STRATEGIC MANAGEMENT AND AIRLINE MANAGEMENT

MBA AVIATION AND TOURISM MANAGEMENT
FRANKFURT UNIVERSITY OF APPLIED SCIENCES

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Sep 2021

COURSE OVERVIEW: SEPTEMBER

Monday, 13SEP	Wednesday, 15SEP	Friday, 17SEP
Strategy Development and Execution	**Airline Strategy**	**Sustainability and Collaboration Models**
Fundamentals	The Airline Industry	Sustainability
Strategic Positioning	Planning the Launch of an Airline	Airline Collaboration Models
Strategic Program Design and Strategy Communications	Group Work on Airline Strategy	Airline M&A
Measuring Success	Air Cargo Industry	Project Preparation

1.THE AIRLINE INDUSTRY

1.1. Most Relevant Definitions
1.2. Major Players
1.3. Customer Purchasing Criteria
1.4. Covid Disruption

1.1. MOST RELEVANT DEFINITIONS

https://ocw.mit.edu/courses/aeronautics-and-astronautics/16-75j-airline-management-spring-2006/lecture-notes/lect1.pdf

Example: Airline Measures

- **A 200-seat aircraft flies 1000 miles, with 140 passengers:**
  - RPM = 140 passengers X 1000 miles = 140,000
  - ASM = 200 seats X 1000 miles = 200,000
- **Assume total revenue = $16,000; total operating expense = $15,000:**
  - Yield = $16,000 / 140,000 RPM = $0.114 per RPM
  - Unit Cost = $15,000 / 200,000 ASM = $0.075 per ASM
  - Unit Revenue = $16,000 / 200,000 ASM = $0.080 per ASM
- **Average Load Factor = RPM / ASM**
  - ALF = 140,000 / 200,000 = 70.0%
    - For single flight, also defined as passengers / seats

https://ocw.mit.edu/courses/aeronautics-and-astronautics/16-75j-airline-management-spring-2006/lecture-notes/lect1.pdf

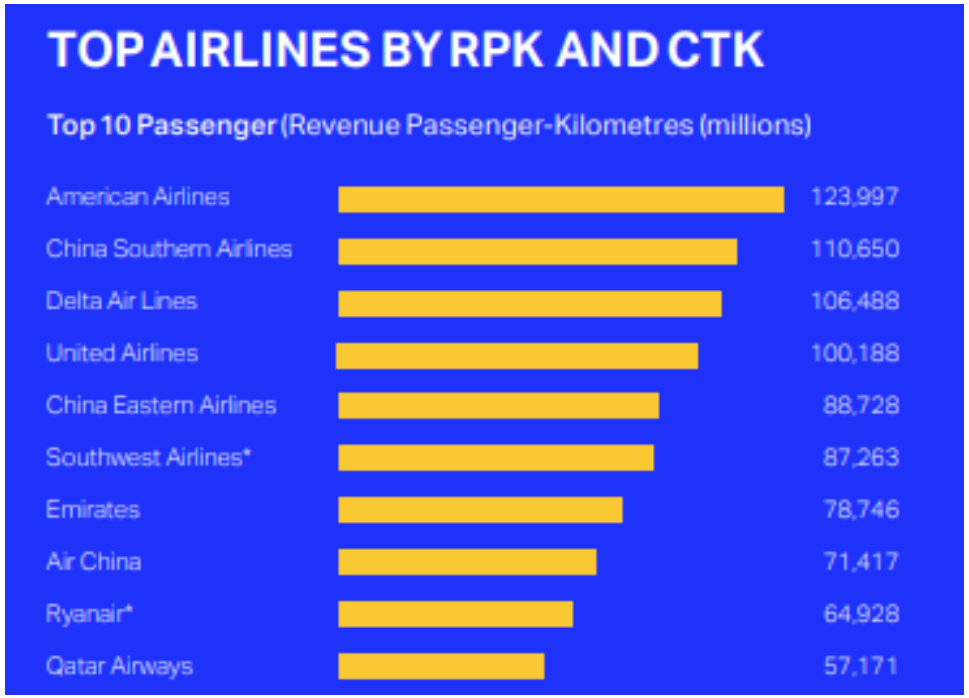
AIRCRAFT AND FLIGHT RELATED

Block Hours: from „offblock“ (aircraft leaving the gate) to „onblocks“ (aircraft on gate)

Aircraft Utilization: Block Hours / Day

Trip Costs: Costs for one flight

1.2. TOP 10 RPK PLAYERS AND TRAFFIC AREAS

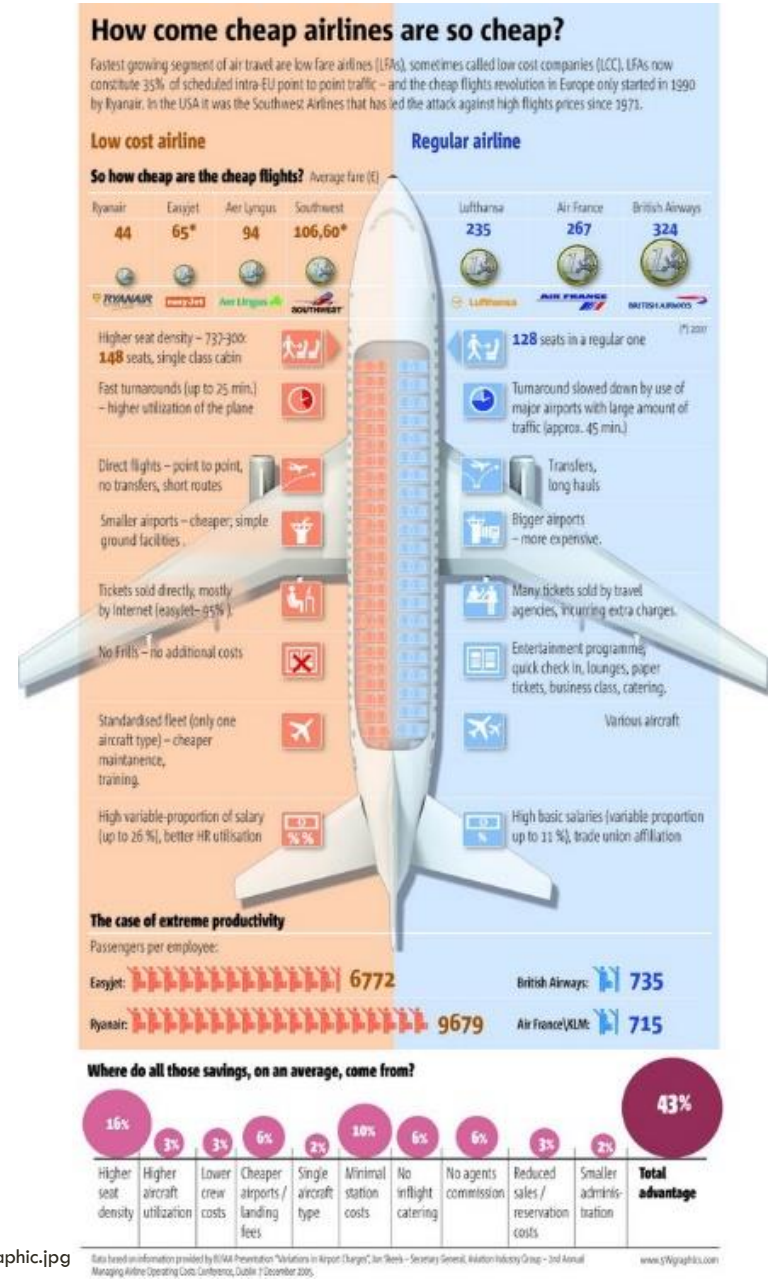


IATA WATS 2021, https://www.iata.org/contentassets/a686ff624550453e8bf0c9b3f7f0ab26/wats-2021-mediakit.pdf

„NO FRILL“ VS. TRADITIONAL AIRLINES

Substantial Differences in:

- Seat Density
- Aircraft productivity
- Airport Size
- Distribution channels
- Product
- Fleet Diversity
- Labor Relations

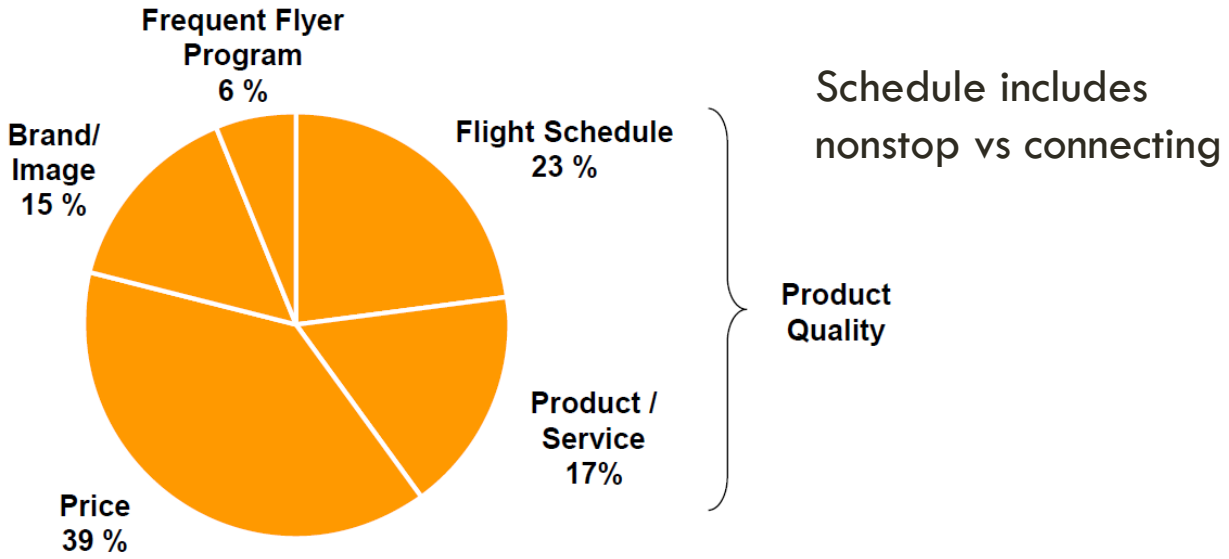


http://www.infographicsblog.com/wp-content/uploads/2010/05/how-come-cheap-airlines-are-so-cheap-infographic.jpg

1.3. CUSTOMER PURCHASING DECISION CRITERIA

Different for different markets and different airlines

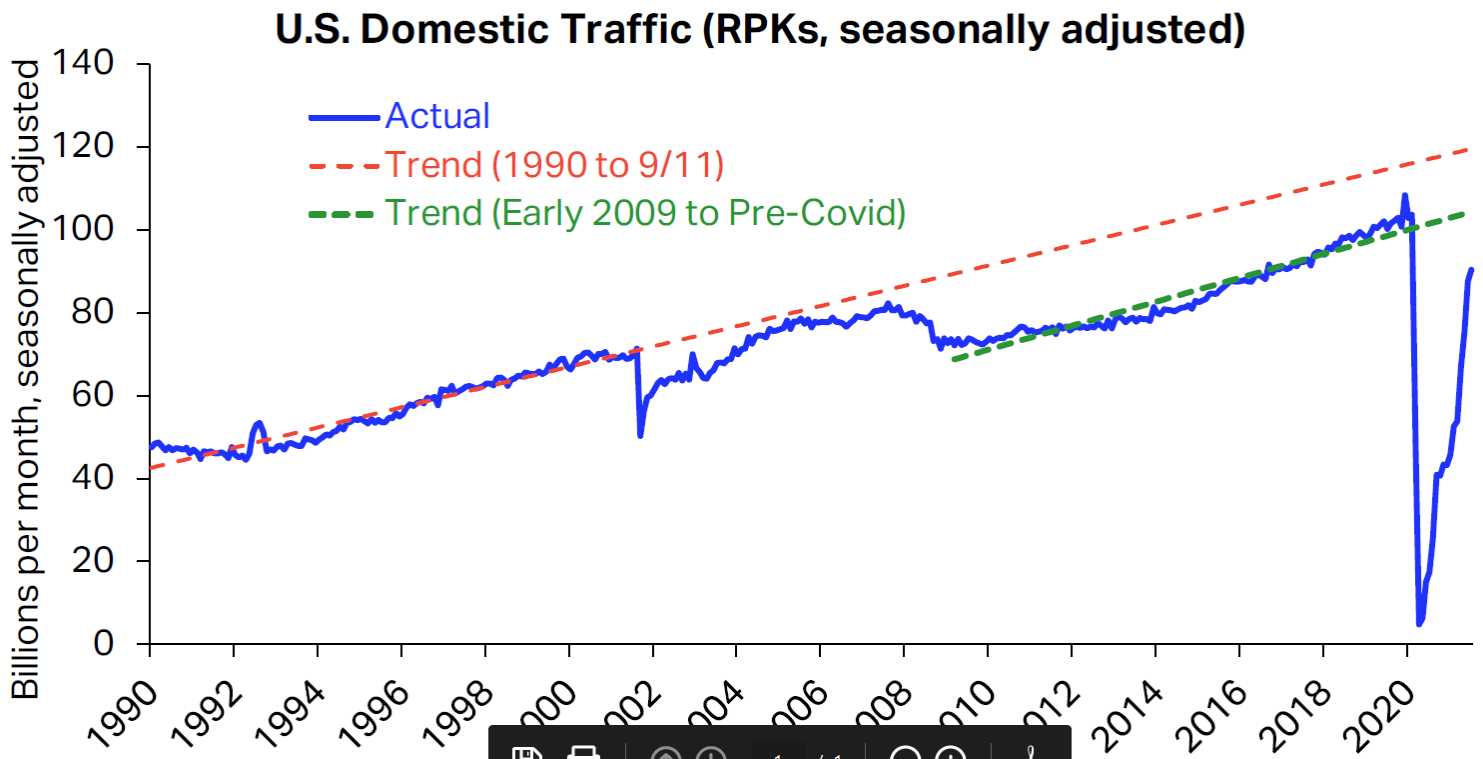
Example Hub Airline:



