK	Oakland International Airport	Oakland, California
166	OGG	Kahului Airport	Kahului, Hawaii
167	OKC	Will Rogers World Airport	Oklahoma City, Oklahoma
168	OMA	Eppley Airfield	Omaha, Nebraska
169	ONT	LA/Ontario International Airport	Ontario, California
170	ORD	Chicago O'Hare International Airport	Chicago, Illinois
171	PBI	Palm Beach International Airport	West Palm Beach, Florida
172	PDX	Portland International Airport	Portland, Oregon
173	PHL	Philadelphia International Airport	Philadelphia, Pennsylvania
174	PHX	Phoenix Sky Harbor International Airport	Phoenix, Arizona
175	PIT	Pittsburgh International Airport	Pittsburgh, Pennsylvania
176	PVD	Theodore Francis Green State Airport	Warwick, Rhode Island
177	RDU	Raleigh-Durham International Airport	Raleigh, North Carolina
178	RIC	Richmond International Airport	Richmond, Virginia
179	RNO	Reno/Tahoe International Airport	Reno, Nevada
180	RSW	Southwest Florida International Airport	South Fort Myers, Florida
181	SAN	San Diego International Airport	San Diego, California
182	SAT	San Antonio International Airport	San Antonio, Texas
183	SDF	Louisville International-Standiford Field	Louisville, Kentucky
184	SEA	Seattle-Tacoma International Airport	Seattle, Washington
185	SFO	San Francisco International Airport	San Francisco, California
186	SJC	Norman Y. Mineta San José International Airport	San José, California
187	SJU	Luis Muñoz Marín International Airport	San Juan, Puerto Rico
188	SLC	Salt Lake City International Airport	Salt Lake City, Utah
189	SMF	Sacramento International Airport	Sacramento, California
190	SNA	John Wayne Orange County Airport	Costa Mesa, California
191	STL	St. Louis-Lambert International Airport	St. Louis, Missouri
192	TPA	Tampa International Airport	Tampa, Florida
193	TUL	Tulsa International Airport	Tulsa, Oklahoma
194	TUS	Tucson International Airport	Tucson, Arizona

North America - Canada			
Code	Airport Name		City, Province
195	YEG	Edmonton International Airport	Edmonton, Alberta
196	YHZ	Halifax Stanfield International Airport	Halifax, Nova Scotia
197	YOW	Ottawa Macdonald-Cartier International Airport	Ottawa, Ontario
198	YQR	Regina International Airport	Regina, Saskatchewan
199	YUL	Montréal-Pierre Elliott Trudeau International Airport	Montréal, Québec
200	YVR	Vancouver International Airport	Vancouver, British Columbia
201	YWG	Winnipeg James Armstrong Richardson International Airport	Winnipeg, Manitoba
202	YYC	Calgary International Airport	Calgary, Alberta
203	YYJ	Victoria International Airport	Victoria, British Columbia
204	YYT	St. John's International Airport	St. John's, Newfoundland
205	YYZ	Toronto Lester B. Pearson International Airport	Toronto, Ontario

Asia Pacific - Major Airport Authorities

	Code	Authority Name	Country
G1	AAI	Airports Authority of India	India
G2	ADG	Airport Development Group	Australia
G3	AOT	Airports of Thailand Public Company Limited	Thailand
G4	APAC	Australia Pacific Airports Corporation	Australia
G5	API	P.T. (Persero) Angkasa Pura I	Indonesia
G6	APII	P.T. (Persero) Angkasa Pura II	Indonesia
G7	KAC	Korea Airports Corporation	Korea
G8	MAHB	Malaysia Airports Holding Behard	Malaysia
G9	QAL	Queensland Airport Limited	Australia

Europe - Major Airport Authorities

	Airport Code	Authority Name	Country
G10	ADP	Aeroports de Paris	France
G11	ADR	Aeroporti di Roma	Italy
G12	AENA	Aeropuertos Espanoles y Navegacion Aerea	Spain
G13	ANA	Aeropostos de Portugal	Portugal
G14	Avinor	Avinor Group	Norway
G15	Berlin	Berlin Airports	Germany
G16	DAA	Dublin Airport Authority	Ireland
G17	Finavia	Finavia Oyj	Finland
G18	Fraport	Fraport AG	Germany
G19	Isavia	Isavia	Iceland
G20	MAG	Manchester Airports Group	United Kingdom
G21	Schiphol	Schiphol Group	The Netherlands
G22	SEA	Società Enti Aeroportuali (SEA) Aeroporti di Milano	Italy
G23	Swedavia	Swedavia	Sweden
G24	TAV	TAV Airports Holding	Turkey

The ATRS Benchmarking Report consists of three parts:

- **Part I** provides a summary of the research approach and key results. It contains 9 summary tables and 10 summary charts covering the main aspects of airport operations and management, including labour productivity, soft cost input productivity, residual variable factor productivity, and revenue generation.

- **Part II** is the main body of the report. It provides over 200 charts and tables comparing most dimensions of airport performance across airports. It also provides comparisons of the status of the airports in terms of traffic volume, number of employees and terminal-airside capacity. A comparison of airport charges including landing and passenger charges is also presented.

- **Part III** of the report presents a short description of each airport including a section on new development and on recent awards. It also includes information on capacity and traffic (with time series data), airport charges as well as highlights of the current revenue, and profit margin. In addition, a summary of the airport charges is also included.

