Transfer rates and flows in international air transport - Global and regional distribution and development

EWGT 2020, Paphos

Dr. Sven Maertens, German Aerospace Center (DLR)
Wolfgang Grimme, German Aerospace Center (DLR)
Stephan Bingemer, Heilbronn University of Applied Sciences

Outline

- Background and Objective
- Literature
- Data / Data quality
- Methodology
- Findings
- Summary and Limitations

Background and Objective

- Good statistical coverage of airport passenger numbers

- Data on transfer passengers usually not disclosed:
  - How have transfer passenger volumes developed?
  - What are the leading transfer airports and regions
    – in terms of both absolute transfer passenger numbers and relative shares of transfer traffic?
  - Have leading transfer airports and regions changed over time?

- We calculate transfer volumes and shares from “Sabre MI” demand data and provide selected results for the years 2002-2018.

Literature

- Transfer rates and volumes have hardly been dealt with in the literature…
  - Redondi/Malighetti/Paleari (2012) have acknowledged the scarce availability of such data
  - Civil Aviation Authority (2008), De Neufville/Rusconi-Clerici (1978) or Kanafani/Ghobrial (1985)…: Selected data for isolated years and airports

- … but are certainly of use for many questions:
  - important driver of airport costs and revenues (Kanafani/Ghobrial, 1985); e.g. no need for additional security checks for indirect intra-Schengen pax (Cattaneo et al, 2017)
  - relevant when designing or developing an airport's (terminal) infrastructure (De Neufville/Rusconi,1978; De Neufville/Odoni, 2003)
  - driver of the financial performance of hub carriers?
  - …

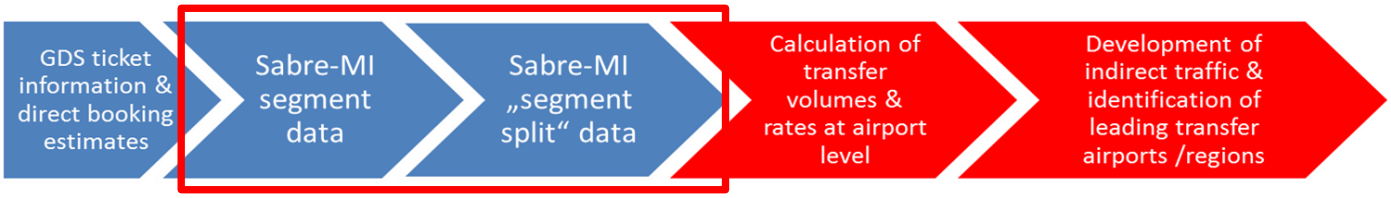
Data

- We calculate transfer passenger numbers and shares from statistics provided by the paid Sabre AirVision Market Intelligence application (short: Sabre MI).

