



Indicator Information Sheet

Subject: Air Transport Development
Kind of indicator: Performance Indicator
Spatial objective: Worldwide
Object: Trends at Airlines
Theme: **Airline Traffic Performance**

1. Purpose of the indicator category

The purpose of the indicator field “Airline Traffic Performance” is to give an overview of the airline traffic performance with regard to different aspects concerning aircraft utilization and supply and demand trends in the business fields of passenger and freight transport. In addition, for a set of airlines the performance with regard to punctuality is investigated by a comparison of European and US data.

To describe the airline traffic performance from a broad perspective, an extended set of different indicators will be discussed in the following:

1. Number of departures per aircraft

The average number of departures per aircraft is a measure for the utilization of aircraft. The utilization of aircraft represents in this context an important parameter as an aircraft should be used as much as possible in order to generate revenues. In interpreting this parameter one has furthermore to acknowledge the fact that with the same aircraft utilization in terms of flying hours, the number of departures of short-haul flights will be on average higher than the number of departures of long-haul flights. So, domestic carriers may have a higher value for this parameter than intercontinental carriers.

2. Number of passengers per aircraft

The average number of passengers per aircraft is an indicator that reflects the trend of aircraft size and load factor development. Airline operators try within this context to balance supply and demand. The average number of passengers per aircraft can also serve as an indicator for them if an extension of capacity is needed e.g. in the form of using larger aircraft or by extending frequencies. Nevertheless, this is always a decision that depends on the special connection that is regarded and therefore the chosen indicator can hereby only give a rough orientation how the overall demand situation on the global air transport developed over the years.

3. Passenger load factor

The passenger load factor is also an important parameter for airline traffic performance. It is calculated by dividing the actually used capacity in terms of the number of passengers per aircraft by the available capacity in terms of passenger seats in the regarded aircraft. The higher the corresponding value is, the better is the traffic performance for the airline as this indicates that capacity is managed and used in the best way by avoiding over-capacity and balancing demand and supply in an optimized manner.



4. Average total tonne-kilometres per aircraft

The TKM per aircraft equals the volume of transported payload (passengers and freight) times the number of kilometres flown per aircraft. It is a main measure to record the total traffic of an airline. As opposed to the number of departures per aircraft and the load factor, the average TKM also takes into account the flown distance, which differs for domestic carriers and intercontinental carriers.

5. Number of departures per employee

The average number of aircraft departures per airline employee is a measure for the working productivity of an airline and influences directly the airline's cost efficiency. It has to be considered that the costs for staff are one of the most important cost factors for airlines. Therefore the value of this parameter should preferably be high from an airline's perspective.

6. Punctuality

Gaining more and more importance in a partly capacity constrained air transport system, one important aspect of flying is nowadays 'punctuality', as this influences directly the costs of an airline regarding the fact that delays can result in a lower productivity and loss of passenger loyalty. Given this fact, punctuality is also a significant factor to describe the quality of the offered service.

2. Description of the indicator development

In this section the development of the above introduced indicators from 1990 to 2011 is presented. The development of the individual indicators is shown graphically with corresponding comments on visible trends.

In this context it has to be considered, that airline traffic performance contains many aspects. There is no silver bullet indicator that provides insight in each and every aspect of performance. Sometimes a separate indicator provides the required information, sometimes the appropriate combination of indicators does.