- This report includes:
 - 205 airports**
 - 24 airports groups/authorities**

THE REPORT

The main objective of this report is to measure and compare the performance of several important aspects of airport operation including:

- **Productivity and Efficiency**
- **Unit Costs and Unit Competitiveness**
- **Financial Results**
- **Airport Charges**

The report also examines the relationship between various performance measures and airport characteristics in order to better explain the differences in airport performance.

PRODUCTIVITY AND EFFICIENCY

The report measures and compares a number of partial measures of productivity including labour productivity, capital productivity, and “soft cost input” productivity. These include the typical partial performers such as passengers per employee, passengers per gate etc.

In addition, this report introduces a number of new partial productivity measures including the “soft cost input” productivity. “Soft cost input” productivity, a measure unique to the ATRS Benchmarking Report, is a catch-all input which includes all expenses other than labour and capital and is used primarily to take into account the cost of buying in outsourced services.

The soft cost input account for 28% to 93% of an airports non-capital expenditures, as such, it is extremely important to consider this soft cost in examining airport performance.

UNIT COST AND UNIT COMPETITIVENESS

The report presents a number of unit cost measures. These include measures such as labour cost per passenger, labour cost per aircraft movement, etc. A unit cost index provides a means by which to examine the relationship to various airport characteristics and airport service levels.

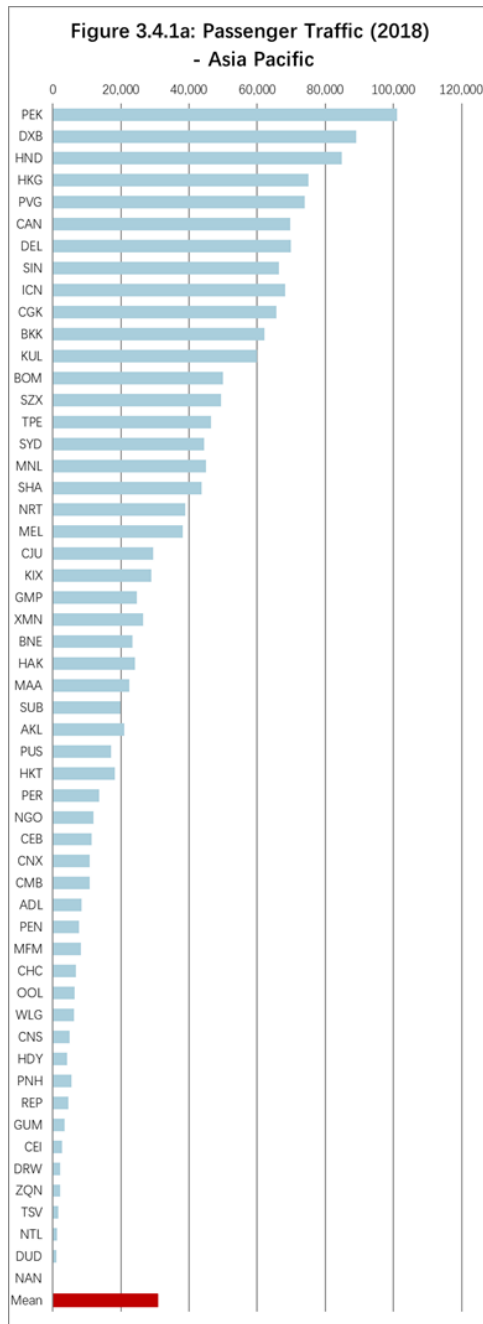
FINANCIAL RESULTS

The report presents a number of revenue generation indicators and common financial ratios, including aeronautical revenue per aircraft movement, total revenue per passenger, return on equity, current ratio, return on asset, etc. A yield for total revenue per unit of output is also provided as an overall revenue generation indicator.

AIRPORT CHARGES

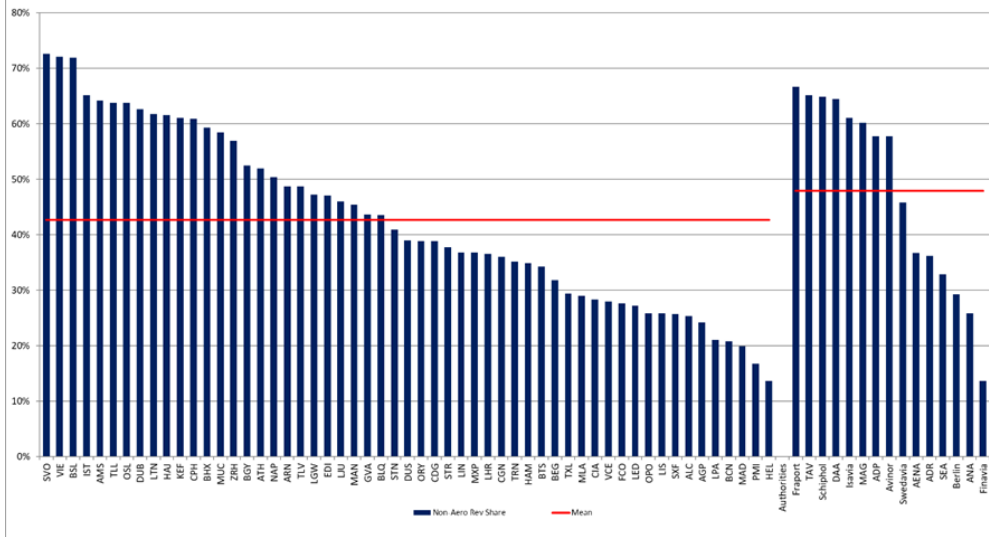
One means for airports to derive revenues is through charges associated with aeronautical activities. Aeronautical charges are levied for the use of an airport’s runway, apron and terminal facilities. Landing charges, typically based on the weight of the aircraft, terminal (Passenger) charges, generally levied on the number of passengers at time of departure, and aeronautical fee as a whole are compared in the report. Three types of aircraft reflecting different aircraft weight classes are considered: **Boeing 777-300ER, Boeing 767-400, Boeing 737-800, Airbus 321, and CRJ 200**. A breakdown of landing charges by weight categories and passenger charges by boarding passenger is also included.