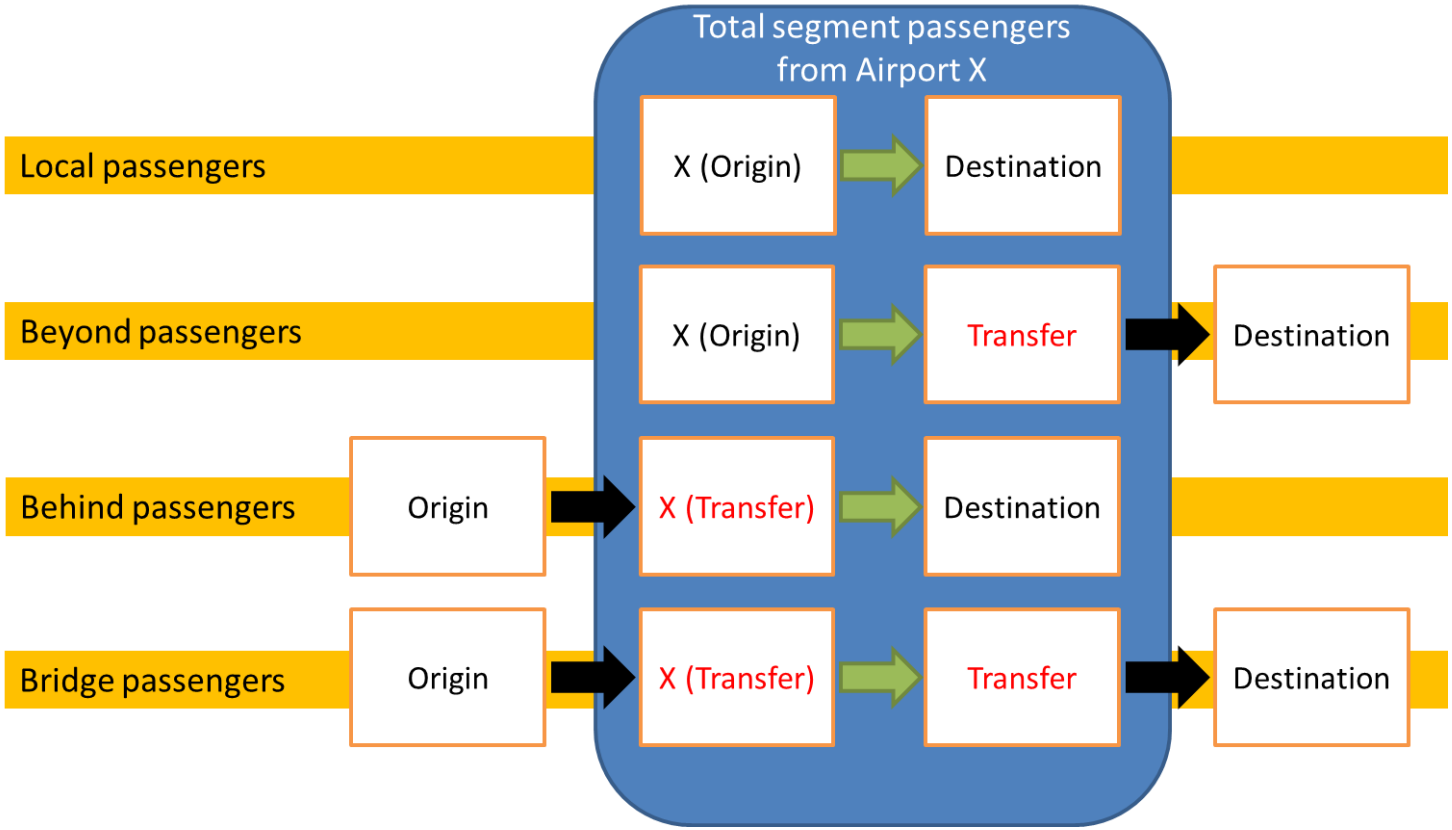
- Sabre MI inputs: Raw booking MIDT (market information data tapes) data from computer reservation systems; data from external sources including IATA, RATI/Flightglobal, US DOT T100/, DOT T/1/2/3, DB1B or Eurostat; estimates for increasingly important direct bookings and charters, …

- Sabre MI outputs:
  - Segment statistics (monthly passenger # and avg. fares by airline and booking/cabin class at the segment, i.e. direct route level),
    e.g.: direct route Berlin-Paphos operated by Ryanair in July 2020; all flights from Luton in 2019; …
  - OD statistics (monthly passenger # and avg. fares by airline and booking/cabin class at the origin-destination level, as ticketed),
    e.g.: Aegean Airlines passengers from France to Israel in May 2019; all passengers flying from Larnaca to the New York in 2018; …

Methodology



- The Sabre MI segment statistics module allows for splitting airport segment passengers into so-called local, behind, beyond and bridge passengers.



Behind and bridge passengers at airport X are those transfering there.