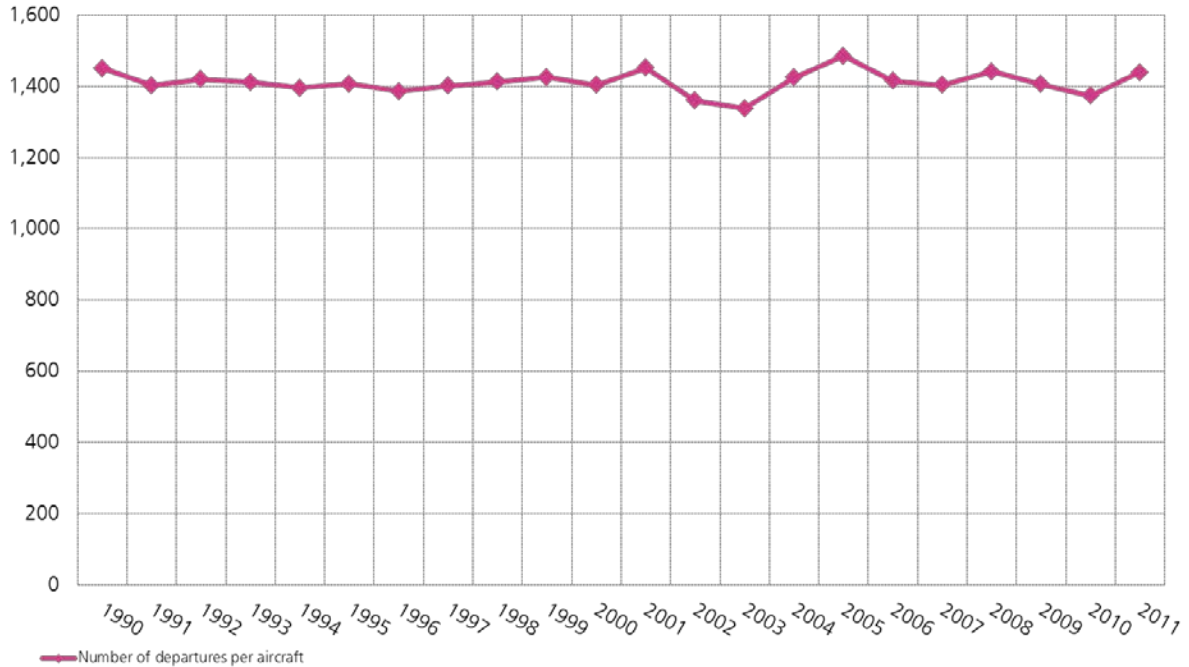
However, the overall conclusion which can be drawn from the presented graphs is that air traffic performance increased over the last twenty years. This conclusion will be illustrated hereafter separately for each presented indicator.



Indicator 1: Average number of departures per aircraft per year

Source: Own calculations based on IATA.

Departures per aircraft



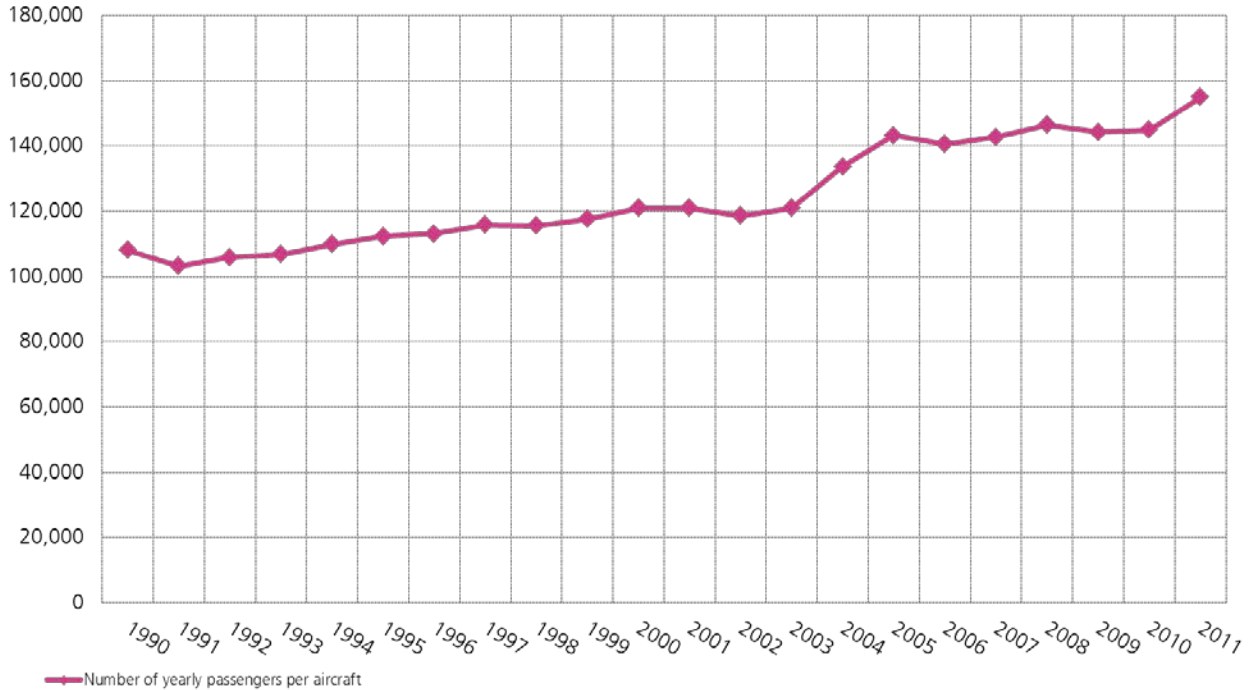
Indicator 1 shows that the average number of departures per aircraft is relatively constant through time, fluctuating around a long-term value of approximately 1,400 departures per year. Nevertheless, after 2001 there was a drop, which reached its low in 2003 as a probable result of the events of 9/11 which resulted in a slower air transport growth for the following period due to a rising uncertainty of passengers with regard to security issues. In spite of this, the recovery of the whole market started afterwards very soon with a peak reached in 2005, when the average number of departures per aircraft returned to the observed past value of about 1,450. This trend became only slightly disrupted again in 2007 and 2009 most probably due to high oil prices in the boom year 2007 and the effects of the economic crisis in 2008/2009, which forced many airlines to cut capacity back in the light of falling demand. In 2011 a slight upwards trend can be observed again.