Samples



Airport Code	2014	2015	2016	2017	2018	% Change 17-18	% Change 14-18
PEK	86,128	89,939	94,383	95,786	100,983	5.4%	17.2%
DXB	70,476	78,015	83,654	88,242	89,149	1.0%	26.5%
HND	72,827	75,573	80,110	81,854	84,894	3.7%	16.6%
HKG	64,700	69,700	70,500	72,866	75,100	3.1%	16.1%
PVG	51,688	60,098	66,002	70,001	74,006	5.7%	43.2%
DEL	40,986	48,424	57,703	65,692	69,867	6.4%	70.5%
CAN	54,780	55,202	59,732	65,807	69,745	6.0%	27.3%
ICN	45,512	49,413	57,765	62,082	68,260	10.0%	50.0%
SIN	54,093	56,737	59,372	62,220	66,300	6.6%	22.6%
CGK	57,221	54,291	58,195	61,611	65,668	6.6%	14.8%
BKK	46,497	52,384	55,473	59,080	62,149	5.2%	33.7%
KUL	48,930	48,938	52,644	58,517	59,959	2.5%	22.5%
BOM	34,994	40,637	45,154	48,496	49,877	2.8%	42.5%
SZX	36,273	39,722	41,971	45,611	49,349	8.2%	36.0%
TPE	34,141	38,473	42,296	44,879	46,535	3.7%	36.3%
MNL	34,094	36,583	39,517	42,022	45,054	7.2%	32.1%
SYD	38,500	39,656	41,091	43,330	44,400	2.5%	15.3%
SHA	37,971	39,091	40,460	41,884	43,646	4.2%	14.9%
NRT	35,595	35,356	39,054	40,687	38,797	-4.6%	9.0%
MEL	31,936	32,104	33,900	35,171	38,100	8.3%	19.3%
CJU	23,198	26,238	29,709	29,604	29,455	-0.5%	27.0%
KIX	20,049	23,973	25,720	28,804	28,860	0.2%	43.9%
XMN	20,864	21,814	22,738	24,485	26,553	8.4%	27.3%
GMP	21,567	23,164	25,043	25,101	24,603	-2.0%	14.1%
HAK	13,854	16,167	18,804	22,585	24,124	6.8%	74.1%
BNE	21,845	22,275	22,685	22,881	23,465	2.6%	7.4%
MAA	14,299	15,218	18,362	20,361	22,487	10.4%	57.3%
AKL	15,062	15,817	17,260	18,345	20,911	14.0%	38.8%
SUB	17,479	16,640	19,486	18,997	19,794	4.2%	13.2%
HKT	11,276	12,538	14,722	16,230	18,267	12.5%	62.0%
PUS	10,379	12,383	14,903	16,404	17,065	4.0%	64.4%
PER	14,000	13,984	12,556	12,381	13,700	10.6%	-2.1%
NGO	9,885	10,411	10,843	11,540	12,015	4.1%	21.5%
CEB	6,840	7,781	8,831	10,051	11,378	13.2%	66.3%
CMB	7,781	8,508	9,466	9,958	10,880	9.3%	39.8%
CNX	6,213	8,070	9,208	9,973	10,809	8.4%	74.0%
ADL	7,853	7,842	7,893	8,090	8,494	5.0%	8.2%
MFM	5,481	5,831	6,629	7,166	8,260	15.3%	50.7%
PEN	6,042	6,259	6,684	7,232	7,790	7.7%	28.9%
CHC	5,690	5,916	6,306	6,733	6,870	2.0%	20.7%
OOL	5,784	5,865	6,273	6,479	6,486	0.1%	12.1%
WLG	5,457	5,796	5,965	6,115	6,145	0.5%	12.6%
PNH	2,666	3,079	3,389	4,240	5,423	27.9%	103.4%
CNS	4,556	4,658	4,711	4,941	4,944	0.1%	8.5%
REP	3,019	3,297	3,478	4,209	4,480	6.4%	48.4%
HDY	2,944	3,568	3,871	4,347	4,266	-1.9%	44.9%
GUM	3,184	3,185	3,354	3,700	3,407	-7.9%	7.0%
CEI	1,292	1,640	1,959	2,385	2,805	17.6%	117.1%
ZQN	1,399	1,651	1,780	1,892	2,242	18.5%	60.3%
DRW	2,302	2,218	2,216	2,246	2,190	-2.5%	-4.9%
TSV	1,595	1,551	1,530	1,590	1,610	1.3%	1.0%
NTL	1,190	1,144	1,257	1,265	1,273	0.6%	7.0%
DUD	853	862	910	973	1,031	5.9%	20.8%
NAN	2,027	2,211	2,047	-	-	-	-
Mean	24,023	25,654	27,689	29,380	30,829	5.6%	32.9%
AAI	190,100	223,616	264,970	308,750	341,449	10.6%	79.6%
AOT	87,572	106,790	119,924	133,116	140,472	5.5%	60.4%
API	85,131	84,292	95,175	105,484	111,454	5.7%	30.9%
MAHB	83,348	83,830	88,977	96,637	99,102	2.6%	18.9%
API	73,228	73,936	84,756	89,752	90,881	1.3%	24.1%
KAC	61,628	69,366	78,524	82,073	82,258	0.2%	33.5%
APAC	32,080	32,200	35,200	36,500	38,100	4.4%	18.8%
QAL	7,577	7,662	8,109	8,276	8,500	2.7%	12.2%
Mean	67,037	85,211	96,954	107,574	114,027	4.1%	34.8%