Methodology

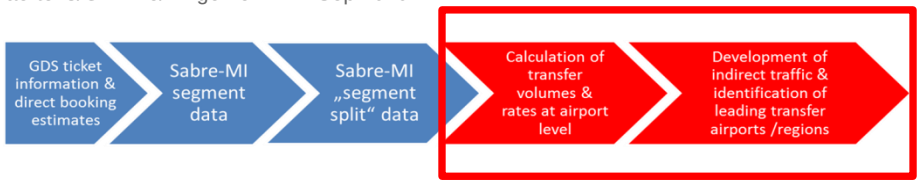
- Transfer rate at airport X in year Y:

$$t_{X,Y} = \frac{pax\_beh_{X,Y} + pax\_br_{X,Y}}{pax\_all_{X,Y}} = \frac{pax\_beh_{X,Y} + pax\_br_{X,Y}}{pax\_loc_{X,Y} + pax\_bey_{X,Y} + pax\_beh_{X,Y} + pax\_br_{X,Y}}$$

- Example: Segment split figures for Atlanta airport, 2016

Segment split	Example	Departing passengers (2016)
Local	e.g. ATL-LAX	15,012,811
Beyond	e.g. ATL-LHR-ABZ	2,635,417
Behind	e.g. LAX-ATL-DUS	32,275,809
Bridge	e.g. LAX-ATL-DUS-SVO	1,438,394

The calculated transfer rate for Atlanta in 2016 is:
(32,275,809 + 1,438,394) / (15,012,811 + 2,635,417 + 32,275,809 + 1,438,394) = 65.6%



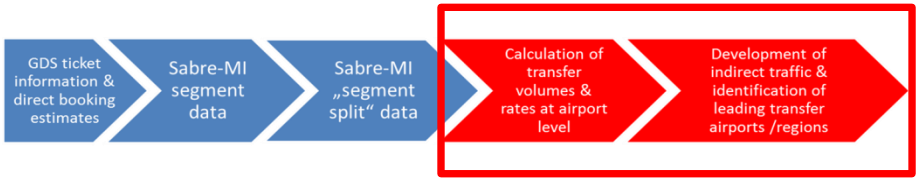
Findings (1): Worldwide development of the transfer passenger volume

					Growth since 2002		
Year	**Departing Pax**	**Transfer Pax**	**Local Pax**	**Transfer share**	**All Departing Pax**	**Transfer Pax**	**Local Pax**
2002	2.47	0.58	1.89	23%			
2006	2.37	0.50	1.87	21%	-4%	-13%	-1%
2010	2.79	0.48	2.31	17%	13%	-16%	22%
2014	3.43	0.56	2.87	16%	39%	-3%	52%
2018	4.41	0.63	3.77	14%	79%	10%	100%

- Total departing airport passengers, 2002-2018: +79% (from 2.5 to 4.4 bn)
- Departing transfer passengers: +10% only
- Transfer share: from 23% to 14%.

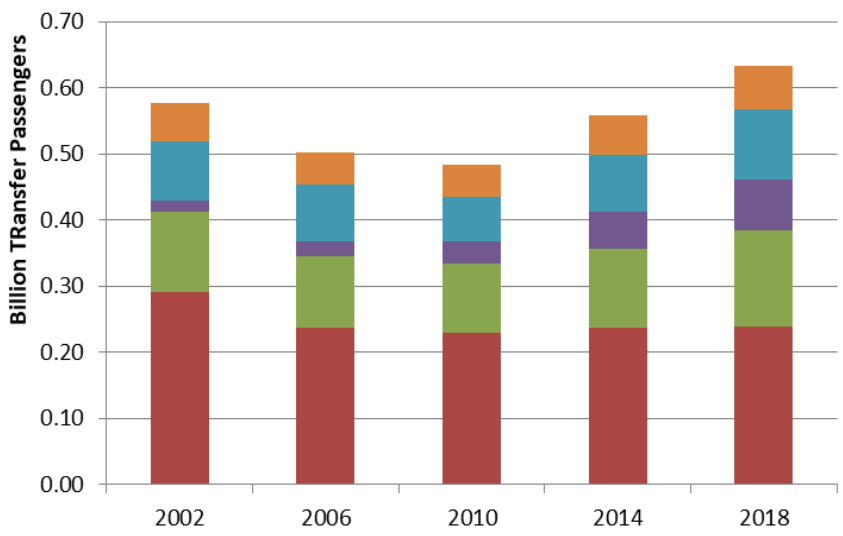
- Possible reasons:
  - Growth of directly-flying low cost carriers (LCC) (e.g. Dobruszkes, 2013)
  - Withdrawal of full service network carriers (FSNC) from secondary hubs, e.g. IB (BCN) and LH (DUS)
  - Decreasing aircraft size on many longhaul routes (e.g. BA)
  - One-stop routings offered by ChiBoGu carriers replacing two-stop connections by traditional FSNC