Schedule includes nonstop vs connecting

Source: Dr.Sebastian Hollmeier, Deutsche Lufthansa AG

1.4. COVID DISRUPTION



Source: IATA Economics using IATA Monthly Statistics

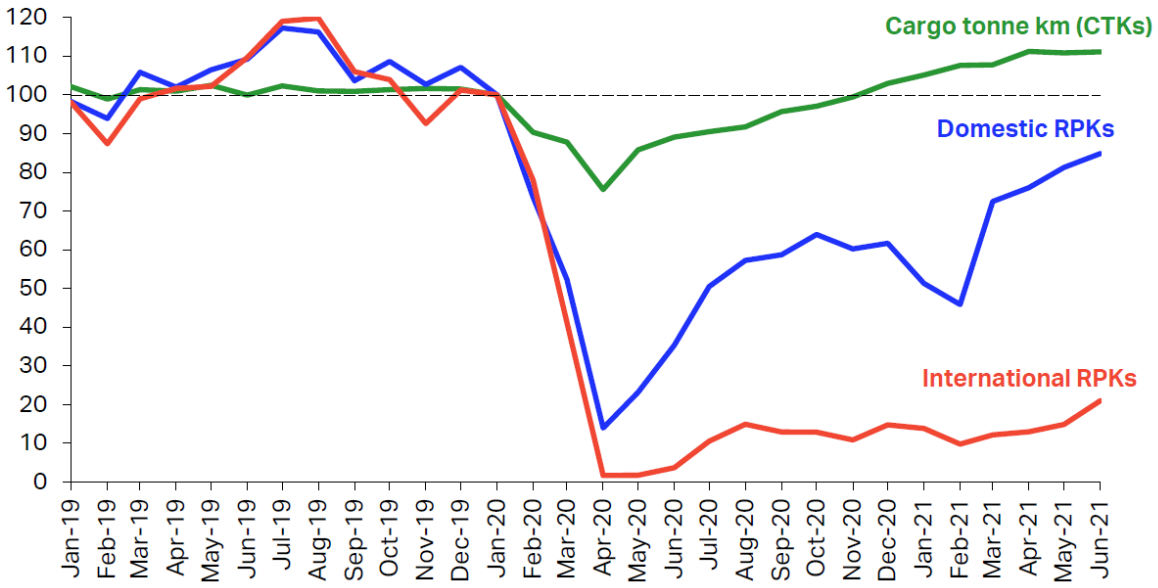
https://www.iata.org/en/iata-repository/publications/economic-reports/u.s.-domestic-air-travel-market-20-years-after-911/

RETURN TO 2019 LEVELS NOT EXPECTED BEFORE 2023-2025

Mid-year but not mid-of the crisis for international travel

Int. RPKs -80.9%, domestic RPKs -22.4%, CTKs +9.9% (Jun 21 vs Jun19)

RPKs and Seasonally adjusted CTKs (indexed, Jan 2020 = 100)



Source: IATA Economics using data from IATA Monthly S

1st Half 2021 vs 1st Half 2019

- ✓ **Revenue Passenger Kilometers (RPKs):** -66.7%
  - ✓ **Domestic:** -33.1%
  - ✓ **International:** -85.8%
- ✓ **Cargo Tonne Kilometers (CTKs):** +8.0%

https://www.iata.org/en/iata-repository/publications/economic-reports/time-to-reconnect-north-america-and-europe/

2. LAUNCHING AN AIRLINE

Outline see next page

2. LAUNCHING AN AIRLINE: OUTLINE

2.1. The Opportunity

2.2. Target Market

2.3. Fleet Planning

2.4. Network Design

2.5. Product

2.6. Generating Revenues

2.7. Production

2.8. Operations Planning

2.9. Labor

2.10. Regulatory Matters

2.11. FInancial Forecasts

2.12. Growth Strategy

2.1. THE OPPORTUNITY: ARE THE OTHERS THAT BAD?

Discussion in Groups:

- What do you love about airlines?
- What do you hate about airlines?
- What could airlines do better from a customer perspective or an employee perspective?

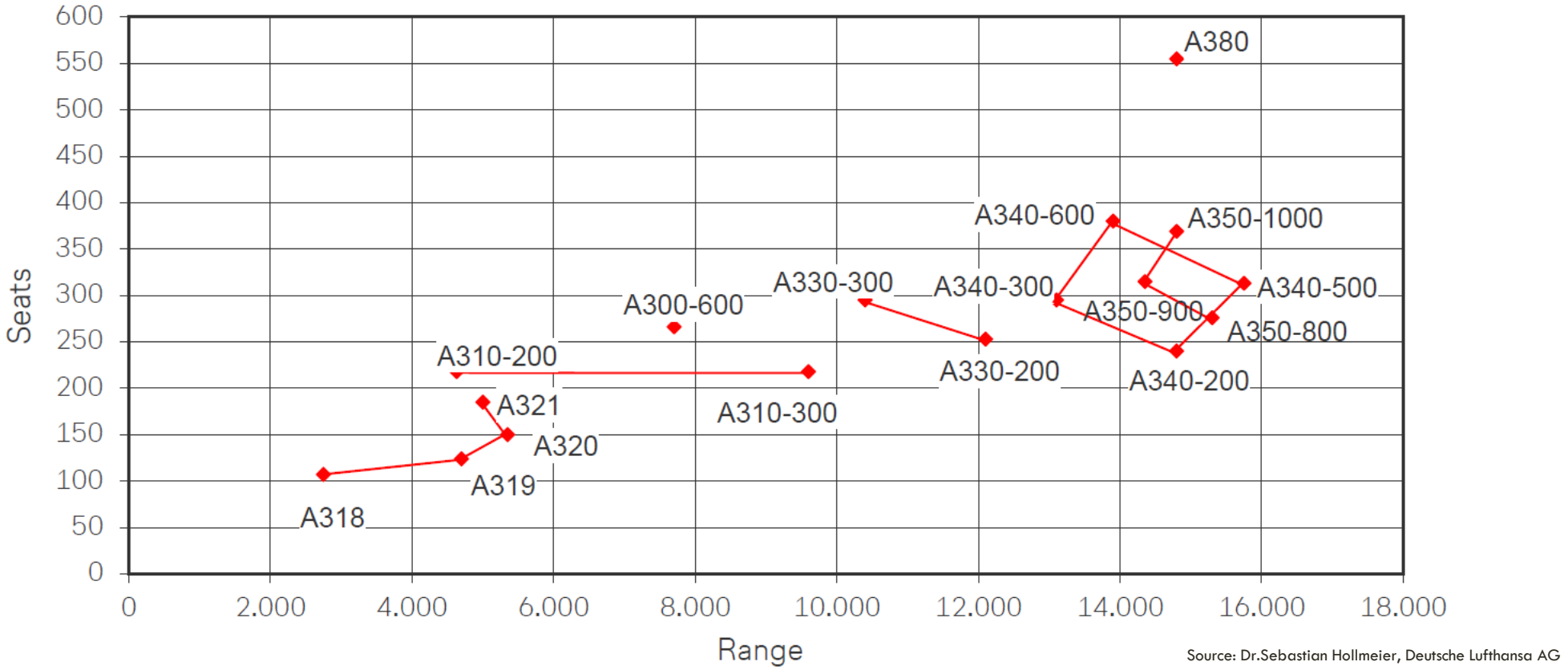
2.2. TARGET MARKET

- Shorthaul vs Longhaul
- Operating Model: Point to Point vs Hub
- Customer Segments (Business, Leisure, VFR,...)

2.3. FLEET PLANNING

- Defining the right number and type of aircraft (plural)
- Unit costs vs trip costs:
  A larger aircraft usually has higher trip costs, but lower unit costs (=Costs/Seat)
- Observe Range and Payload
- Commonality to your existing fleet
- Sourcing: owned or leased, brand new or used
- Next Decision to make: Seat Density, Cabin Class Mix

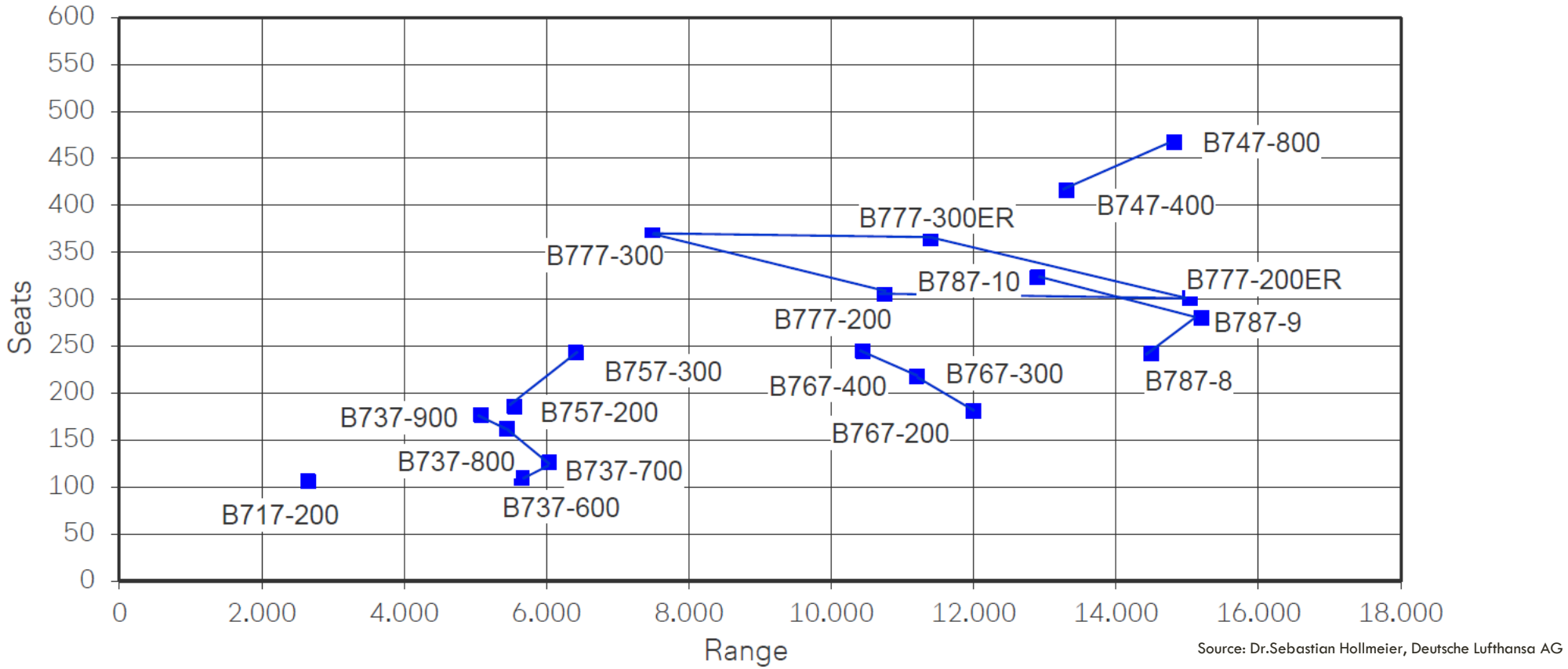
AIRBUS MODELS



Source: Dr.Sebastian Hollmeier, Deutsche Lufthansa AG

Source: Flight International based on OEM data

BOEING MODELS



Source: Dr.Sebastian Hollmeier, Deutsche Lufthansa AG

Source: Flight International based on OEM data

2.4. NETWORK DESIGN

- Where to fly: Route Planning
- How often to fly: Frequency Definition
- When to fly: Timetable Design
- Which aircraft type of the fleet to use: Fleet Assignment (on a per flight level)
- Which specific aircraft to use (by tailsign)
- Observing planning parameters in rotation building
- The Hub-Logic

ROUTE PLANNING: WHERE TO FLY

- Starting point for a hub airline is overall O&D demand, e.g. Europe - Tampa
- Check competion‘s offer
- Estimate your piece of the pie
- Develop revenue estimation (# of Passengers and Revenue/Passenger)
- Discuss with local tourism agencies, industry associations, etc.
- Calculate operating costs
- Compare to other projects (e.g. flying to somewhere in Asia) and decide

FREQUENCY DEFINITION

- Check how many seats you need for the expected demand for you in a week
- Decide whether you need daily flights
- Decide whether you need several flights per day
  - Some routes are frequency-focused (e.g. DUS-LHR)
  - Other routes work well with only one flight a day or less, mostly leisure and VFR routes
  - Tradeoff between higher yields with higher frequency, but also higher operating costs
- Take into account different operating costs on longhaul for 2/7 vs 6/7

TIMETABLE DESIGN: WHEN TO SCHEDULE A CERTAIN ROUTE

- Passenger Demand Preferences for certain days of the week and hours of the day
- A flight that leaves for an intra-European flight at 6am will have lower revenues than one leaving at 7am
- Large business destinations often have high demand in the morning and in the afternoon
- Leisure destinations can be set into the timetable more flexibly
- Longhaul routes‘ timetable design is subject to
  - Airport Slots
  - Airport Curfews
  - Timezone Differences

Why do all flights from the U.S. East Coast to Europe leave between 1600 and 2200 local time?

FLEET ASSIGNMENT: ASSIGNING AN AIRCRAFT TYPE TO A SCHEDULED FLIGHT

FRA – MAD 12:00 14:30

MAD – FRA 15:20 17:50

FRA – VIE 12:00 13:40

VIE – FRA 16:30 17:50

Which roundtrip is planned with A321, which with A319?

What are shortterm optimization opportunities?

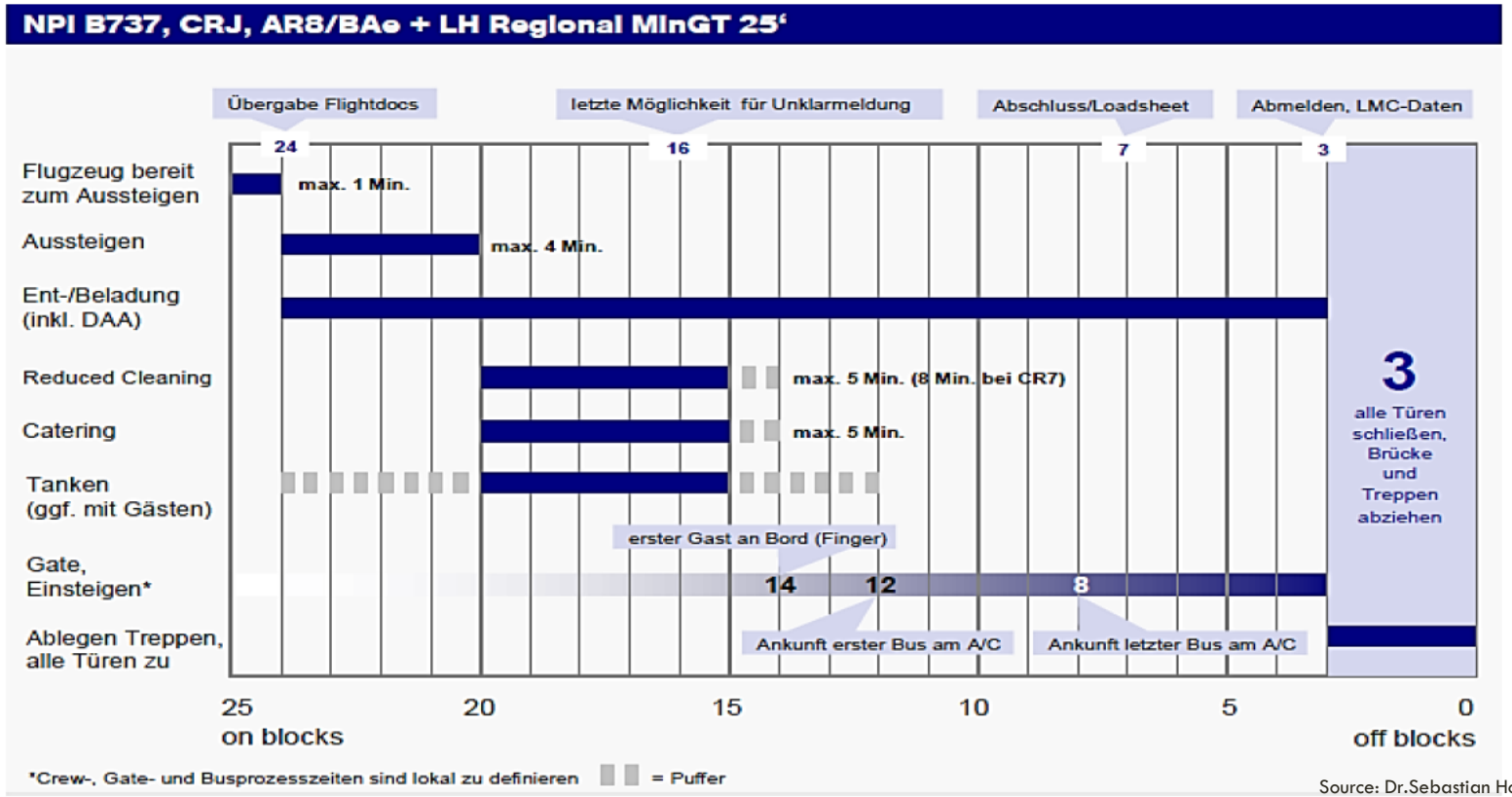
ROTATION BUILDING PER INDIVIDUAL TAILSIGN