Figure 6.1.1b: Non-Aeronautical Revenue Share (2018) - Europe



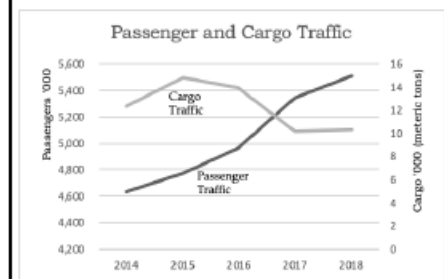
Belgrade Nikola Tesla Airport BEG

Belgrade, Serbia Fiscal Year-End: Dec. 31, 2018

Website: www.beg.aero

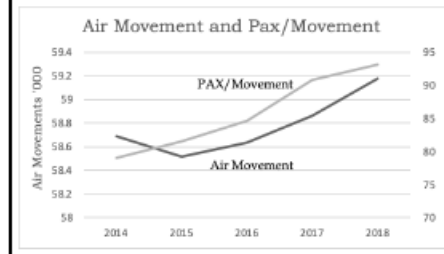
Ownership & Management

Belgrade Nikola Tesla Airport is operated by Aerodrom "Beograd - Nikola Tesla" P.E and is owned by Republic of Serbia (83.15%), Free float (16.85%).

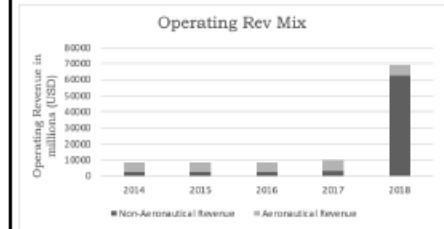


Capacity	
Runways	1
Terminal Size (m²)	50,000
Gates	27
Employees	501

Traffic	
% International PAX	100.0%
Dominant Carrier	Air Serbia
% of Dominant Carrier	47.08%
Movements per Day	162
Daily Gate Utilization (PAX)	559



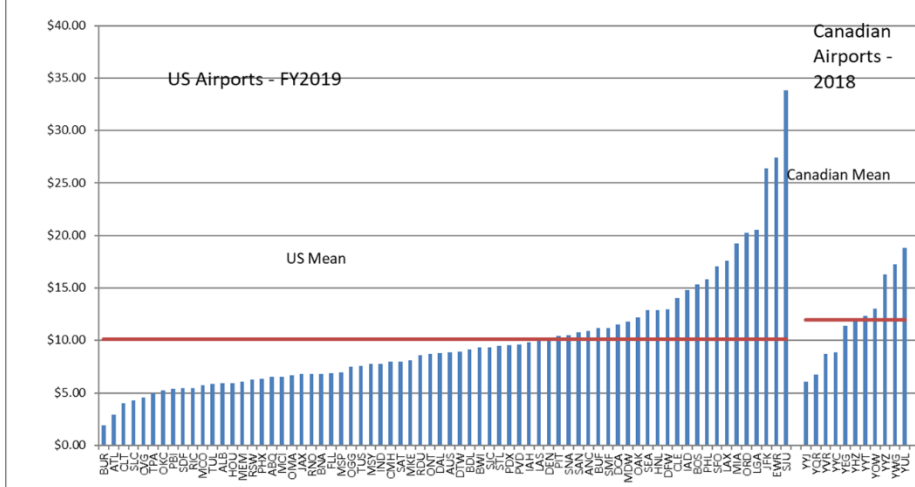
Airport Charges	
Landing charge (EUR) (MTOM) per tonne: Up to 25 ton – 5.70; over 25 ton – 7.70	
Parking charge (EUR) 2.00 per tonne up to 24 hours Minimum charge 15 per aircraft	
Passenger charge (EUR) (€/departing pax): International Terminal 1: 12.00 Terminal 2: 14.50 Transfer: 4.00 Domestic: 8.50	



- ### Notes and Observations
- Serbia and Montenegro Air Traffic Services (SMATSA) signed (24-Dec-2019) a EUR17.5 million contract for the construction of a 75m air traffic control tower for Belgrade Nikola Tesla Airport and an annex to the air traffic control centre building in Belgrade. Construction will commence in Jan-2020 and is expected to be complete in 18 months. The project forms part of SMATSA's air traffic control system modernisation programme.
 - VINCI Airports stated (17-Jan-2020) Belgrade Nikola Tesla Airport is "becoming one of the region's most dynamic airports", with passenger traffic up 9.2% in 2019. The operator noted strong performance reflects the opening of 13 new international routes.
 - Russia's President Vladimir Putin proposed (04-Dec-2019) to support the modernisation of Air Serbia's fleet. Mr Putin said Russia is prepared to not only deliver Russian-made aircraft, but also organise a local maintenance and repair centre at Belgrade Nikola Tesla Airport.