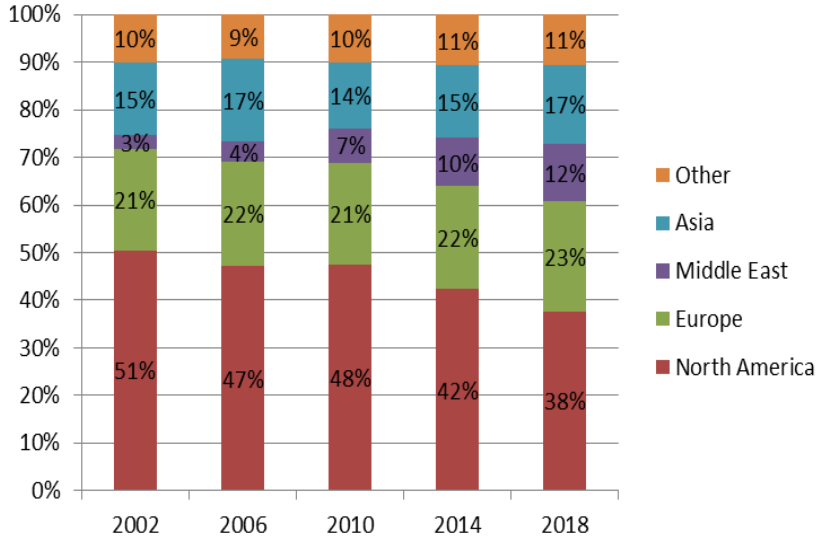
Findings (2): Leading transfer regions



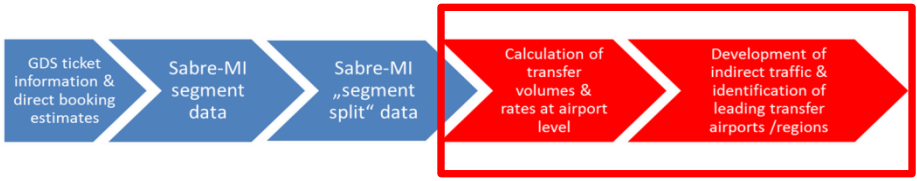
- Massive loss in transfer passenger volumes (from 291m to 240m) and shares (from ~51% to ~38%) for North America
- European + Asian airports remained stable
- Main winners: M.E. airports due to ChiBoGu effect (rise from 3% to 12%)