Rotations need to adhere to

- maintenance requirements
- block time calculation
- Minimum Ground Time Definition
- Additional Flight Planning Parameters, e.g. buffers for ATC critical rotations

			REG	FLNO	ARCID	ST	FROM	STD	DEPARTURE	POS	TO	STA	ARRIVAL	POS
1			DABII	LH 1063	DLH8C	J	DRS	0505	0500/0507	010	FRA	0610	0555/0601	A36
2			DABII	LH 1052	DLH5UX	J	FRA	0650	0652/0703	A36	DRS	0745	0744/0747	009
3			DABII	LH 1055	DLH4C	J	DRS	0830	0827/0833	009	FRA	0935	0925/0927	A40
4			DABII	LH 1354	DLH5EL	J	FRA	1130	1132/1144	A40	STR	1210	1206/1211	012
5			DABII	LH 1359	DLH4T	J	STR	1245	1243/1251	012	FRA	1335	1321/1330	V119
6			DABII	LH 3304	DLH3NM	J	FRA	1430	1431/1450	V119	WAW	1605	E1614	009
7			DABII	LH 3305	DLH3WY	J	WAW	1715		009	FRA	1900		V118
8			DABII	LH 4944	DLH8FE	J	FRA	1945		V118	EDI	2140		

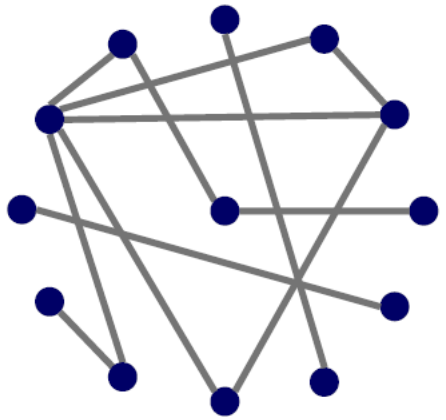
PLANNING PARAMETERS FOR ROTATION BUILDING, E.G. MINIMUM GROUND TIME



Source: Dr.Sebastian Hollmeier, Deutsche Lufthansa AG

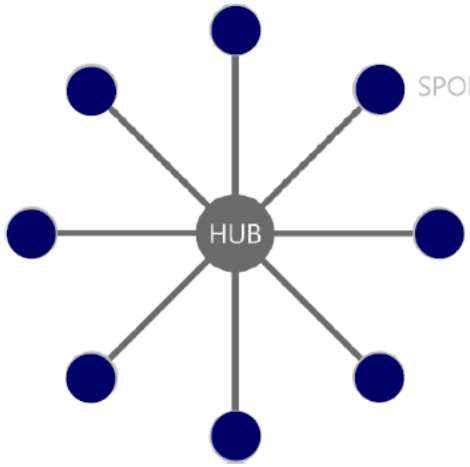
THE HUB LOGIC

Point-to-point traffic



- Attractive direct connections
- Only few markets can be served profitably

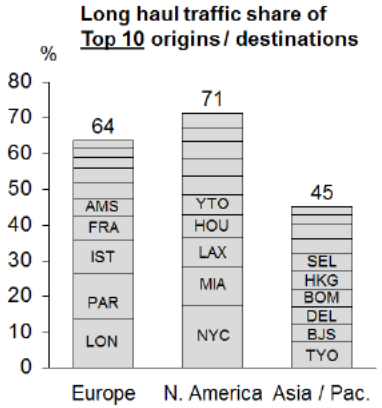
Hub-and-spoke traffic



- Large number of markets served
- Economies of scale of larger aircraft through bundling passengers

Source: Dr.Sebastian Hollmeier, Deutsche Lufthansa AG

WHAT IS AN IDEAL HUB LOCATION?

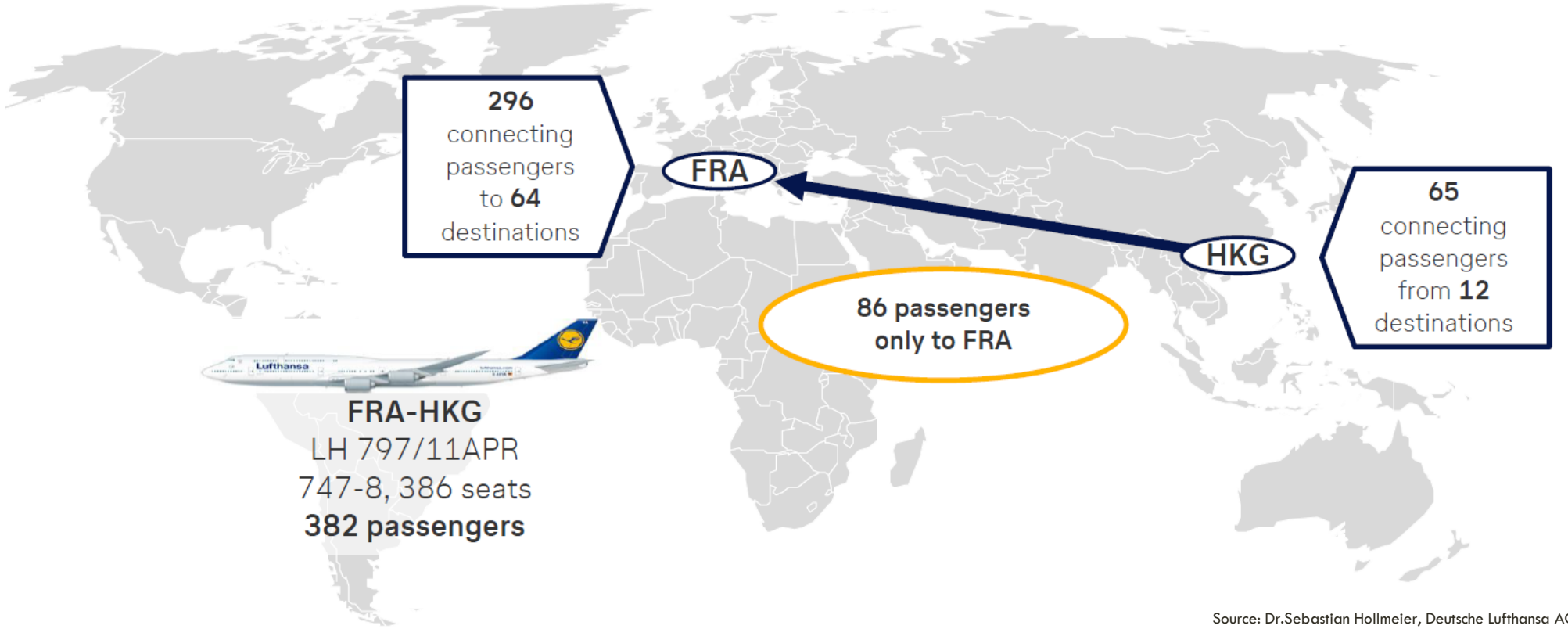


Airport and operational requirements

- Size of local demand
- Geographic location
- Available infrastructure (minimum connecting time, attractiveness)
- Process quality (punctuality, reliability, passenger convenience, …)
- Cost for airlines / passengers

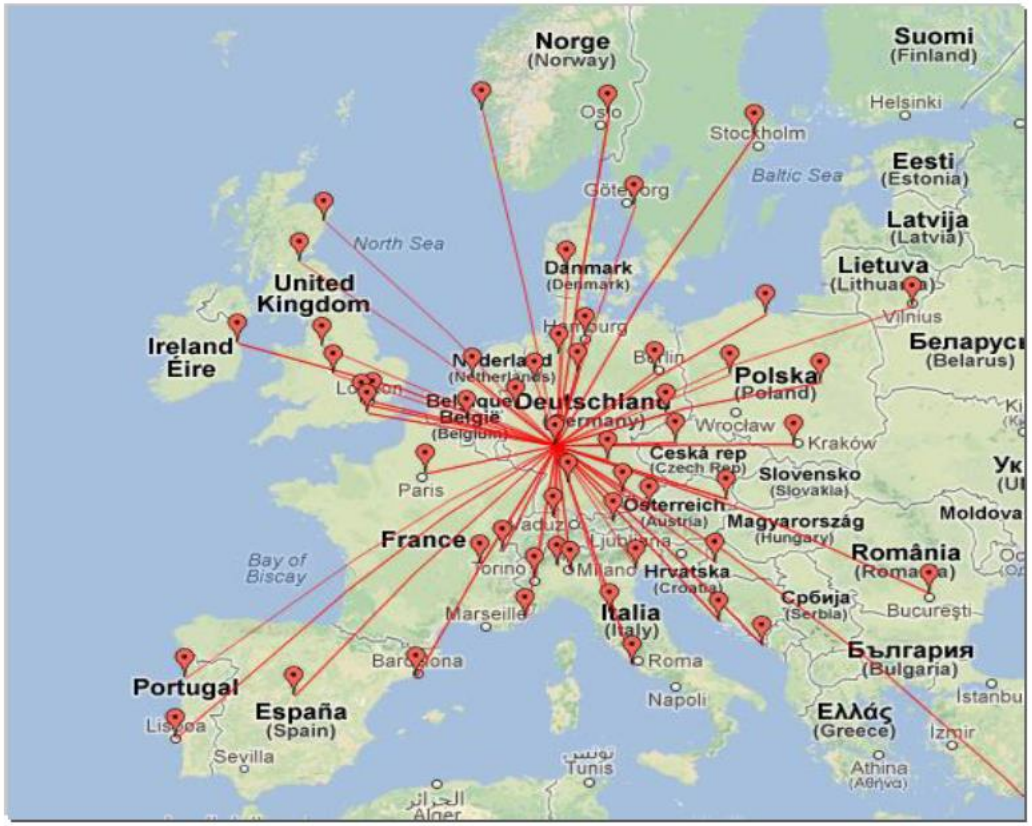
Source: Dr.Sebastian Hollmeier, Deutsche Lufthansa AG

EXAMPLE FLIGHT HKG-FRA



Source: Dr.Sebastian Hollmeier, Deutsche Lufthansa AG

TRANSFERING PASSENGERS TO OTHER EUROPEAN DESTINATIONS



263 transfer passengers to 56 European destinations

Aberdeen, Amsterdam, Barcelona, Berlin, Billund, Birmingham, Bremen, Brussels, Bucharest, Cologne, Dobrovnic, Dresden, Dublin, Dusseldorf, Edinburgh, Florence, Gdansk, Geneva, Gothenburg, Hamburg, Hannover, Innsbruck, Krakow, Lisbon, London City, London Gatwick, London Heathrow, Lyon, Madrid, Manchester, Milan Linate, Milan Malpensa, Muenster-Osnabrueck, Munich, Newark, Nice, Nuremberg, Oporto, Oslo, Paris, Poznan, Praha, Rome, Salzburg, Split, Stockholm Arlanda, Stuttgart, Tel Aviv, Turin, Venice, Vienna, Vilnius, Warsaw, Zagreb, Zurich

Source: Dr.Sebastian Hollmeier, Deutsche Lufthansa AG

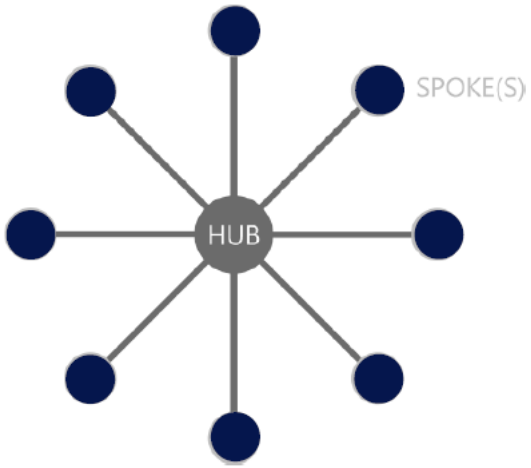
TRANSFERING PASSENGERS TO THE AMERICAS

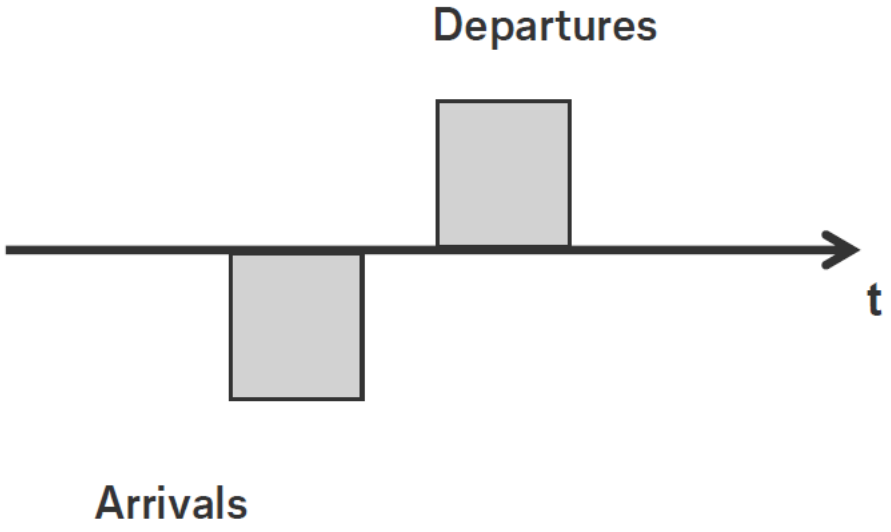
33 transfer passengers to 9 American destinations

Montreal,
Chicago,
New York (Newark),
Atlanta
Mexico
Caracas
Bogota
Rio de Janeiro
Sao Paolo