Airport Charges – Cost per enplaned passenger

Figure S-10c Cost per Enplaned Passenger (2018--2019), North America



Part I. Summary Report
 Background and Objectives
 Summary of Results
 Results on the Productivity Measurement and Analysis
 Partial Productivity Measures
 Labour Productivity
 Soft Cost Input Productivity
 Capital Productivity
 Variable Factor Productivity
 Gross Variable Factor Productivity
 Residual Variable Factor Productivity
 Unit Variable Cost and Cost Competitiveness
 Airport Cost Structure
 Unit Variable Cost
 Cost Competitiveness
 Airport Financial Performance
 Revenue Share
 Revenue generation
 Financial Profitability
 Airport Rate and Charges
 Summary Tables
 Summary Tables of Productivity and Efficiency
 Summary Tables of Airport Cost Performance
 Summary Tables of Airport Revenue
 Summary Figures

Part II. Analysis and Full Results

Introduction
 Objectives
 Approach and Scope

Sample Airports

Airport Capacities and Traffic Volume
 Airside Capacity
 Terminal-Side Capacity
 Number of Gates
 Terminal Size
 Number of Employees
 Traffic Volume
 Passenger Traffic
 Cargo Traffic
 Work Load Unit (WLU)
 Aircraft Movements
 Passengers per Aircraft Movement
 Market Share of Dominant Hub Carrier
 Connectivity – Number of Non-stop Destinations

Airport Productivity and Efficiency Performance
 Outputs and Inputs
 Partial Productivity Measures
 Labor Productivity
 Number of Passengers per Employee

Aircraft Movements per Employee
 Work Load Units (WLU) per Employee
 Overall Labor Productivity
 Capital Productivity
 Passengers per Gate
 Passengers per Square Meter of Terminal Space
 Aircraft Movement per Runway
 Productivity of Soft Cost Input
 Soft Cost Input Productivity with Passengers as Output
 Soft Cost Input Productivity-Overall Output Index
 Variable Factor Productivity
 Factors Affecting Productivity
 Labour Productivity and Airport Size
 Labour Productivity vs. International Traffic
 Labour Productivity vs. Cargo Traffic
 Capital Productivity vs. Airport Size
 Capital Productivity vs. International Traffic
 Soft Cost Input Productivity vs. Airport Size
 Soft Cost Input Productivity vs. Share of International Traffic
 Variable Factor Productivity vs. Airport Characteristics
 Variable Factor Productivity Decomposition and Productive Efficiency
 VFP Regression
 Residual Variable Factor Productivity

Airport Cost Performance
 Airport Cost Structure
 Labour Cost Share
 Soft Cost Shares
 Unit Cost
 Labour Cost per Passenger
 Labour Cost per Aircraft Movement
 Labour Cost per Work Load Unit
 Variable Cost per Passenger
 Variable Cost per Aircraft Movement
 Variable Cost per Work Load Unit
 Unit Variable Cost Index
 Factors Affecting Unit Costs
 Input Prices
 Average Annual Employee Compensation
 Variable Input Price Index
 Unit Variable Cost vs. Labour Price
 Unit Variable Cost vs. Airport Size
 Unit Variable Cost vs. Airport Characteristics
 5.4 Cost Competitiveness

Airport Financial Performance
 Revenue Shares
 Non-Aeronautical Revenue Share
 Aeronautical Revenue Share
 Concession Revenue Share
 Parking Revenue Share
 Revenue Generation
 Aeronautical Revenue per Aircraft Movement
 Concession Revenue per Passenger
 Operating Revenue per Passenger

Operating Revenue per Aircraft Movement
 Operating Revenue per Work Load Unit
 Operating Revenue per Employee
 Financial Profitability
 Net Operating Income
 EBITDA
 Operating Margin
 Current Ratio
 Return on Asset
 Return on Equity
 Debt-Asset Ratio
 Debt-Equity Ratio

Airport Rates and Charges
 Landing Charges
 Terminal (Passenger) Charges
 Combined Landing and Passenger Charges
 Combined Landing and Passenger Charges without Baggage and Check-in Charges
 Combined Landing and Passenger Charges with Baggage and Check-in Charges
 Cost per Enplaned Passenger
 Air Travel Security Charges
 Other Airport Charges

Part III. Airport Profiles, Methodologies and Data Description
 Appendix I Airport Profiles
 Asia Pacific Airports
 European Airports
 North American Airports

Appendix II Methodology: Computation of Total Factor Productivity
 Appendix III Data and Data Sources

List of Tables

S-1 Sample Airports
 S-2 Airport Characteristics
 S-3 Partial Factor Productivity Measures
 S-4 Other Partial Productivity Measures
 S-5 Gross Variable Factor Productivity
 S-6 Residual Variable Factor Productivity
 S-7 Unit Variable Cost and Airport Cost Competitiveness
 S-8 Revenue Shares
 S-9 Revenue Generation Indicators

2-1a Sample Airports-Asia Pacific
 2-1b Sample Airports-Europe
 2-1c Sample Airports-North America
 2-2a Airport Characteristics-Asia Pacific
 2-2b Airport Characteristics-Europe
 2-2c Airport Characteristics-North America

3.1a Length of Runways –Asia Pacific
 3.1b Length of Runways –Europe

4.1.1a Input Measures – Asia Pacific
 4.1.1b Input Measures – Europe
 4.1.1c Input Measures – North America
 4.1.2a Output Measures – Asia Pacific
 4.1.2b Output Measures – Europe
 4.1.2c Output Measures – North America
 4.5.1a VFP Regression Results – Asia Pacific
 4.5.1b VFP Regression Results – Europe
 4.5.1c VFP Regression Results – North America
 4A-1 Cost Frontier Function Estimation Results