Indicator 2: Average number of passengers per aircraft per year

Source: Own calculations based on IATA.

Number of passengers
per aircraft



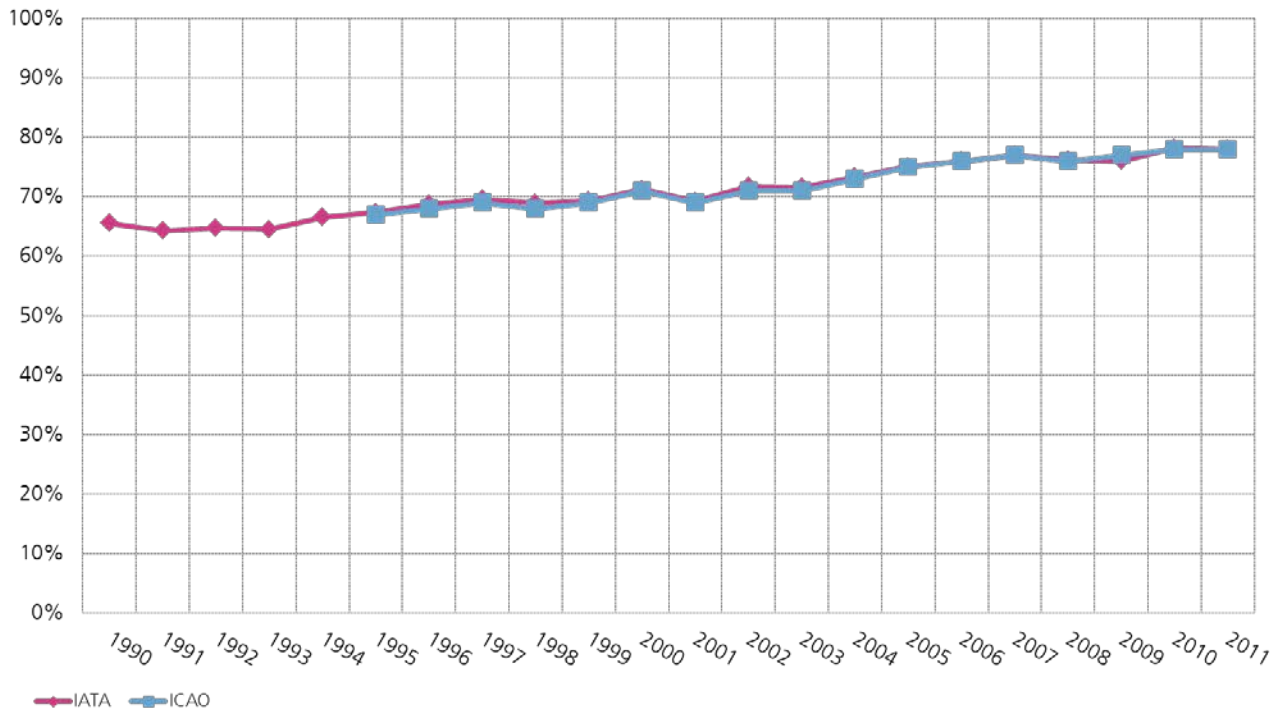
Indicator 2 shows that the average number of passengers per aircraft per year has increased over the last 20 years by about 33%. This was a more or less steady increase except for the years 2004 and 2005, in which the number of passengers per aircraft changed in a way that could be described as a clear step. The significant increase in 2004 and 2005 reflects with these characteristics the development of the passenger load factor that is given by the following indicator (Indicator 3). Even in times of crisis, for example in 2001 (9/11) or in 2008/2009 (financial crisis), the number of passengers per aircraft does not show a significant decrease. Only a stagnation in the growth factor can be observed in these time periods. Taking these trends into account, it can in general be said that the observed development supports the conclusion that the air traffic performance and volume increased strongly over the last two decades and that more and more people are using the aircraft as mode of transport.