Source: Dr.Sebastian Hollmeier, Deutsche Lufthansa AG

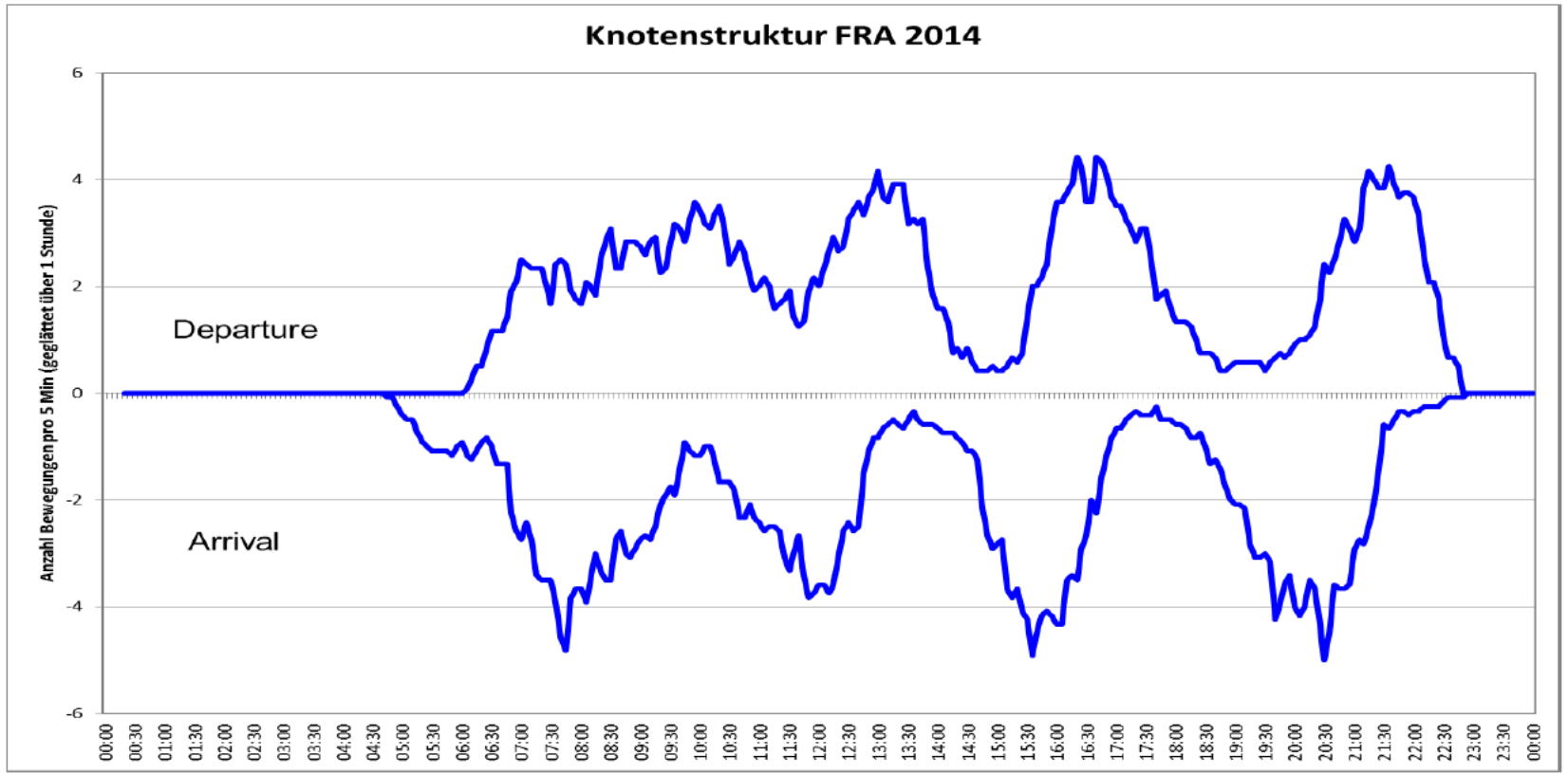
PLANNING FOR TRANSFERS LEADS TO PEAKS IN ARRIVALS AND DEPARTURES AT THE HUB





Source: Dr.Sebastian Hollmeier, Deutsche Lufthansa AG

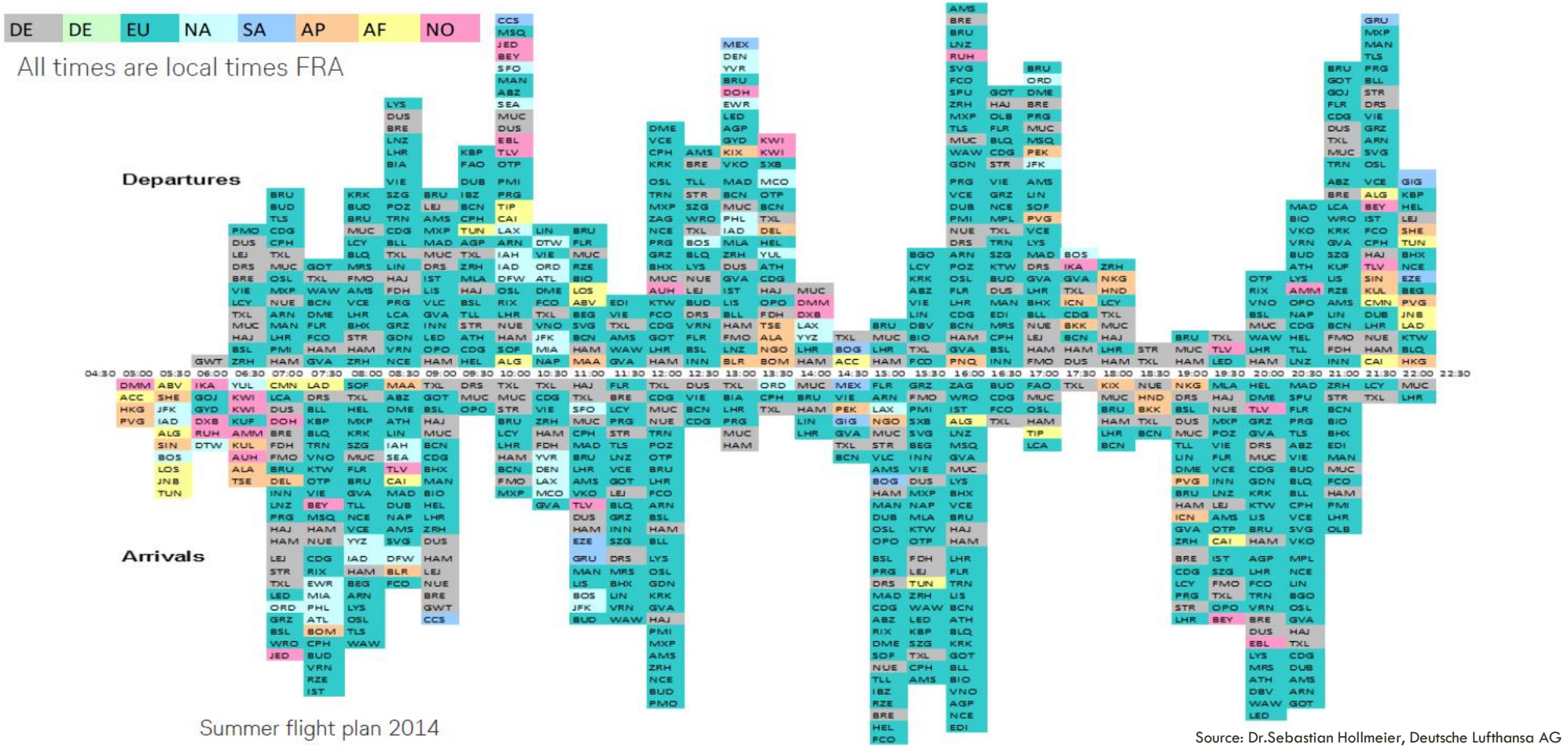
PEAKS ARE CALLED BANKS OR WAVES



Source: Dr.Sebastian Hollmeier, Deutsche Lufthansa AG

Summer flight plan 2014

DEPARTURES AND ARRIVALS IN FRA



Source: Dr.Sebastian Hollmeier, Deutsche Lufthansa AG

2.5. PRODUCT OFFERING

- Premium or not?
- Cabin Classes
- Inflight Service
- Ground Services: Premium Counters, Lounges
- Frequent Flyer Program

FOUR CLASS OFFERING

First Class

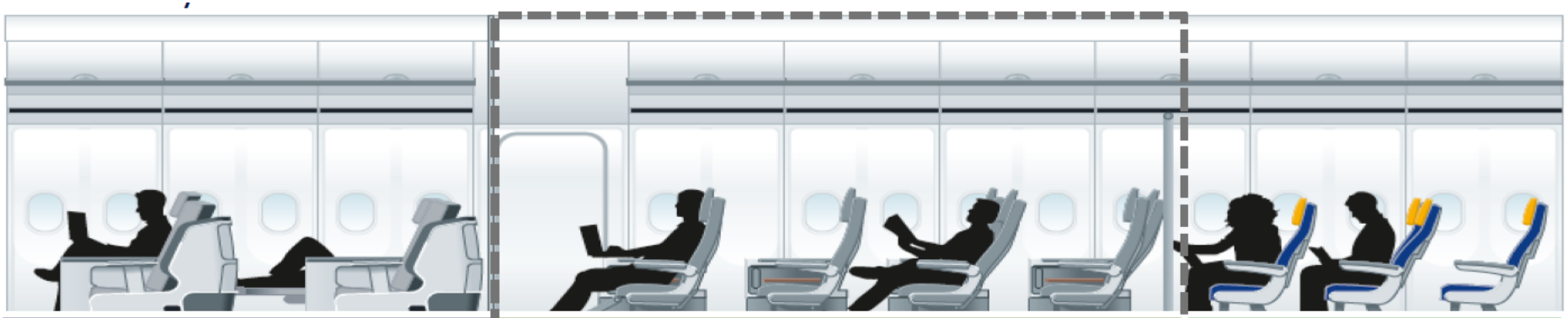
New Business Class Center Single Seat

Premium Economy Class

Economy Class

Source: Dr.Sebastian Hollmeier, Deutsche Lufthansa AG

CABIN CLASSES EVOLVE



Business Class		Premium Economy Class		Economy Class	
Seat distance	162,6 cm	Seat distance	96,5 cm	Seat distance	78,7 cm
Seat width*	50,8 cm	Seat width*	45,7-48,3 cm	Seat width*	43-45,7 cm
Seat backrest width**	67 cm	Seat backrest width**	58,4-62,2 cm	Seat backrest width**	48,3-52 cm
Bed surface length	198,1 cm	Inclination angle	20,3 cm	Inclination angle	15,2 cm
Screen size	38,1 cm	Screen size	28/30,5 cm, Vorderreihe 23 cm	Screen size	23 cm
Leg support	Every seat	Leg support	erste Reihe	Leg support	nein
Foot rest	Every seat	Foot rest	jeder Sitz	Foot rest	nein
Power outlet	Every seat	Power outlet	jeder Sitz	Power outlet	jeder zweite Sitz

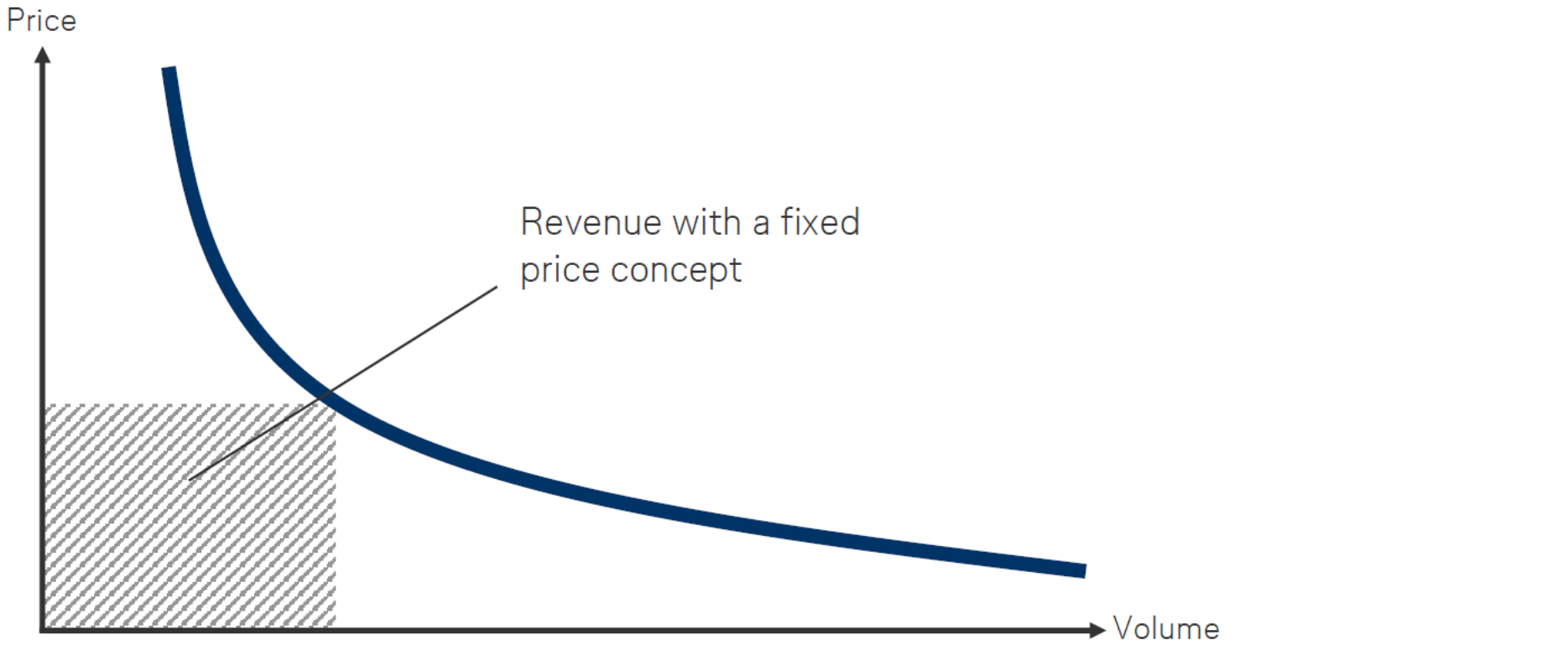
*between armrests, **including armrest

Source: Dr.Sebastian Hollmeier, Deutsche Lufthansa AG

2.6. REVENUE GENERATION

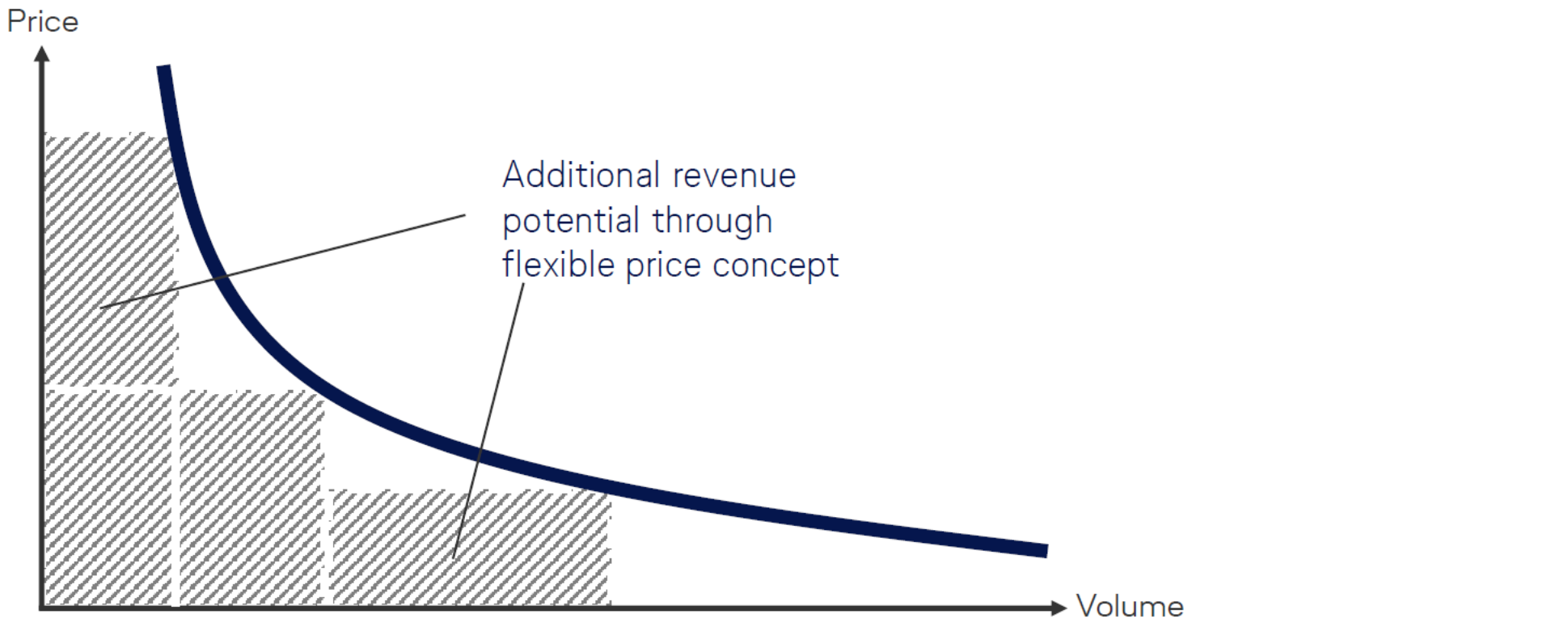
- Pricing
- Revenue Management
- Ancillaries
- Distribution and Sales