7.1a Landing Charges – Asia Pacific
 7.1b Landing Charges – Europe
 7.1c Landing Charges – North America
 7.2a Terminal (Passenger) Charges for International Flights– Asia Pacific
 7.2b Terminal (Passenger) Charges for International Flights – Europe
 7.2c Average Terminal (Passenger) Charges – North America
 7.3a Combined Landing and Terminal Charges – Asia Pacific
 7.3b Combined Landing and Terminal Charges - Europe
 7.4 Cost per Enplaned Passenger-North America

List of Figures

S-1 Labor Productivity
 S-2 Soft Cost Input Productivity
 S-3 Passengers per Square Meter of Terminal Area
 S-4 Residual Variable Factor Productivity
 S-5 Non-Aeronautical Revenue Share
 S-6 Revenue per Passenger
 S-7 Revenue per Employee
 S-8 Landing Charges for Boeing 737
 S-9 Landing Charges for Airbus 320
 S-10 Combined Landing and Passenger Charges

3.2.1a Number of Gates – Asia Pacific
 3.2.1b Number of Gates – Europe
 3.2.1c Number of Gates – North America
 3.2.2a Passenger Terminal Size – Asia Pacific
 3.2.2b Passenger Terminal Size – Europe
 3.2.2c Passenger Terminal Size – North America
 3.3a Number of Employees – Asia Pacific
 3.3b Number of Employees – Europe
 3.3c Number of Employees – North America
 3.4.1a Passenger Traffic – Asia Pacific
 3.4.1b Passenger Traffic – Europe
 3.4.1c Passenger Traffic – North America
 3.4.1d International Share Passenger Traffic – Asia Pacific
 3.4.1e International Share Passenger Traffic – Europe
 3.4.1f International Share Passenger Traffic – North America
 3.4.1g Seat Share of Low Cost Carriers – Asia Pacific
 3.4.1h Seat Share of Low Cost Carriers – Europe
 3.4.1i Seat Share of Low Cost Carriers – North America
 3.4.2a Cargo Traffic – Asia Pacific
 3.4.2b Cargo Traffic – Europe
 3.4.2c Cargo Traffic – North America