Relative passenger split between transfer regions, 2002-2018

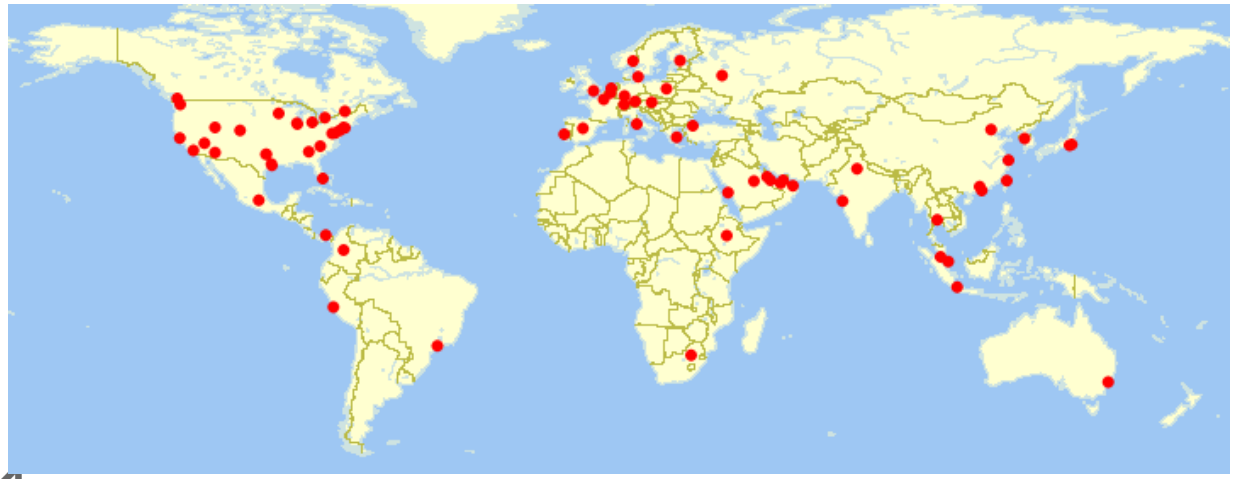




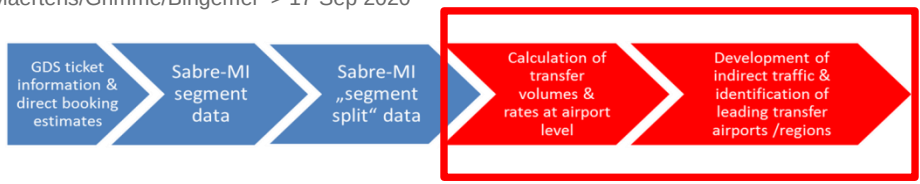
Findings (3): Leading transfer airports



- Only 73 out of more than 7,000 airports worldwide represented 80% of all transfer passengers in 2018.
- This group is led by Atlanta (5%), Dubai (3.7%) and Frankfurt (3%).
- While Atlanta (-0.9 percentage points (pp) since 2002) lost market shares and Frankfurt (+0.2) remained stable, Dubai increased its position by 3.0 pp (from 0.7% to 3.7%).This reflects the rise of Emirates.



DLR



Findings (4): Transfer rate and market share development of the 25 largest airports (in 2018)

- Loss for most U.S. airports

		Transfer Rates					Worldwide Transfer Market Share					
Apt	Dep. Pax	2002	2006	2010	2014	2018	2002	2006	2010	2014	2018	Change (pp)
ATLANTA	**51,704,863**	**67%**	**67%**	**68%**	**69%**	**62%**	**5.9%**	**5.7%**	**6.1%**	**5.8%**	**5.0%**	**-0.9%**
BEIJING	50,797,035	10%	17%	8%	8%	12%	0.3%	0.8%	0.6%	0.6%	1.0%	0.6%
DUBAI	44,144,724	41%	42%	51%	51%	53%	0.7%	1.3%	2.4%	3.1%	3.7%	3.0%
L.A.	**42,620,069**	**32%**	**27%**	**27%**	**26%**	**21%**	**2.3%**	**1.7%**	**1.6%**	**1.6%**	**1.4%**	**-0.9%**
TOKYO	41,921,596	43%	19%	4%	4%	6%	3.2%	1.0%	0.2%	0.3%	0.4%	-2.8%
CHICAGO	**39,628,481**	**50%**	**51%**	**53%**	**49%**	**43%**	**3.6%**	**3.7%**	**3.5%**	**2.9%**	**2.7%**	**-0.9%**
LONDON	39,095,919	28%	32%	31%	32%	31%	2.0%	2.1%	1.9%	1.9%	1.9%	-0.1%
JAKARTA	37,049,117	13%	14%	6%	8%	7%	0.2%	0.5%	0.2%	0.4%	0.4%	0.2%
HONG KONG	36,870,151	30%	33%	32%	29%	29%	1.1%	1.4%	1.6%	1.6%	1.7%	0.6%
SHANGHAI	36,692,491	10%	16%	9%	12%	14%	0.1%	0.5%	0.4%	0.6%	0.8%	0.7%
PARIS	35,407,114	39%	39%	35%	37%	34%	2.0%	2.2%	2.1%	2.1%	1.9%	-0.1%
DELHI	35,248,750	12%	10%	13%	19%	12%	0.1%	0.2%	0.4%	0.7%	0.7%	0.6%
AMSTERDAM	34,865,439	48%	43%	43%	43%	39%	1.9%	1.7%	1.9%	2.0%	2.1%	0.2%
FRANKFURT	34,697,852	54%	55%	54%	58%	55%	2.8%	2.9%	3.1%	3.1%	3.0%	0.2%
GUANGZHOU	33,876,119	17%	20%	7%	9%	14%	0.3%	0.5%	0.3%	0.5%	0.8%	0.4%
SEOUL	33,023,089	28%	10%	20%	18%	14%	0.5%	0.4%	0.7%	0.7%	0.7%	0.2%
ISTANBUL	32,868,285	35%	32%	36%	41%	47%	0.4%	0.5%	1.1%	2.1%	2.4%	2.0%
DALLAS	**32,719,044**	**59%**	**57%**	**60%**	**60%**	**54%**	**3.4%**	**3.1%**	**3.4%**	**3.3%**	**2.8%**	**-0.6%**
SINGAPORE	32,633,433	44%	38%	34%	28%	27%	1.3%	1.3%	1.5%	1.3%	1.4%	0.1%
DENVER	**30,562,162**	**44%**	**48%**	**50%**	**42%**	**37%**	**1.8%**	**2.2%**	**2.7%**	**2.0%**	**1.8%**	**0.0%**
NEW YORK	**30,434,964**	**15%**	**14%**	**22%**	**21%**	**17%**	**0.5%**	**0.6%**	**1.0%**	**1.0%**	**0.8%**	**0.3%**
BANGKOK	30,214,142	30%	31%	30%	28%	24%	1.0%	1.4%	1.3%	1.1%	1.1%	0.2%
KUALA LUMPUR	29,928,305	41%	31%	21%	23%	17%	0.6%	0.7%	0.8%	1.0%	0.8%	0.1%
MADRID	28,467,852	41%	37%	33%	34%	33%	1.5%	1.7%	1.5%	1.2%	1.5%	0.0%
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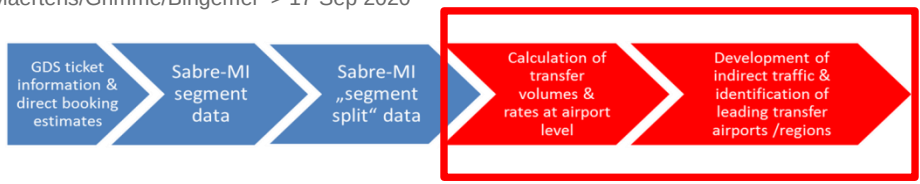