SELLING ALL SEATS FOR THE SAME PRICE WOULD BE SUPOPTIMAL



Source: Dr.Sebastian Hollmeier, Deutsche Lufthansa AG

A FLEXIBLE PRICE CONCEPT WITH APPROPRIATE FENCING GENERATES MORE REVENUE



Source: Dr.Sebastian Hollmeier, Deutsche Lufthansa AG

SEGMENTATION BY TIME OF BOOKING

Private travellers

- want to travel
- highly price sensitive
- plan trips long in advance
- rather flexible in their travel plans
- usually travel economy class

Business travellers

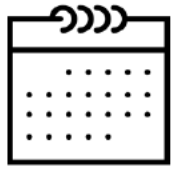
- have to travel
- value travel time benefits (sometimes)
- plan their trips with short lead times
- require a high degree of flexibility for their travel plans
- often times enjoy a „frequent traveller's" status

Source: Dr.Sebastian Hollmeier, Deutsche Lufthansa AG

FARE SEGMENTATION 1/2

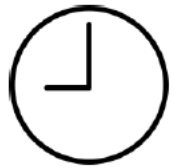
1. Duration limits

- minimum / maximum stay limits
- at least one Saturday night
- duration limits only work, if passengers buy return tickets. Therefore, one-way tickets are usually in the most expensive fare class



2. Departure time limits

- weekends and midday are typically less attractive to business travellers
- special promotional fares at these times generate additional off-peak demand



Source: Dr.Sebastian Hollmeier, Deutsche Lufthansa AG

FARE SEGMENTATION 2/2

3. Purchase time restrictions

- minimum number of days in advance
- „last minute“

4. Routing restrictions

- no stop-overs
- no „open-jaw“ rule, i.e. departure and arrival airport must be the same

5. Flexibility restrictions

- no (free) changed bookings
- no refunds
- no interlining

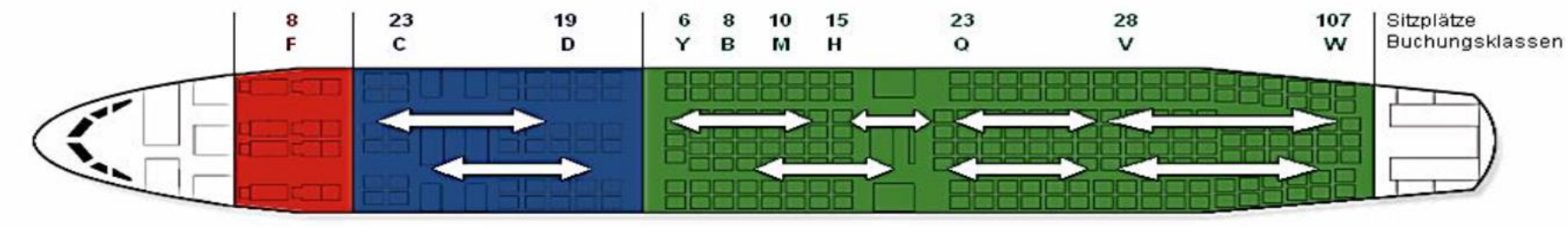
Source: Dr.Sebastian Hollmeier, Deutsche Lufthansa AG

BOOKING CLASSES WITH DIFFERENT PRICE POINTS

Beförderungs-klassen F, C und M	Flugpreise in Euro	Buchungs-klassen *Bu-Kla*	Konditionen
First	8.380	F	
Business	5.271	C	
	4.311	D	
	4.429	Y	
	3.470	Y	
Economy	2.300	Z	
	2.099	B	
	1.250	M	
	1.070	H	
	920	Q	
	830	V	

Source: Dr.Sebastian Hollmeier, Deutsche Lufthansa AG

REVENUE MANAGEMENT AIMS TO MAXIMIZE THE REVENUE PER FLIGHT



Source: Dr.Sebastian Hollmeier, Deutsche Lufthansa AG

ANCILLARIES BECOME INCREASINGLY IMPORTANT

- Bag Fee
- Seat Reservation
- Specific seats in the same cabin class
- Airport Check-in penalty
- …

- Low Cost Airlines generate a substantial amount of their total revenues with „Ancillaries“

DISTRIBUTION INCREASINGLY DIRECT

- Global Distribution Systems (Amadeus, Galileo, Sabre) no longer the gate keepers
- Direct connect to travel agencies and large corporates
- Internet sales to the consumer from airlines own website

- However, 3rd party internet sales could replace GDS‘ power

2.7. COST STRUCTURE

- Variable Costs (per Flight, per Passenger)
  - Fuel
  - ATC
  - Landing Charges
  - Aircraft Handling
  - Food+Beverage
  - Variable Distribution Costs

COC: Cash Operating Costs

- + Fixed Costs (per Aircraft, Crew, MRO)
  - Crew
  - Maintenance
  - Airplane Depreciation

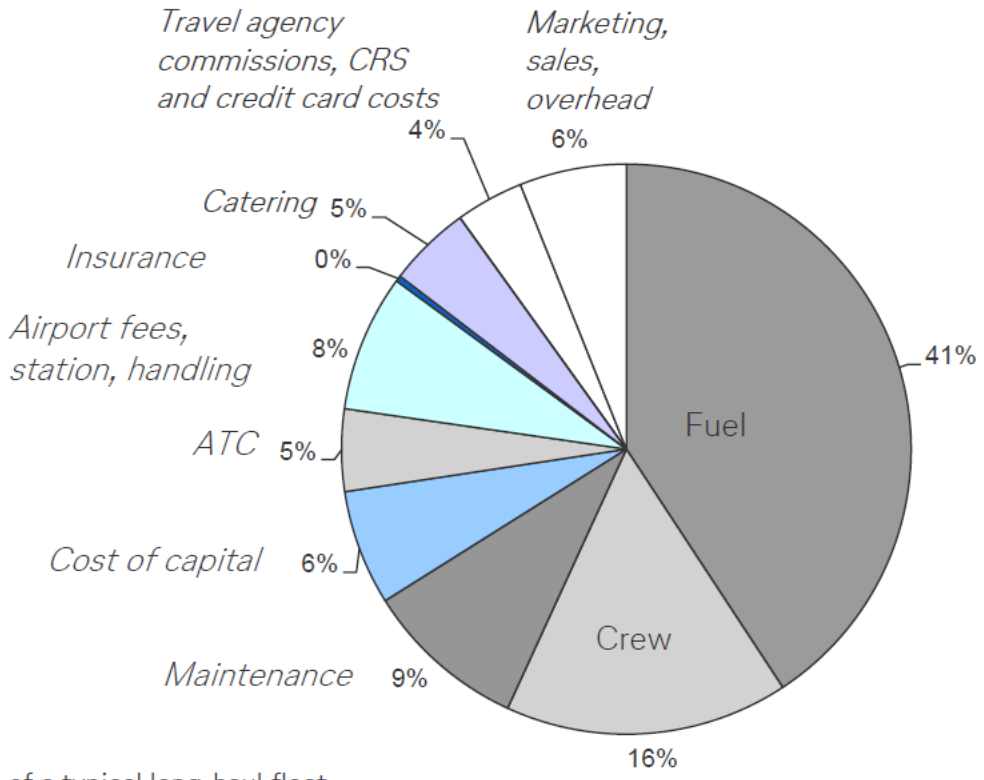
DOC: Direct Operating Costs

- Overhead (Sales, Management)

LONG HAUL:FUEL AS THE HIGHEST COST FACTOR

DOC entail …

- Fuel
- Airframe and engine maintenance
- Landing fees
- Handling charges (ground handling)
- Air traffic control fees
- Depreciation and interest effects
- Insurance
- Cockpit and cabin crew



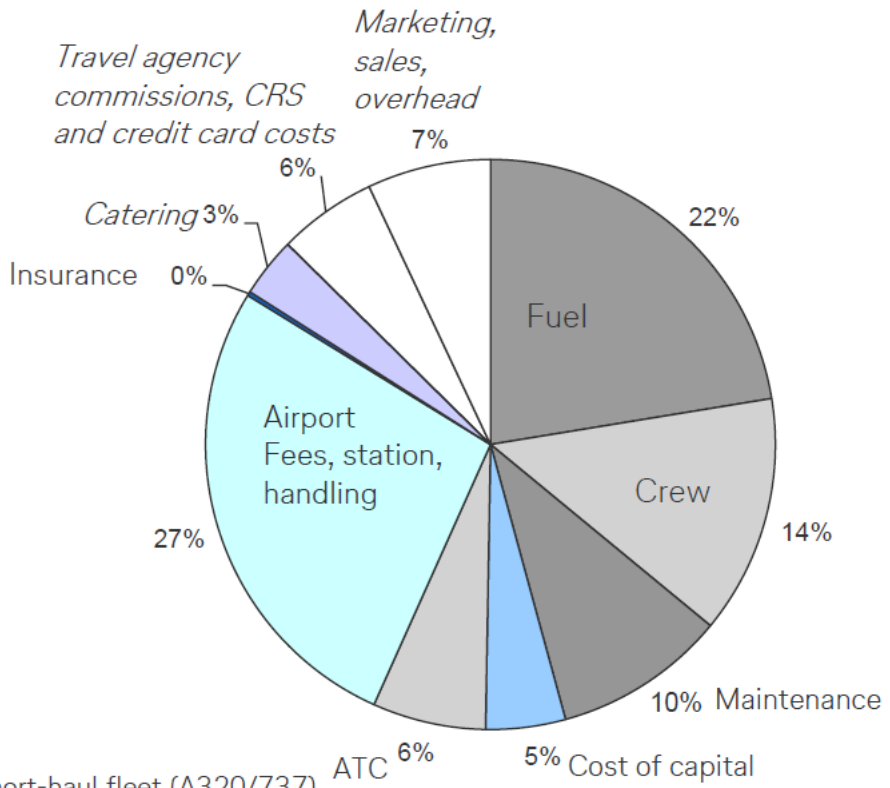
Example of a typical long-haul fleet

Source: Dr.Sebastian Hollmeier, Deutsche Lufthansa AG

SHORT HAUL: GROUND COSTS RELATIVELY HIGHER

DOC entail …

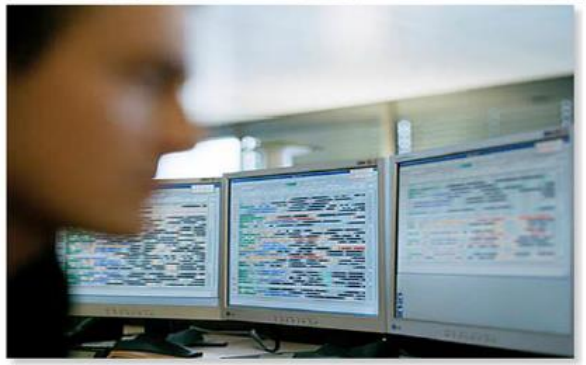
- Fuel
- Airframe and engine maintenance
- Landing fees
- Handling charges (ground handling)
- Air traffic control (ATC) fees
- Depreciation and interest effects
- Insurance
- Cockpit and cabin crew



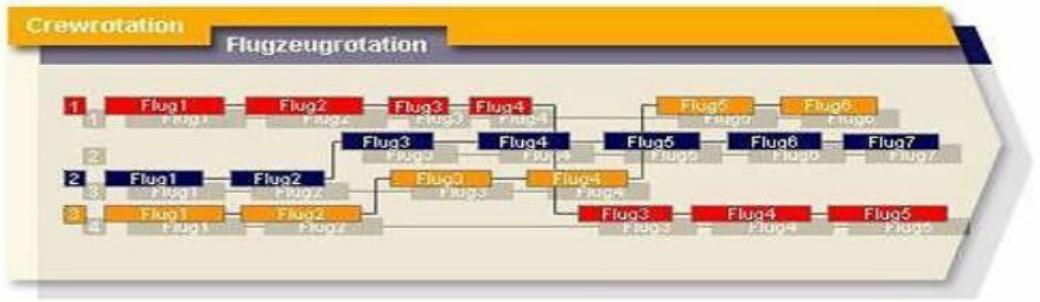
Example fo a typical short-haul fleet (A320/737)

Source: Dr.Sebastian Hollmeier, Deutsche Lufthansa AG

2.8. OPERATIONS PLANNING



Netzoptimierung	Crew-Umlaufplanung	Crew-Einsatzplanung	Crew-Steuerung
Flugrotationen	Crewrotationen	Individueller Einsatzplan	Anpassungen im laufenden Betrieb
monatliche Übergabe	Drei Wochen Bearbeitungszeit	Vier Wochen Bearbeitungszeit	laufender Tag



Source: Dr.Sebastian Hollmeier, Deutsche Lufthansa AG

2.9. LABOR

- Recruitment
- Training
- Retention
- Collective Labor Agreements
  - U.S. Railway Labor Act, 1936
  - Seniority
  - Labor Relations

2.10. REGULATORY

- Freedoms of the Air
- Traffic Rights
- Airport Slots
- ETOPS: Extended Twin Engine Operations
- Gaining an AOC

FREEDOMS OF THE AIR

1. Freedom -The right to fly over a foreign country without landing.

2. Freedom -The right to refuel or carry out maintenance in a foreign country without embarking or disembarking passengers or cargo.[

