

**TURKISH
AVIATION
ACADEMY**



Introduction – State of Industry

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Air Transportation Management

M.Sc. Program

Airport Planning and Management

Module 01

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Welcome to Class

- It is my honor and pleasure to be here in Istanbul to participate in this class!
- I have very much enjoyed my previous visits over the past 50 years, especially last year for this course, and am happy to return.
- The opportunity to learn more about new airport developments here is a special treat.
- Allow me to take a few moments to introduce my colleagues and my sequence of introductory presentations.

What we bring to course

- Together, the team has very extensive, worldwide experience. We have worked on “every inhabited continent” (except perhaps Antarctica). We are thus able to share a perspective that goes beyond convention.
- We enjoy the opportunity to share thoughts with you and to learn from your experience. We know that someone in the audience knows more than we do on any subject, so we welcome your comments and questions.

Introductions to Team

- Professor Amedeo Odoni is my colleague at MIT and co-author of our text on “Airport Systems Planning, Design, and Management”. His specialty is on the “airside” and finance.
- Complementarily, I am a civil engineer and my expertise is on the “landside” of airports.
- Dr. Joe Sulmona is a consultant on airport strategic management and training, working closely with the Airports Council International. See his bio at <http://www.aci.aero>

Outline of my first presentations

I have 3 overall complementary, overlapping presentations to share with you:

→ Introduction – State of Industry (module 1). The focus here on the overall picture of the trends shaping the context for airports.

→ Airports in the 21st Century (module 2). This highlights the range of technical, organizational developments at airports.

→ Changing Airline Industry (module 8). This discusses the critical changes in our clients.

Topics for this session

→ **What appears as steady trends:**

- Growth
- Centered on Asia
- Falling Prices
- Average Aircraft Size stable

→ **What is definitely changing:**

- Rise in Low Cost Carriers (LCC)
- Range of New Carriers
- Consolidation of Traditional Carriers
- Disappearance of Traditional Carriers
- Different Transfer Hubs
- Rise of Second Airports in a Multi-Airport System

Strong Steady Growth

- **About 6% each year, on average, worldwide**
 - Mostly in China
 - Also in Southeast Asia, India
 - And through Mid-East transfer hubs (Gulf)
 - More like 3% year in North America, largest market
- **This is mostly due to**
 - Increasing middle class with enough income
 - Technological improvements that increase efficiency and lower costs (lighter aircraft, better air traffic control (ATC))
 - Operational innovations of Low Cost Carriers (LCC)
 - Increase in Transfer Hubs (such as Atlanta, Dubai...)

Principal drivers of air transportation industry

- **Long-term annual decrease in costs, and fares:**
 - Due to new technologies (engine efficiency, carbon fiber, satellite navigation, etc)
- **Innovations of Low-cost carriers**
 - Southwest, Jet Blue, Westjet, Ryanair, easyJet, AirAsia
 - New operational practices (30 minute turn-around times, flight attendants clean aircraft, paperless tickets, etc.)
- **Operational changes:**
 - Use of transfer hubs (where passengers change aircraft to continue route, Boston-Istanbul-Singapore)
 - Consolidation of Industry into larger organizations

Cost Trends

- **Over past decade and more, “real costs” (net of inflation) have dropped significantly**
 - Yields (revenues/unit distance) dropped ~ 20%
 - While inflation has risen ~50%
 - So real costs halved ($0.8/1.5 \sim 0.5$)
- **Meanwhile traffic doubled**
 - Implying price elasticity of about $-2 > -1.0$ [this is the ratio of (+)change in traffic/(-)change in price]
 - A price elasticity more negative than -1 means that revenues grow as price drops
- **This is good for industry**

Average Aircraft Size stable

- **Average seats/aircraft is stable! In US from 166 to 172 over last 20 years. Favors smaller aircraft.**
- **As of 2015: 787 Dreamliner up... A380 stagnant**
 - Large Airbus A380, (525 to ~850 pax in all-economy). Range > 10,000 km **319 orders, 0 in 2016! 200 delivered**
 - Smaller Boeing 787 “Dreamliner” (210 - 330 pax). Range > 15,000 km **1200 orders, 58 in ‘16, 500 delivered**
 - <http://www.boeing.com/commercial/787/#/flight-tracker>
- **Strong demand for smaller aircraft that can link distant airports bypassing connecting hubs**

Dreamliner nickname “hub buster”

Change: Rise of LCCs

- **Low-Cost Carriers**

- “Low Cost” due to their economical way of operating (any airline can have low-prices, to meet competition)
- 30 minute turn-around times (more time in air, working)
- Flight attendants clean aircraft; Paperless ticketing...