3.4.3a	Work Load Units (WLU) – Asia Pacific	4.4.4b	Passengers per Terminal Square Meter Area vs. Airport Size
3.4.3b	Work Load Units (WLU) – Europe	4.4.4c	Aircraft Movements per Runway vs. Airport Size
3.4.3c	Work Load Units (WLU) – North America	4.4.5a	Passengers per Gate vs. Share of International Traffic
3.4.4a	Aircraft Movement – Asia Pacific	4.4.5b	Passengers per Square Meter of Terminal Space vs. Share of International Traffic
3.4.4b	Aircraft Movement – Europe	4.4.5c	Aircraft Movement per Runway vs. Share of International Traffic
3.4.4c	Aircraft Movement – North America	4.4.6a	Passengers per Unit of Soft Cost Input vs. Airport Size
3.4.5a	Passengers per Aircraft Movement – Asia Pacific	4.4.6b	Soft Cost Input Productivity vs. Airport Size
3.4.5b	Passengers per Aircraft Movement – Europe	4.4.7a	Passengers per Unit of Soft Cost Input vs. Share of International Traffic
3.4.5c	Passengers per Aircraft Movement – North America	4.4.7b	Soft Cost Input Productivity vs. Share of International Traffic
3.5a	Share of Flights by Dominant Carrier – Asia Pacific	4.4.8a	Variable Factor Productivity vs. Airport Size
3.5b	Share of Flights by Dominant Carrier – Europe	4.4.8b	Variable Factor Productivity vs. Share of International Traffic
3.5c	Share of Flights by Dominant Carrier – North America	4.4.8c	Variable Factor Productivity vs. Share of Cargo Traffic
3.6a	Non-Stop Destinations – Asia Pacific	4.4.8d	Variable Factor Productivity vs. Share of Non-Aeronautical Revenue
3.6b	Non-Stop Destinations – Europe	4.5.2a1	Residual Variable Factor Productivity – Asia
3.6c	Non-Stop Destinations – North America	4.5.2a1	Residual Variable Factor Productivity – Asia (over 40 million passengers)
4.2.1.1a	Passengers per Employee – Asia Pacific	4.5.2a3-50	Residual Variable Factor Productivity – Asia (10-40 million passengers)
4.2.1.1b	Passengers per Employee – Europe	4.5.2a3-51	Residual Variable Factor Productivity – Asia (under 10 million passengers)
4.2.1.1c	Passengers per Employee – North America	4.5.2a4	Residual Variable Factor Productivity – Oceania
4.2.1.2a	Aircraft Movements per Employee – Asia Pacific	4.5.2a5	Residual Variable Factor Productivity – Asia Pacific Airport Groups
4.2.1.2b	Aircraft Movements per Employee – Europe	4.5.2b1	Residual Variable Factor Productivity – Europe (over 25 million passengers)
4.2.1.2c	Aircraft Movements per Employee – North America	4.5.2b2	Residual Variable Factor Productivity – Europe (10-25 million passengers)
4.2.1.3a	Work Load Units (WLU) per Employee – Asia Pacific	4.5.2b3	Residual Variable Factor Productivity – Europe (under 10 million passengers)
4.2.1.3b	Work Load Units (WLU) per Employee – Europe	4.5.2b4	Residual Variable Factor Productivity – Europe (airport groups)
4.2.1.3c	Work Load Units (WLU) per Employee – North America	4.5.2c1	Residual Variable Factor Productivity – North America (over 40 mil. passengers)
4.2.1.4a	Overall Labor Productivity – Asia Pacific	4.5.2c2	Residual Variable Factor Productivity – North America (25-40 mil. passengers)
4.2.1.4b	Overall Labor Productivity – Europe	4.5.2c3	Residual Variable Factor Productivity – North America (10-25 mil. passengers)
4.2.1.4c	Overall Labor Productivity – North America	4.5.2c4	Residual Variable Factor Productivity – North America (under 10 mil. Passengers)
4.2.2.1a	Passengers per Gate – Asia Pacific	5.1.1a	Labour Cost Share – Asia Pacific
4.2.2.1b	Passengers per Gate – Europe	5.1.1b	Labour Cost Share – Europe
4.2.2.1c	Passengers per Gate – North America	5.1.1c	Labour Cost Share – North America
4.2.2.2a	Passengers per Square Meter of Terminal Area – Asia Pacific	5.2.1a	Labour Cost per Passenger – Asia Pacific
4.2.2.2b	Passengers per Square Meter of Terminal Area – Europe	5.2.1b	Labour Cost per Passenger – Europe
4.2.2.2c	Passengers per Square Meter of Terminal Area – North America	5.2.1c	Labour Cost per Passenger – North America
4.2.2.3a	Aircraft Movements per Runway – Asia Pacific	5.2.2a	Labour Cost per Aircraft Movement – Asia Pacific
4.2.2.3b	Aircraft Movements per Runway – Europe	5.2.2b	Labour Cost per Aircraft Movement – Europe
4.2.2.3c	Aircraft Movements per Runway – North America	5.2.2c	Labour Cost per Aircraft Movement – North America
4.2.3.1a	Productivity of Soft Cost Inputs with Passengers as Output – Asia Pacific	5.2.3a	Labour Cost per Work Load Unit – Asia Pacific
4.2.3.1b	Productivity of Soft Cost Inputs with Passengers as Output – Europe	5.2.3b	Labour Cost per Work Load Unit – Europe
4.2.3.1c	Productivity of Soft Cost Inputs with Passengers as Output – North America	5.2.3c	Labour Cost per Work Load Unit – North America
4.2.3.2a	Soft Cost Input Productivity – Overall Output Index – Asia Pacific	5.2.4a	Variable Cost per Passenger – Asia Pacific
4.2.3.2b	Soft Cost Input Productivity – Overall Output Index – Europe	5.2.4b	Variable Cost per Passenger – Europe
4.2.3.2c	Soft Cost Input Productivity – Overall Output Index – North America	5.2.4c	Variable Cost per Passenger – North America
4.3a	Gross Variable Factor Productivity – Asia Pacific	5.2.5a	Variable Cost per Aircraft Movement – Asia Pacific
4.3b	Gross Variable Factor Productivity – Europe	5.2.5b	Variable Cost per Aircraft Movement – Europe
4.3c	Gross Variable Factor Productivity – North America	5.2.5c	Variable Cost per Aircraft Movement – North America
4.4.1a	Passengers per Employee vs. Airport Size	5.2.6a	Variable Cost per Work Load Unit – Asia Pacific
4.4.1b	Labour Productivity vs. Airport Size	5.2.6b	Variable Cost per Work Load Unit – Europe
4.4.2a	Passengers per Employee vs. Share of International Traffic	5.2.6c	Variable Cost per Work Load Unit – North America
4.4.2b	Labour Productivity vs. Share of International Traffic	5.2.7a	Unit Variable Cost Index – Asia Pacific
4.4.3a	Passengers per Employee vs. Share of Cargo Traffic	5.2.7b	Unit Variable Cost Index – Europe
4.4.3b	Labour Productivity vs. Share of Cargo Traffic	5.2.7c	Unit Variable Cost Index – North America
4.4.4a	Passengers per Gate vs. Airport Size	5.3.1.1a	Average Annual Employee Compensation – Asia Pacific
		5.3.1.1b	Average Annual Employee Compensation – Europe
		5.3.1.1c	Average Annual Employee Compensation – North America
		5.3.1.2a	Variable Input Price Index – Asia Pacific