3. Freedom -The right to fly from one's own country to another.

4. Freedom -The right to fly from another country to one's own.

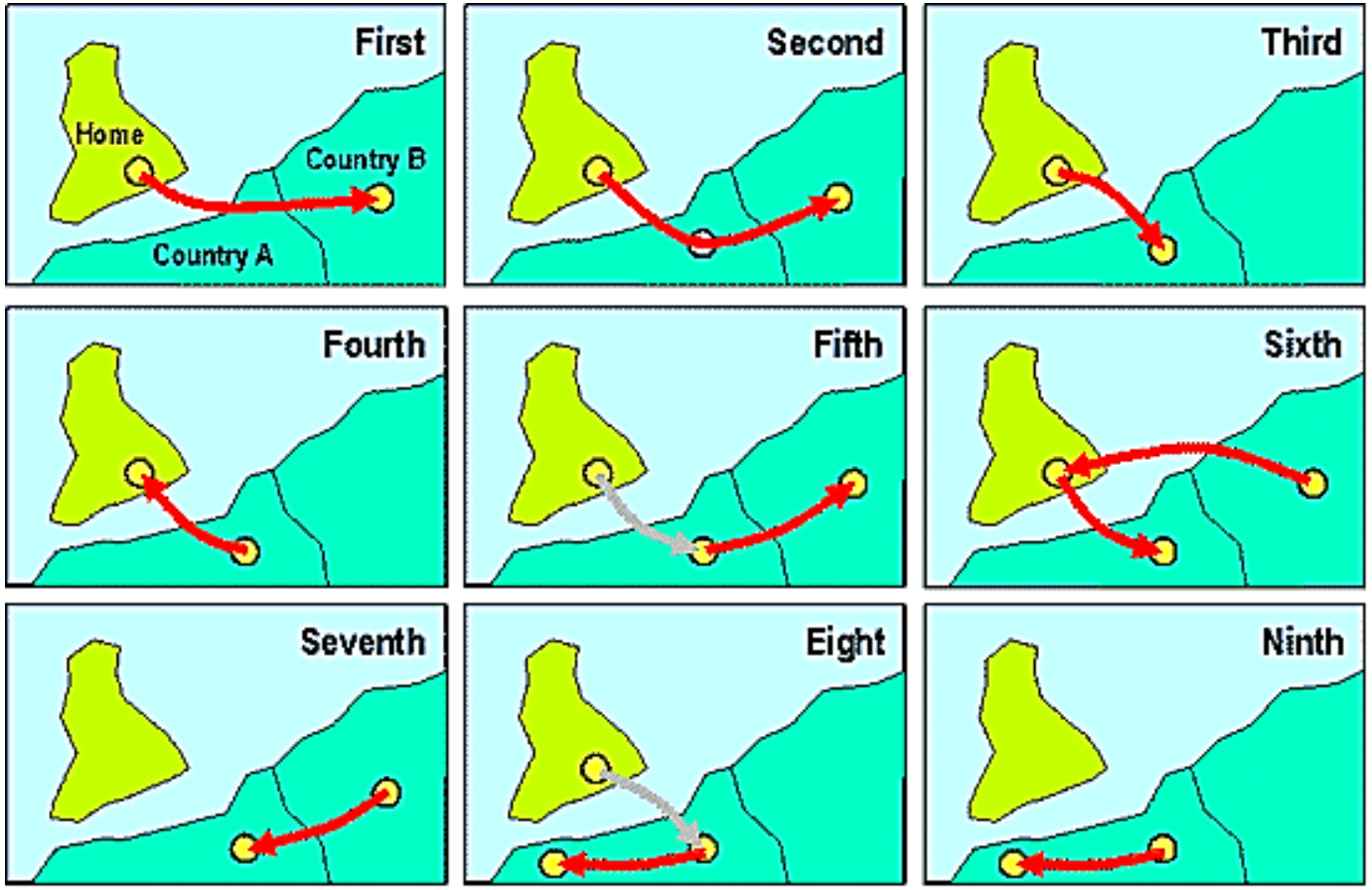
5. Freedom -The right to fly between two foreign countries on a flight originating or ending in one's own country.

6. Freedom -The right to fly from a foreign country to another while stopping in one's own country for non-technical reasons.[

7. Freedom -The right to fly between two foreign countries while not offering flights to one's own country.

8. Freedom -The right to fly inside a foreign country, continuing to one's own country.

9. Freedom -The right to fly within a foreign country without continuing to one's own country.


First
Home
Country B
Country A
Second
Third
Fourth
Fifth
Sixth
Seventh
Eight
Ninth

BILATERALS BETWEEN COUNTRIES

Bilateral agreement between countries (contracts under international law)

Usually determined very precisely

- ☐ Routes
- ☐ Capacity shares and frequencies
- ☐ Authorized carriers are named explicitly
- ☐ If necessary: compensation payments (royalties)

2.11. CAPITAL REQUIREMENTS AND FINANCIAL FORECASTS

- When launching an airline, investors will want to know
  - your capital expenditure plan
  - Your targeted cost position
  - your revenue growth expectations
  - your mitigation plan if things don‘t go as planned

2.12. GROWTH STRATEGY

- Because of the high asset costs, growth in the Airline Industry needs to be diligently planned
- Several airlines have failed because they tried to grow to quickly
- Investors will look at your growth strategy in detail

3 GROUP WORK

3 GROUP WORK:TASK (PAGE 1/2)

- Form three new groups of 3 students and one group of 4 students
- Choose one of these airlines
  - Scoot
  - Easyjet
  - Vistara Airlines
  - Air France KLM
  - Delta
  - Emirates Airlines

3 GROUP WORK:TASK (PAGE 2/2)

Describe their strategic positioning in the market place.

Develop approximately10 Charts:

- ❑Founding, ownership, etc.
- ❑Target Market
- ❑Airline Model (p2P, Hub,..., No Frills/Premium)
- ❑Fleet Composition
- ❑Network Strategy (frequencies per route,...)
- ❑Product
- ❑Distribution Strategy
- ❑Labor Strategy
- ❑Financial Forecast
- ❑Growth Strategy

4. AIR CARGO INDUSTRY

All material courtesy of Lufthansa Cargo

4.1. AIR CARGO FUNDAMENTALS

AIR CARGO: SPEED, RELIABILITY AND SECURITY

Demand

- **Origins of Demand**
- Customers
- Commodities
- Tradelanes
- Growth Rates

Reasons: Global Trade
esp. between continents

Specialization and Scale
for instance "German hidden champions" to the world

Labor Arbitrage
e.g. South-East Asia to Europe

(Raw) Materials
e.g. Diamonds

Climate
e.g. roses from Kenia

Culture
e.g. Olympics, Formula 1

Transport modes

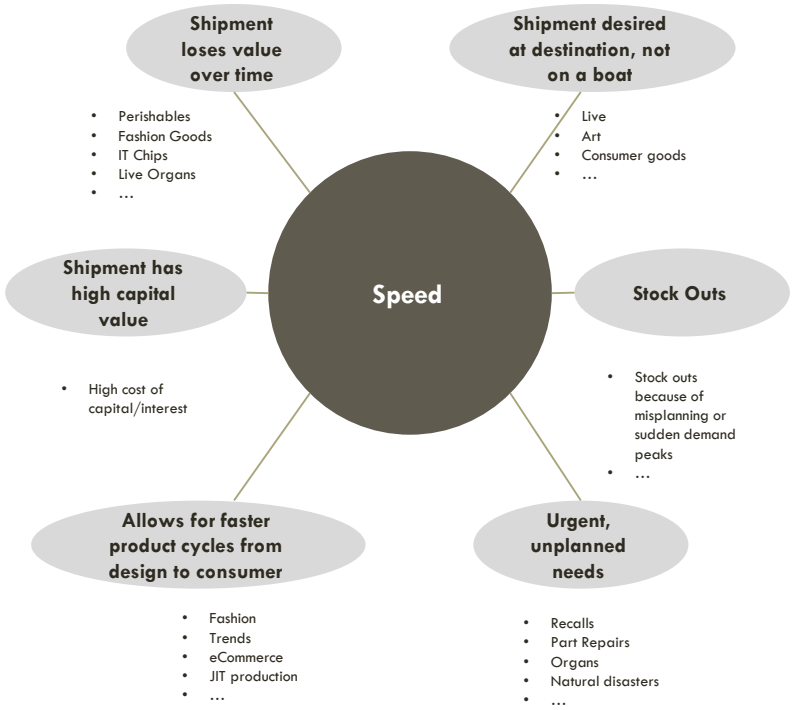
Air

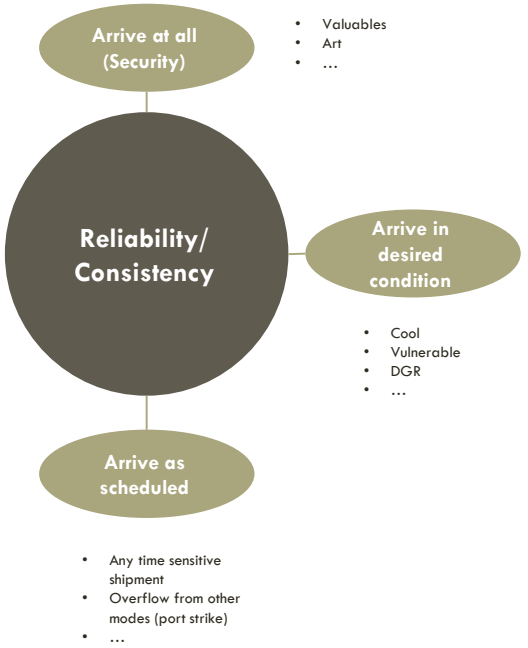
USP
- **Speed** (e.g. time-to-market in high-tech)
- **Reliability** (e.g. pharmceuticals)
- **Security** (e.g. banknotes)

Rail
Asia-Europe

Ocean
bulk and containerized

REASONS FOR SPECIFICALLY CHOOSING AIR CARGO INSTEAD OF OTHER MODES

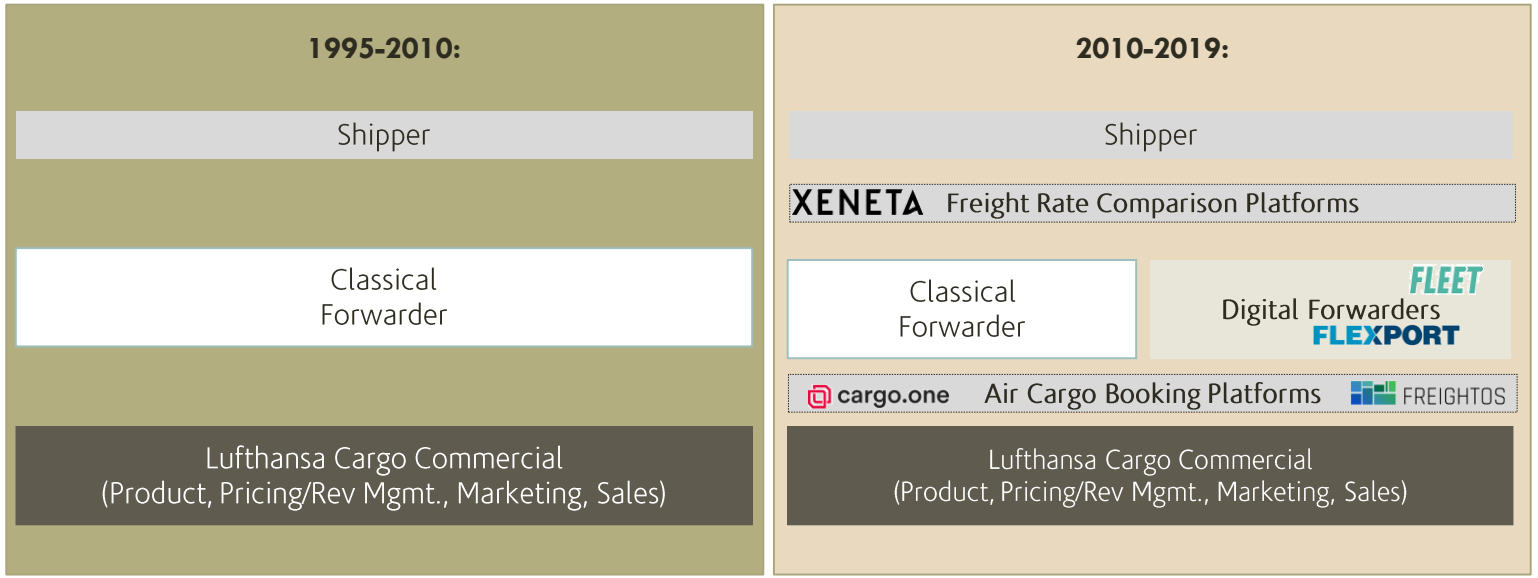




CUSTOMERS OF AIR CARGO CARRIERS ARE PRIMARILY FORWARDERS, BUT SLOWLY DIVERSIFIYING

Demand

- Origins of Demand
- **Customers**
- Commodities
- Tradelanes
- Growth Rates



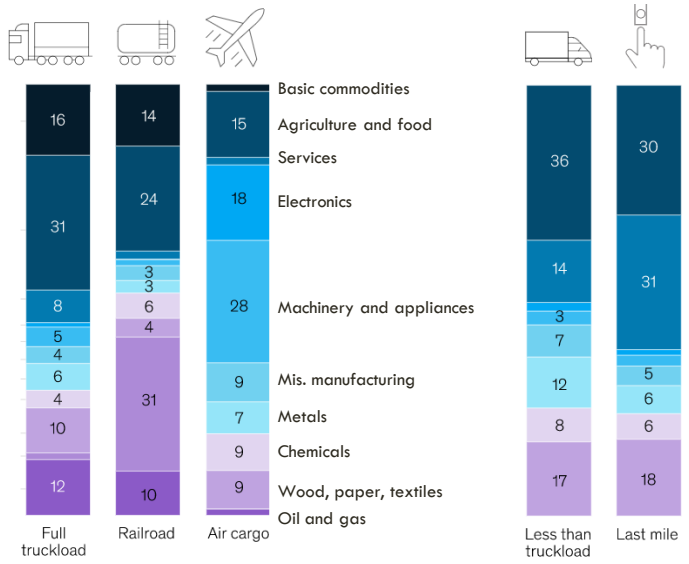
Forwarder as Customer. Contracting short-term, primarily via individually negotiated spot rates, limited cancellation fees. Very much still a people's business.