- **Major examples**

- Southwest (+AirTran); jetBlue (US)
- WestJet (Canada); Gol; Azul (Brazil)
- Ryanair; easyJet; Norwegian (Europe)
- Pegasus (Turkey); AirAsia (Southeast Asia);
- IndiGo; Jet; SpiceJet (46, 23, 13% of Indian market)
- Legacy spinoffs: Scoot (Singapore); Eurowings (Lufthansa); Transavia (Air France-KLM)

Change: Rise of Other Airlines

- **Middle East:**

- Fueled by oil money, ambition, and drive
- Good Location (between Europe Asia, good weather)
- Emirates, Etihad, Qatar

- **Chinese:**

- Huge population, growing middle class and markets
- China Southern, China Eastern, Air China, Hainan, Shenzhen, Xiamen

- **Integrated Cargo Delivery:**

- “door to door” service, efficient transfers (sorting hubs and uncongested airports)
- Fedex, UPS among biggest, most valuable airlines

Change:

Consolidation of Legacy Airlines

● Mergers

- Air France + Air Inter + KLM
- British + Iberia + Aer Lingus + Vueling
- Lufthansa + Swiss + Austria + Belgian;
- TAP + Portugalia
- JAL + JAS;
- Air India + Indian
- Gol + Varig
- Delta + Northwest;
- United + Continental
- American + (US Air + American West) + TWA

Change:

Disappearance of Legacy Airlines

- **Some National Airlines have disappeared!**
 - Varig (Brazil)
 - Malev (Hungary)
 - Sabena (Belgium)
- **Major Bankruptcies... some recoveries**
 - Major airlines in North America have gone through bankruptcy to erase debts and continue
 - United, Delta in US
 - Air Canada
 - Swiss was “born again” as subsidiary of Lufthansa
 - Olympic Airlines faded into Aegean Airlines...

Change: Different Transfer Hubs

- **Major New Ones Challenge established hubs such as London, Frankfurt, Singapore:**
 - Dubai (Emirates)
 - Kuala Lumpur (AirAsia)
 - München (Lufthansa opens second hub)
 - Istanbul (Turkish)
- **Transfer Operations moved elsewhere**
 - Madrid (Iberia bought by British)
 - Milan (Alitalia moved hub to Rome)
 - Pittsburgh (US Air moved to Philadelphia)
 - Minneapolis/St Paul (Northwest merged)
- **Market can change drastically**

Change: Rise of Second Airports

- **Low-Cost**

- Miami/Fort Lauderdale; Dallas/Love
- London/Stansted; Frankfurt/Hahn; etc.
- Sahiba Gokçen

- **Cargo**

- Memphis (Fedex); Louisville (UPS)
<http://www.cnet.com/pictures/at-fedexs-memphis-hub-sorting-1-5-million-packages-pictures/25/>
- Cologne (Fedex hub)
<https://www.youtube.com/watch?v=QFhFadMuyIY>

- **Now ~ 75 Multi-airport systems worldwide (cities with 2 or more significant airports)**

Airport and Airline Rankings

Thought Questions

- Which are the biggest airlines?
- How do we measure big?
- Which are the biggest airports?

Airline Ranking: Passengers carried (000s)

Rank ↕	Airline ↕	2015 ^[3] ↕	2014 ^[4] ↕	2013 ^[5] ↕
1	 American Airlines	146,530	87,830	86,823
2	 Southwest Airlines	144,575	129,087	115,323
3	 Delta Air Lines	138,842	129,433	120,636
4	 China Southern Airlines	109,301	100,683	91,504
5	 Ryanair	101,401	86,370	81,395
6	 United Airlines	95,384	90,439	90,161
7	 China Eastern Airlines	75,139	66,174	62,653
8	 Easyjet	70,232	62,309	58,410
9	 Turkish Airlines	60 198		
10	 Air China	58,661	54,674	
	 Lufthansa		59,850	63,273









American, Delta.
United grew by
mergers.

Southwest, Ryanair,
EasyJet are Low
Cost Carriers

Old European
Airlines no longer in
top 10

In 2016 Lufthansa
Group had 110
million – including
Eurowings (18.5),
Swiss (18), Austrian
(11)

Airline Ranking: Number of Aircraft

Rank ↕	Airline	Fleet (June 2016)
1	 American Airlines	1,789 ^[a]
2	 Delta Air Lines	1,330 ^[a]
3	 United Airlines	1,229 ^[a]
4	 Southwest Airlines	720
5	 FedEx Express	688
6	 China Southern Airlines	515
7	 China Eastern Airlines	429
8	 Air Canada	404 ^[a]
9	 Air China	384 ^[b]
10	 Ryanair	349

US based carriers have largest fleets.