5.3.1.2b	Variable Input Price Index – Europe	6.3.3b	Operating Margin – Europe
5.3.1.2c	Variable Input Price Index – North America	6.3.3c	Operating Margin – North America
5.3.2	Unit Variable Cost vs. Labour Price	6.3.4a	Current Ratio – Asia Pacific
5.3.3	Unit Variable Cost vs. Airport Size	6.3.4b	Current Ratio – Europe
5.3.4a	Unit Variable Cost vs. Aircraft Size	6.3.4c	Current Ratio – North America
5.3.4b	Unit Variable Cost vs. Share of International Traffic	6.3.5a	Return on Assets – Asia Pacific
5.3.4c	Unit Variable Cost vs. Share of Non-Aeronautical Revenue	6.3.5b	Return on Assets – Europe
5.4a1	Cost Competitiveness – Asia (over 40 million passengers)	6.3.5c5-49	Return on Assets – North America
5.4a2	Cost Competitiveness – Asia (10-40 million passengers)	6.3.6a5-49	Return on Equity – Asia Pacific
5.4a3	Cost Competitiveness – Asia (under 10 million passengers)	6.3.6b5-49	Return on Equity – Europe
5.4a4	Cost Competitiveness – Oceania	6.3.6c5-50	Return on Equity – United States
5.4a5	Cost Competitiveness – Asia Pacific Airport Groups	6.3.6d5-50	Return on Retained Earnings – Canada
5.4b1	Cost Competitiveness – Europe (over 25 million passengers)	6.3.7a5-51	Debt-Assets Ratio – Asia Pacific
5.4b2	Cost Competitiveness – Europe (10-25 million passengers)	6.3.7b5-51	Debt-Assets Ratio – Europe
5.4b3	Cost Competitiveness – Europe (under 10 million passengers)	6.3.7c5-51	Debt-Assets Ratio – North America
5.4b4	Cost Competitiveness – Europe (Airport Groups)	6.3.8a5-51	Debt-Equity Ratio – Asia Pacific
5.4c1	Cost Competitiveness – North America (over 40 mil. Passengers)	6.3.8b5-52	Debt-Equity Ratio – Europe
5.4c2	Cost Competitiveness – North America (25-40 mil. passengers)	6.3.8c5-52	Debt-Equity Ratio – United States
5.4c2	Cost Competitiveness – North America (10-25 mil. passengers)	5-52	
5.4c2	Cost Competitiveness – North America (under 10 mil. passengers)	7.2a 5-52	Terminal Charge per Passenger (International Flights) – Asia Pacific
		7.2b	Terminal Charge per Passenger (International Flights) – Europe
		7.2c	Average (Terminal) Revenue per Passenger – North America
		7.4	Cost per Enplaned Passenger – North America
6.1.1a	Non-Aeronautical Revenue Share – Asia Pacific		
6.1.1b	Non-Aeronautical Revenue Share – Europe		
6.1.1c	Non-Aeronautical Revenue Share – North America		
6.1.3a	Concession Revenue Share – Asia Pacific		
6.1.3b	Concession Revenue Share – Europe		
6.1.3c	Concession Revenue Share – North America		
6.1.4a	Parking Revenue Share – Asia Pacific		
6.1.4b	Parking Revenue Share – Europe		
6.1.4c	Parking Revenue Share – North America		
6.2.1a	Aeronautical Revenue per Aircraft Movement – Asia Pacific		
6.2.1b	Aeronautical Revenue per Aircraft Movement – Europe		
6.2.1c	Aeronautical Revenue per Aircraft Movement – North America		
6.2.2a	Concession Revenue per Passenger – Asia Pacific		
6.2.2b	Concession Revenue per Passenger – Europe		
6.2.2c	Concession Revenue per Passenger – North America		
6.2.3a	Operating Revenue per Passenger – Asia Pacific		
6.2.3b	Operating Revenue per Passenger – Europe		
6.2.3c	Operating Revenue per Passenger – North America		
6.2.4a	Operating Revenue per Aircraft Movement – Asia Pacific		
6.2.4b	Operating Revenue per Aircraft Movement – Europe		
6.2.4c	Operating Revenue per Aircraft Movement – North America		
6.2.5a	Operating Revenue per Work Load Unit – Asia Pacific		
6.2.5b	Operating Revenue per Work Load Unit – Europe		
6.2.5c	Operating Revenue per Work Load Unit – North America		
6.2.6a	Operating Revenue per Employee – Asia Pacific		
6.2.6b	Operating Revenue per Employee – Europe		
6.2.6c	Operating Revenue per Employee – North America		
6.3.1a	Net Operating Income – Asia Pacific		
6.3.1b	Net Operating Income – Europe		
6.3.1c	Net Operating Income – North America		
6.3.2a	EBITDA – Asia Pacific		
6.3.2b	EBITDA – Europe		
6.3.2c	EBITDA – North America		
6.3.3a	Operating Margin – Asia Pacific		



Airport Benchmarking Report Order Form

First Name: _____ Last Name: _____ Organization _____

Address: _____

City _____ State/Province _____ Country/ZIP _____

Phone: _____ Email: _____

I. Please select the report(s) you would like to order:

- 2020 report (PDF version): **US\$950**
- 2019 report (PDF version): **US\$750**
- 2018 report (PDF version): **US\$500**
- 2017 report (PDF version): **US\$500**
- 2016 report (PDF version): **US\$300**
- 2015 report (PDF version): **US\$300**
- 2014 report (PDF version): **US\$300**
- 2013 report (PDF version): **US\$300**
- 2012 report (PDF version): **US\$300**
- 2011 report (PDF version): **US\$300**
- 2010 report (PDF version): **US\$300**
- 2009 report (PDF version): **US\$300**

Please return to:
 Air Transport Research Society
 (ATRS)
 Attn to: Dr. Chunyan Yu

Tel: 386-226-6723

Email: benchmarking@atrsworld.org

Website: www.atrsworld.org

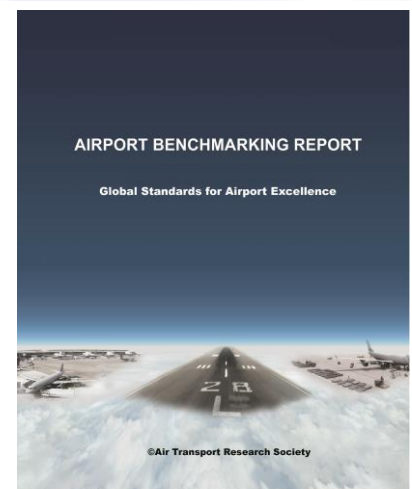
OPTIONAL: An additional US\$120 for each PRINTED copy

* Leave this section blank if only PDF versions are required

Year(s): _____

II. Payment Method:

- Wire Transfer:
Send (e-mail or fax) this completed form to us to obtain wire transfer instructions.
- Check or Money Order
(payable to Embry-Riddle Aeronautical University)
- Please tick if you are an individual or corporate member of ATRS



Please note that Credit card payments are only accepted if you purchase report online