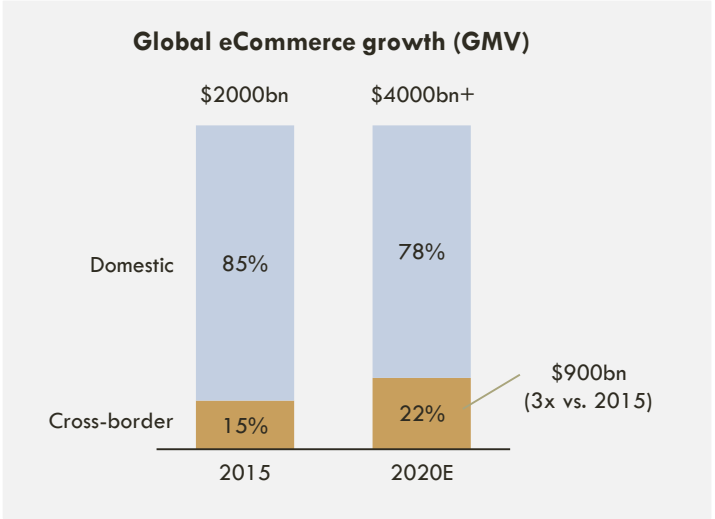
COMMODITIES REQUIRING SPEED, RELIABILITY AND SECURITY ARE TRANSPORTED VIA AIR

Demand

- Origins of Demand
- Customers
- **Commodities**
- Tradelanes
- Growth Rates

2018 US commodity mix by mode, % share



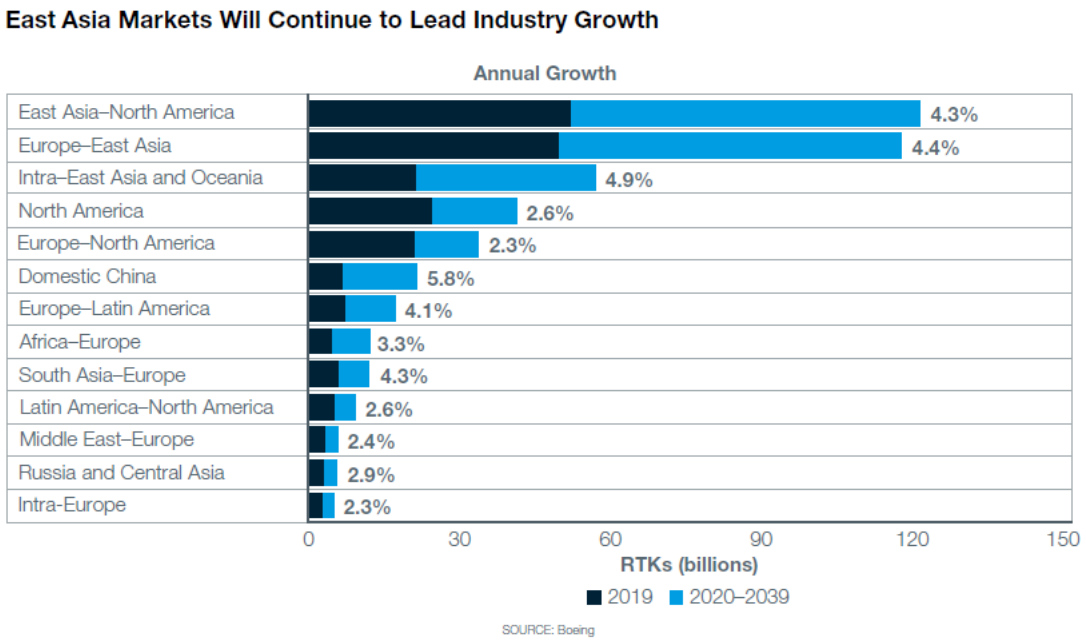


Sources: McKinsey „US freight after COVID-19“ (July 2020), DHL „The 21st Century Spice Trade“

AIR CARGO TRADELANES DOMINATED BY ASIA – EUROPE – NORTH AMERICA DEMAND

Demand

- Origins of Demand
- Customers
- Commodities
- **Tradelanes**
- Growth Rates



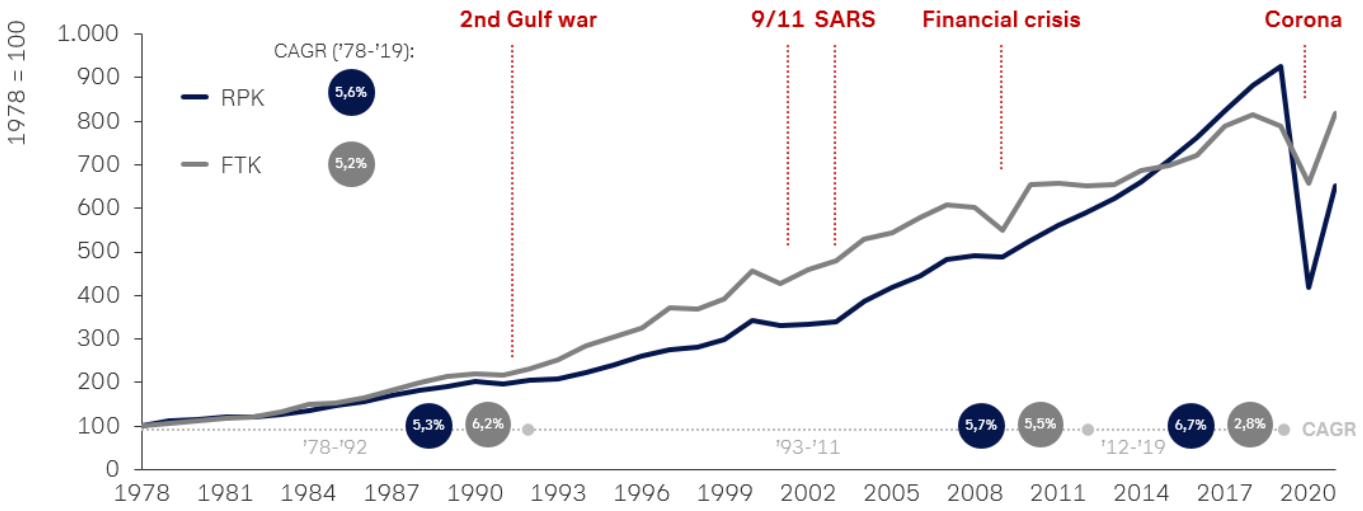
http://www.boeing.com/resources/boeingdotcom/market/assets/downloads/2020_WACF_PDF_Download.pdf

AIR CARGO VOLUMES STEADILY GROWING OVER TIME, WITH SHORT TERM EXOGENOUS CRISES

Demand

- Origins of Demand
- Customers
- Commodities
- Tradelanes
- **Growth Rates**

Passenger and cargo growth since 1978



- Passenger and cargo growth follow similar long-term trend
- Cargo seems to be hit more significantly during crisis – but also recovers rapidly

Data Source: ICAO, IATA estimate for 2019-21

SUPPLY: AIR CARGO SUPPLY PARTLY AS "CO-PRODUCT", DERIVED FROM PASSENGER AIRCRAFT

Supply

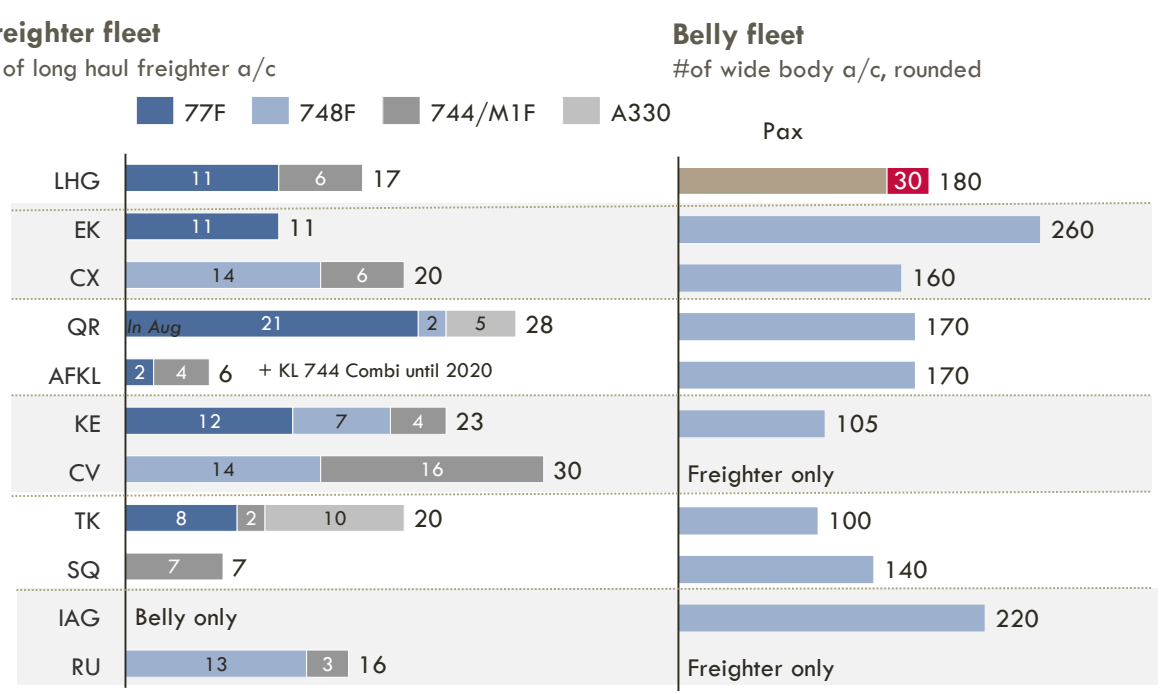
- **Air Cargo Players**
- Integrators
- Share of Bellies
- World Freighter Fleet
- Intermodal Competition

Types of Air Cargo Carriers

United Airlines, American Airlines — Belliy Only

Air China Cargo, Lufthansa — Combi: Bellies and Freighters

AirBridgeCargo, cargolux — Freighter Only

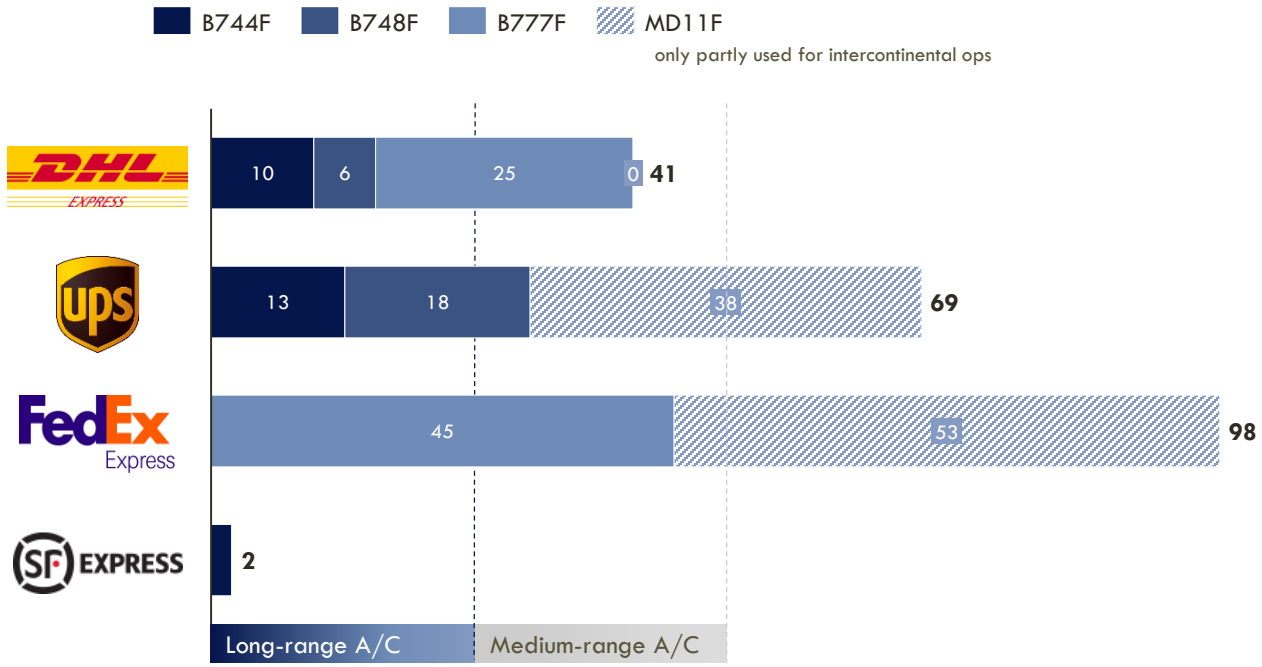


Source: LCAG Analyses, 2020

AIR CARGO COMMODITIES USED AS FILL-UP FOR INTEGRATORS' EXPRESS SERVICES FLEET

Supply

- Air Cargo Players
- **Integrators**
- Share of Bellies
- World Freighter Fleet
- Intermodal Competition



Source: LCAG Analyses, 2020

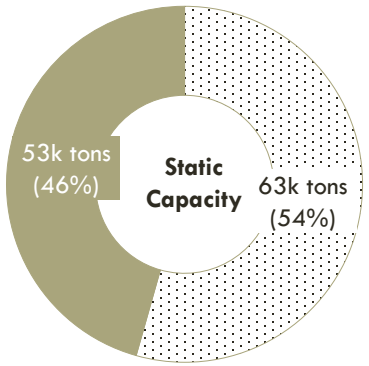
Aircraft currently in service (no orders), data for UPS/FedEx from LCAG Q2 fleet report (Cirium database); DHL uses "virtual airline" with >10 operators, fleet size approximated via Wikipedia/Flightradar24

FREIGHTERS SUPPLY ABOUT 50% OF AIR CARGO CAPACITY, WITH LOWEST RATIO ON ATLANTIC

Supply

- Air Cargo Players
- Integrators
- **Share of Bellies**
- World Freighter Fleet
- Intermodal Competition

Freighters, e.g.
748F: 127t
777F: 102t
M1F: 85t



Bellies, e.g.
773: 20t
779: 19t
789: 16t
A359: 15t
A333: 15t
A346: 14t
748: 14t

Source: LCAG Analyses, 2020

http://www.boeing.com/resources/boeingdotcom/market/assets/downloads/2020_WACF_PDF_Download.pdf

GLOBALLY, 700+ LONG HAUL AIRCRAFT IN OPERATION (INCL B767: 1000+)

Supply

- Air Cargo Players
- Integrators
- Share of Bellies
- **World Freighter Fleet**
- Intermodal Competition

Freighter fleets (Widebody Cargo Aircraft: B747 freighter types, B762/3 freighter types, MD11F, B777F & A330F)
Report Q3 2020
In Service OCT 2020

New generation aircraft

B777F

Top 5 (ranked by TTL A/C)

FedEx	45
Qatar Airways	21
AeroLogic	16
China Southern Airlines	14
Korean Air	12
Total	**191**
Lufthansa Cargo	13 (incl. 4 BOX)

B748F

Top 5 (ranked by TTL A/C)

UPS Airlines	18
Cargolux	14
Cathay Pacific	14
AirBridgeCargo	13
Nippon Cargo Airlines	8
Total	**91**

A330F

Top 5 (ranked by TTL A/C)

Turkish Airlines	10
Avianca Cargo	6
Hong Kong Air Cargo	5
Qatar Airways	4
Egyptair	3
Total	**40**

Old generation aircraft

B744(S)F/ERF

Top 5 (ranked by TTL A/C)

Atlas Air	29
Kalitta Air	24
China Airlines	18
UPS Airlines	13
Asiana Airlines	11
Total	**199**

B741/2/3F

Top 5 (ranked by TTL A/C)

Islamic Republic of Iran Air Forc	6
Fars Qeshm Air Lines	2
Geo Sky	2
Fly Pro	1
TCA	1
Total	**13**

MD-11F

Top 5 (ranked by TTL A/C)