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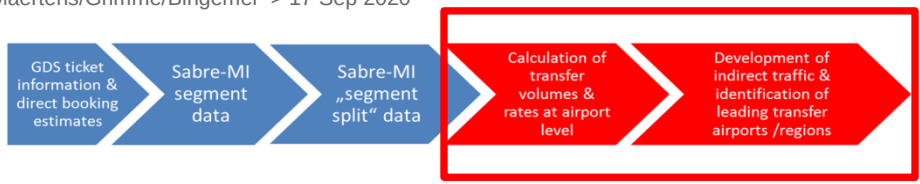

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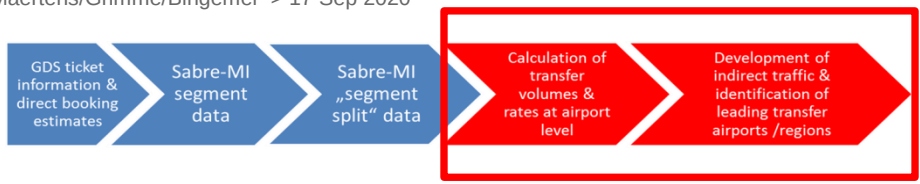

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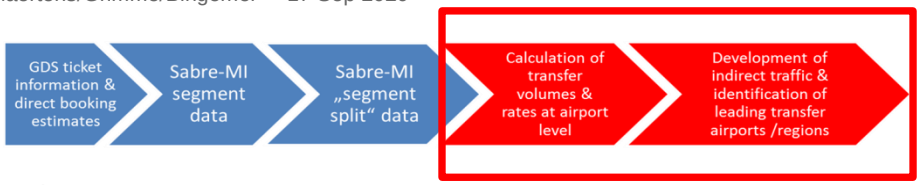
- Rising market shares for ME airports
- Stable transfer passenger market share for EU hubs, despite declining individual transfer rates at Madrid (from 41% town to 33%), Amsterdam (from 48% to 39% or Paris (from 39% to 34%)
- Transfer rate at FRA (55%) has remained higher than at other EU hubs – the “non-capital” effect.