**Note Size of LCCs
Southwest and Ryanair**

**Also of Integrated Cargo
airline Fedex**

**Chinese Airlines have
overtaken Old European
Airlines, now no longer
in top 10**

Airline Ranking: Countries served

Rank ↕	Airline ↕	countries served ^[1]
1	 Turkish Airlines	118 ^[18]
2	 Lufthansa	83
3	 Emirates	83
4	 KLM	78
5	 Air France	78
6	 British Airways	78
7	 Qatar Airways	74
8	 Delta Air Lines	71
9	 Singapore Airlines	66
10	 American Airlines	60

**Countries served
not same as
Destinations
served!**

**Delta serves > 325
destinations in
> 70 countries.**

**Atlanta hub serves:
178 US cities
80 International
258 cities in all**

Airline Ranking: Tonne-miles carried

Rank ↕	Airline ↕	2015 ^[8] ↕	2014 ^[13] ↕	2013 ^[14] ↕
1	 FedEx Express	15,799	16,020	16,127
2	 Emirates SkyCargo	12,157	11,240	10,459
3	 UPS Airlines	10,807	10,936	10,584
4	 Cathay Pacific Cargo	9,935	9,464	8,241
5	 Korean Air Cargo	7,761	8,079	7,666
6	 Qatar Airways Cargo	7,660	5,997	4,972
7	 Lufthansa Cargo	6,888	7,054	7,218
8	 Cargolux	6,309	5,753	5,225
9	 Singapore Airlines Cargo	6,083	6,019	6,240
10	 Air China Cargo	5,718		
	 China Airlines Cargo		5,266	4,813

**Fedex, UPS
Cargo airlines
top list along
with Emirates**

**Lufthansa,
Singapore in
decline**

Airline Ranking: Sample Market Capitalizations

Airline	Market Cap	Airline Type
UPS	99	Integrated Freight
Fedex	50	Integrated Freight
Delta	38	
United	23	
Ryanair	21	Low Cost
Southwest	19	Low Cost
Emirates	18	
American	14	
British IA Group	13	
China Eastern	12	
China Southern	9	
Singapore	8	
Lufthansa	6	
<u>easyjet</u>	5	Low Cost
Air France +KLM	5	

“ Market Cap”
= value of company
= (no. shares) x (share price)

Note Importance of
Integrated Freight,
Low Cost Carriers

Note weakness of
old European Airlines

Source: Bloomberg quotes January 2017

Airport Ranking: By Passenger Traffic

RANK 2015	RANK 2014	AIRPORT CITY / COUNTRY / CODE	PASSENGERS	
			(Enplaning and deplaning)	Percent change
1	1	ATLANTA GA, US (ATL)	101 491 106	5.5
2	2	BEIJING, CN (PEK)	89 938 628	4.4
3	6	DUBAI, AE (DXB)	78 010 265	10.7
4	7	CHICAGO IL, US (ORD)	76 949 504	9.8
5	4	TOKYO, JP (HND)	75 316 718	3.4
6	3	LONDON, GB (LHR)	74 989 795	2.2
7	5	LOS ANGELES CA, US (LAX)	74 937 004	6.1
8	10	HONG KONG, HK (HKG)	68 283 407	8.2
9	8	PARIS, FR (CDG)	65 766 986	3.1
10	9	DALLAS/FORT WORTH TX, US (DFW)	64 072 468	0.9
11	13	ISTANBUL, TR (IST)	61 836 781	9.2
12	11	FRANKFURT, DE (FRA)	61 032 022	2.5
13	19	SHANGHAI, CN (PVG)	60 053 387	16.3
14	14	AMSTERDAM, NL (AMS)	58 284 864	6.0
15	18	NEW YORK NY, US (JFK)	56 827 154	6.8
16	16	SINGAPORE, SG (SIN)	55 449 000	2.5
17	15	GUANGZHOU, CN (CAN)	55 201 915	0.8
18	12	JAKARTA, ID (CGK)	54 053 905	-5.5
19	17	DENVER CO, US (DEN)	54 014 502	1.0
20	22	BANGKOK, TH (BKK)	52 902 110	14.0

**Note Importance
Transfer airports:
Atlanta, Chicago,
Dubai,
Dallas/Fort Worth
Istanbul,
Amsterdam,
Denver, Bangkok**

**Note relative
growth of
Dubai, Chicago,
Hong Kong,
Istanbul**

Take-aways

- **The Airline/Airport Industry continues to grow quickly, thanks to**
 - Increased efficiency in many areas
 - Rise of incomes, middle class, especially in Asia
- **Much disruption in Airline/Airport Industry**
 - New Competitors, both for airlines and airports
 - Displacing, squeezing out traditional airlines
 - Challenging established airport transfer hubs
 - Rerouting traffic, from Europe toward Middle East
- **Disruptions may last another 20 years!**