FedEx	53
UPS Airlines	38
Western Global	9
Lufthansa Cargo	6
Total	**106**

B767(S)F

Top 5 (ranked by TTL A/C)

FedEx	92
UPS Airlines	75
Amazon Air	52
Cargojet Airways	17
ABX Air	14
Total	**357**

Source: LCAG Analyses, 2020

RAIL ASPIRING TO GROW INTO AIR CARGO'S MARKETS

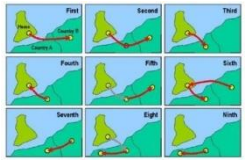
Supply

- Air Cargo Players
- Integrators
- Share of Bellies
- World Freighter Fleet
- **Intermodal Competition**

Source: https://www.csis.org/reconnecting-asia

UP TO 2019, EVOLUTIONARY TECHNOLOGICAL AND REGULATORY DEVELOPMENTS, WITH INCREASINGLY SOCIETAL FOCUS ON ENVIRONMENTAL ISSUES

Technological	Regulatory	Societal
▪ Aircraft ▪ Ground Handling	▪ Traffic Rights ▪ Regulations ▪ Trade War ▪ Brexit	▪ Relevance of Air Freight ▪ Environmental Issues



Pictures: Natilus.co; https://www.quora.com/Why-do-we-see-much-more-5th-and-8th-freedom-cargo-flights-than-passenger-flights; https://www.sueddeutsche.de/wirtschaft/davos-thunberg-neubauer-siemens-1.4770438

4.2. COVID IMPACT

CNN BUSINESS

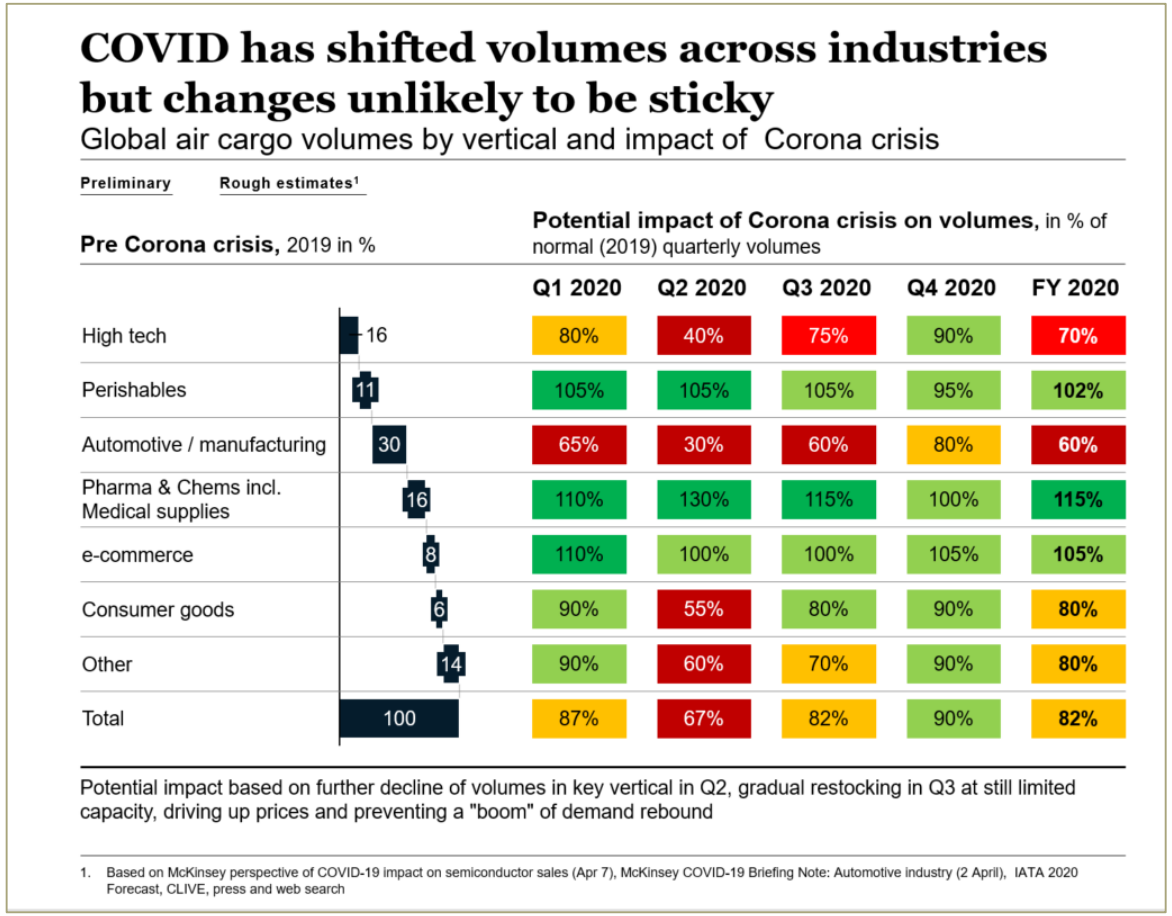
'This is a crisis.' Airlines face $113 billion hit from the coronavirus

By Charles Riley, CNN Business

Updated 0942 GMT (1742 HKT) March 6, 2020

COVID IMPACT: INDUSTRIAL **DEMAND** REPLACED BY URGENT PPE NEEDS

- Industrial Demand slightly reduced due to factory closures
- With advent of Covid in USA and Europe, skyrocketing demand for PPE shipments
- Ocean not capable of quickly re-introducing capacity, additionally issues with container availability
- Yields at elevated levels (Shanghai 100+ % increase in April 2020)
- Volumes in total smaller, however, than pre-crisis



COVID has shifted volumes across industries but changes unlikely to be sticky

Global air cargo volumes by vertical and impact of Corona crisis

Preliminary Rough estimates[1]

	Pre Corona crisis, 2019 in %	Potential impact of Corona crisis on volumes, in % of normal (2019) quarterly volumes				
		Q1 2020	Q2 2020	Q3 2020	Q4 2020	FY 2020
High tech	16	80%	40%	75%	90%	70%
Perishables	11	105%	105%	105%	95%	102%
Automotive / manufacturing	30	65%	30%	60%	80%	60%
Pharma & Chems incl. Medical supplies	16	110%	130%	115%	100%	115%
e-commerce	8	110%	100%	100%	105%	105%
Consumer goods	6	90%	55%	80%	90%	80%
Other	14	90%	60%	70%	90%	80%
Total	100	87%	67%	82%	90%	82%

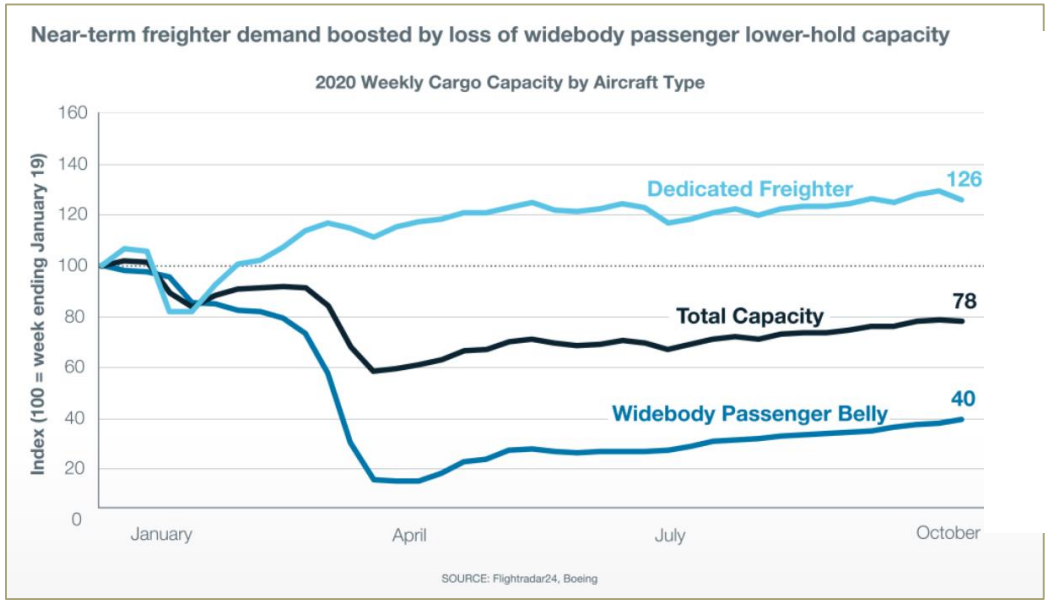
Potential impact based on further decline of volumes in key vertical in Q2, gradual restocking in Q3 at still limited capacity, driving up prices and preventing a "boom" of demand rebound

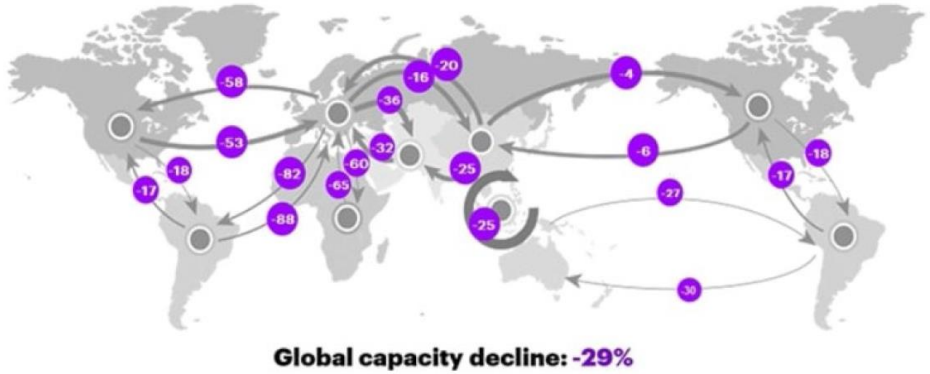
1. Based on McKinsey perspective of COVID-19 impact on semiconductor sales (Apr 7), McKinsey COVID-19 Briefing Note: Automotive industry (2 April), IATA 2020 Forecast, CLIVE, press and web search

McKinsey April 2020

MASSIVE REDUCTION OF AIR CARGO **SUPPLY** DUE TO BELLY GROUNDINGS

- Belly Shock: 30-35% of supply worldwide missing
- Reintroducing old freighters and passenger aircraft for freight only
- Freighter Aircraft flying at maximum productivity
- Forwarders ordering ACMI Capacity

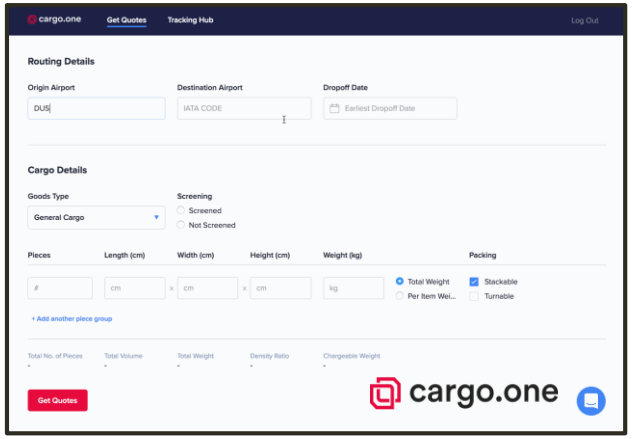




https://deugro-group.com/wp-content/uploads/grp_covid-19impacts_corrected_internal_external.pdf

COVID IMPACT: **TECHNOLOGICAL, REGULATORY, SOCIETAL**

- **Technological**: Suddenly no personal contact possible (at least in the short term, business worked without it)
- **Regulatory**: Traffic Rights opened in times of crisis (e.g. South America 7th freedom rights)
- **Societal**: relevance of Air Cargo prominently displayed



News / Air cargo carriers get temporary seventh freedom rights across Latin America

Source: Cargo.one http://cargomagazine.nl/air-cargo-carriers-get-temporary-seventh-freedom-rights-across-latin-america/

Source: bayern.de

4.3. AIR CARGO OUTLOOK AND THE „POST COVID“ NEW NORMAL: SOME QUESTIONS THAT ARE BEING ASKED REGARDING AIR CARGO

- Will nearshoring replace global trade?
- Will booking be done fully digital?
- Will forwarders circumvent air cargo airlines? Will they continue to charter full freighters?
- Will intercontinental eCommerce growth be accelerated?
- Will there be structural overcapacity?
- Will traffic rights fall?

Any acceleration, deceleration, disruption of 2019 trends or any new Covid induced phenomena?

POST COVID HYPOTHESES: LIMITED STRUCTURAL CHANGES ON **DEMAND** SIDE

- **Origins for Air Cargo Demand:**
  Still: labor arbitrage, specialization, hedonism, …no fundamental change expected
- **Customers:** Acceleration of booking platforms. Air Cargo „Commercial Layers“ not losing out because of Forwarders‘ ACMI experience. Potentially more fixed contracts for capacity (with cancellation penalty)
- **Commodities:** Commodity recovery expected. Intercontinental eCommerce will accelerate based on Covid experience
- **Tradelanes:** continued focus on Asia-Europe-North America, with evolution on other trade lanes
- **Growth Rates** and longterm development: back to normal CAGR of 3-5%. No major near shoring effects expected

POST-COVID HYPOTHESES: **SUPPLY** COULD INCREASE IN THE SHORT TERM AND INTEGRATORS TO TAKE A LARGER STAKE IN AIR CARGO MARKET?

- **Air Cargo Players**: Benefit for Freighter Only Carriers because of pax financial burdens of belly only and Combi Carriers.
- **Integrators**: Gaining interest in Air Cargo?
- **Share of Bellies:** Potentially shift to freighters due to slower passenger aircraft growth
- **World Fleet**: Added orders, however no sustained risk of overcapacity due to large „old“ world fleet (742, 744…) and limited supply. Old aircraft will re-retire in next downturn
- **Intermodal competition**: Rail will continue to grow, but will have to be profitable as well

POST COVID HYPOTHESES: **TECHNOLOGICAL, REGULATORY, SOCIETAL**

- **Technological**: Modernization in Air Cargo (Ground Handling, Fleet) will continue: Longer Cycles, few changes expected
- **Regulatory**: Traffic Rights will continue to be relevant. Free trade to be fostered by new U.S. administration?
- **Societal**: Environmental issues will be back on the agenda. Global Importance of Air Freight understood based on Covid experience

TERM PAPER

Start of processing: 27th September 2021, Submission: 22th November 2021, Presentation: 14th of March 2022 (expected), (Registration until 01NOV, Deregistration until 18OCT)

PROJECT A: Launching a new airline

Describe the opportunity, perform an external assessment, develop a strategic positioning for your airline. Describe in a word document. Present in a startup pitchdeck.

Defining a Strategy for e.g.

- a new LCC (in Europe, in India, in US...)
- a new Hub Airline
- a new Cargo Airline

OR

PROJECT B: Developing a new strategy for an existing airline

Identify Competencies, perform External Assessment, describe the airline's current strategic positioning, develop recommendation for 3 strategic priorities that the airline should target. Describe in a Word document. Present with a strategy program slide deck, recommending strategic priorities, quantified targets and initiatives to reach those targets.

Defining a Strategy for e.g.

- Easyjet
- Southwest Airlines
- Air France/KLM
- American Airlines