		Transfer Rates					Worldwide Transfer Market Share					
Apt	Dep. Pax	2002	2006	2010	2014	2018	2002	2006	2010	2014	2018	Change (pp)
ATLANTA	51,704,863	67%	67%	68%	69%	62%	5.9%	5.7%	6.1%	5.8%	5.0%	-0.9%
BEIJING	50,797,035	10%	17%	8%	8%	12%	0.3%	0.8%	0.6%	0.6%	1.0%	0.6%
DUBAI	44,144,724	41%	42%	51%	51%	53%	0.7%	1.3%	2.4%	3.1%	3.7%	3.0%
L.A.	42,620,069	32%	27%	27%	26%	21%	2.3%	1.7%	1.6%	1.6%	1.4%	-0.9%
TOKYO	41,921,596	43%	19%	4%	4%	6%	3.2%	1.0%	0.2%	0.3%	0.4%	-2.8%
CHICAGO	39,628,481	50%	51%	53%	49%	43%	3.6%	3.7%	3.5%	2.9%	2.7%	-0.9%
LONDON	39,095,919	28%	32%	31%	32%	31%	2.0%	2.1%	1.9%	1.9%	1.9%	-0.1%
JAKARTA	37,049,117	13%	14%	6%	8%	7%	0.2%	0.5%	0.2%	0.4%	0.4%	0.2%
HONG KONG	36,870,151	30%	33%	32%	29%	29%	1.1%	1.4%	1.6%	1.6%	1.7%	0.6%
SHANGHAI	36,692,491	10%	16%	9%	12%	14%	0.1%	0.5%	0.4%	0.6%	0.8%	0.7%
PARIS	35,407,114	39%	39%	35%	37%	34%	2.0%	2.2%	2.1%	2.1%	1.9%	-0.1%
DELHI	35,248,750	12%	10%	13%	19%	12%	0.1%	0.2%	0.4%	0.7%	0.7%	0.6%
AMSTERDAM	34,865,439	48%	43%	43%	43%	39%	1.9%	1.7%	1.9%	2.0%	2.1%	0.2%
FRANKFURT	**34,697,852**	**54%**	**55%**	**54%**	**58%**	**55%**	**2.8%**	**2.9%**	**3.1%**	**3.1%**	**3.0%**	**0.2%**
GUANGZHOU	33,876,119	17%	20%	7%	9%	14%	0.3%	0.5%	0.3%	0.5%	0.8%	0.4%
SEOUL	33,023,089	28%	10%	20%	18%	14%	0.5%	0.4%	0.7%	0.7%	0.7%	0.2%
ISTANBUL	32,868,285	35%	32%	36%	41%	47%	0.4%	0.5%	1.1%	2.1%	2.4%	2.0%
DALLAS	32,719,044	59%	57%	60%	60%	54%	3.4%	3.1%	3.4%	3.3%	2.8%	-0.6%
SINGAPORE	32,633,433	44%	38%	34%	28%	27%	1.3%	1.3%	1.5%	1.3%	1.4%	0.1%
DENVER	30,562,162	44%	48%	50%	42%	37%	1.8%	2.2%	2.7%	2.0%	1.8%	0.0%
NEW YORK	30,434,964	15%	14%	22%	21%	17%	0.5%	0.6%	1.0%	1.0%	0.8%	0.3%
BANGKOK	30,214,142	30%	31%	30%	28%	24%	1.0%	1.4%	1.3%	1.1%	1.1%	0.2%
KUALA LUMPUR	29,928,305	41%	31%	21%	23%	17%	0.6%	0.7%	0.8%	1.0%	0.8%	0.1%
MADRID	28,467,852	41%	37%	33%	34%	33%	1.5%	1.7%	1.5%	1.2%	1.5%	0.0%
SAN FRANCISCO	27,715,890	31%	29%	23%	22%	23%	1.2%	1.0%	0.9%	0.9%	1.0%	-0.2%



Findings (5): Airports with the highest transfer rates (out of global Top200)

- 2002:
  - Every other “Top 20” airport based on the highest individual transfer rate located in the U.S
  - Along with some key European and Latin American hubs
  - Only three Middle East/Asian hubs: Abu Dhabi (52%), Doha (47%) and Singapore (44%)
- 2018:
  - Lower transfer rates for US airports
  - Massive increases in transfer rates for secondary ME hubs
  - Addis Ababa and Panama within Top 5, reflecting the growth of COPA and Ethiopian Airlines

Airport with the highest transfer rates 2002 vs. 2018

Year	2002		2018	
Position	Airport	Transfer rate	Airport	Transfer rate
1	CHARLOTTE	76%	PANAMA CITY	77%
2	ATLANTA	67%	DOHA	76%
3	DALLAS FORT WORTH	59%	ABU DHABI	72%
4	HOUSTON	58%	CHARLOTTE	67%
5	ST LOUIS	56%	ADDIS ABABA	66%
6	PANAMA CITY	54%	ATLANTA	62%
7	FRANKFURT	54%	FRANKFURT	55%
8	ABU DHABI	52%	DALLAS FORT WORTH	54%
9	COPENHAGEN	52%	DUBAI	53%
10	SAO PAULO	52%	HOUSTON	50%
11	SALT LAKE CITY	51%	MUSCAT	47%
12	DETROIT	50%	ISTANBUL	47%
13	MINNEAPOLIS / ST PAUL	50%	CHICAGO	43%
14	CHICAGO	50%	MOSCOW SVO	42%
15	AMSTERDAM	48%	DETROIT	41%
16	DOHA	47%	MUNICH	40%
17	ZURICH	44%	AMSTERDAM	39%
18	SINGAPORE	44%	CHICAGO	38%
19	BRASILIA	44%	HELSINKI	38%
20	DENVER	44%	DALLAS FORT WORTH	38%

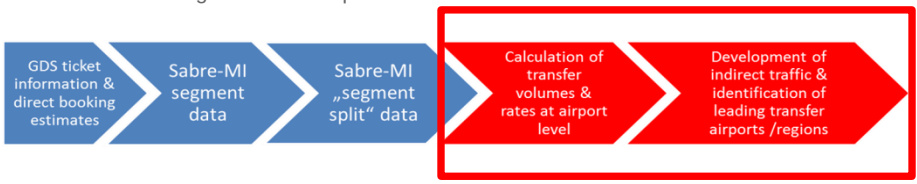
North America	Europe	Africa
South America	Middle East	Asia

Summary and Limitations

- Data on transfer passengers hardly available but potentially useful
- Transfer rate estimates can be derived from Sabre MI's segment statistics.
- We used this methodology to map the development of transfer traffic worldwide, comparing the years 2002 and 2018, and to identify the world's leading transfer airports and regions and any significant shifts over time.
- At a global level, the share of transfer passengers has decreased. The results further show lower transfer rates and global transfer market shares for most of the largest U.S. hubs in 2018 compared to 2002, as well as an increasing role of the BoGu (Bosporus-Gulf) hubs in global transfer traffic. The main European hub airports show relatively stable results.
- Self-hubbing and transfers exceeding 24 hours are not considered.

Thank you!

Sven Maertens: sven.maertens@dlr.de
Wolfgang Grimme: wolfgang.grimme@dlr.de
Stephan Bingemer: stephan.bingemer@hs-heilbronn.de



Backup: Findings (6): Validation of airport-level results

- Comparison with „official“ numbers indicates deviations within +/- 10%

- Assumed reasons:
  - Sabre MI data quality
  - Non-consideration of self-hubbing

Airport	Year	Share of transfer passengers		Other Source
		Sabre MI	Other source	
ATL	2011	65.53%	69.9%	RICONDO & ASSOCIATES (2012)
BRU	2016	23.56%	19.0%	Brussels Airport (2017)
FRA	2014	55.08%	55.0%	PR Newswire (2015)
FRA	2016	57.22%	60.6%	Fraport AG (2017)
ICN	2013	20.59%	18.5%	CAPA (2015)
LGW	2009	8.10%	9.0%	Statista (2018)