Indicator 3: Passenger load factor

Source: Own calculations based on IATA, ICAO.

Passenger load factor



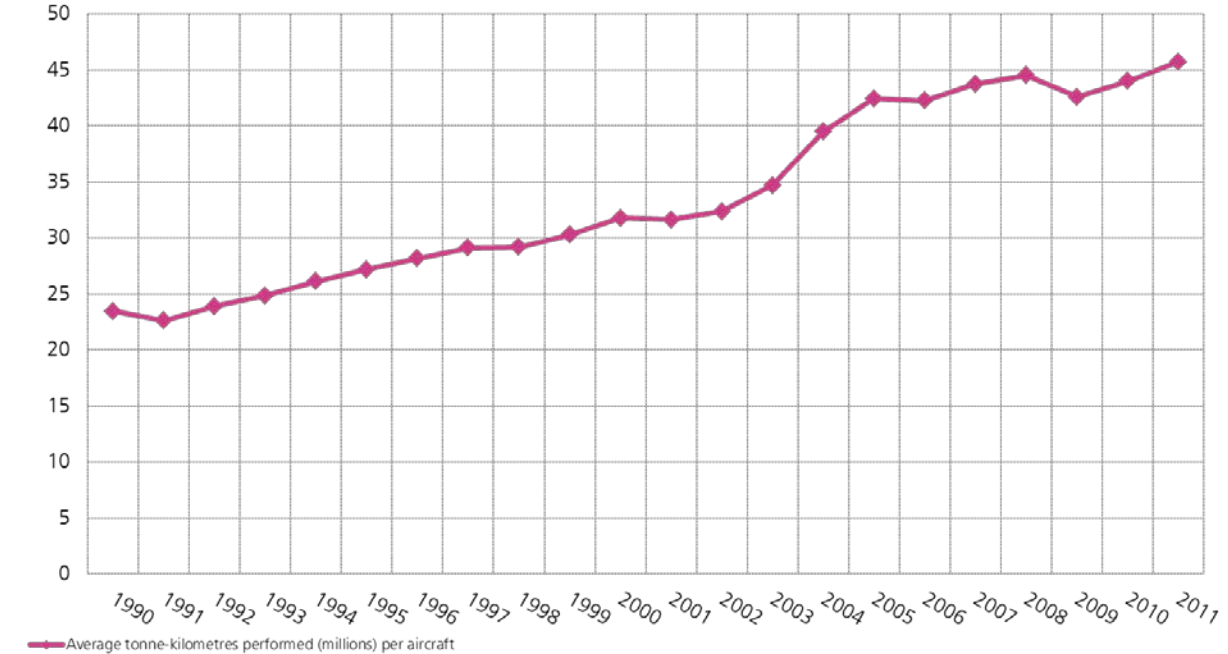
Regarding the IATA and ICAO data for Indicator 3, it can be noticed that the passenger load factor grew almost continuously through the regarded decades and increased by about 10 percentage points over the last 20 years. This must be seen as a very positive development for airlines, since it means that a larger share of the available transport capacity was used by optimising supply and demand. Saying this, one must take into consideration also that the capacity was even increased by the airlines over the years (also see the table related to Indicator 3 in the annex). The optimization of the load factor influences normally also directly the revenues of airlines and indicates that the whole air transport system is operating more efficiently on the large scale when an extended set of airlines is analysed.



Indicator 4: Average total tonne-kilometres per aircraft

Source: Own calculations based on IATA.

Average tonne-kilometres performed (millions) per aircraft



Indicator 4 shows that significantly more total tonne-kilometres per aircraft, which includes passenger and freight weight volumes, were performed in 2009 compared to 1990, as the indicator is continuously rising by about 81% in this time period. This can partly be explained by the development of the passenger load factor presented by Indicator 3. Since the average number of departures per aircraft is more or less the same through the years (cf. Indicator 1), the increase in TKMs indicates that the volume of payload per aircraft increased and/or that passengers and freight were transported over longer distances. This could be a hint for a functional supply management by the airline industry and more long-distance flights.

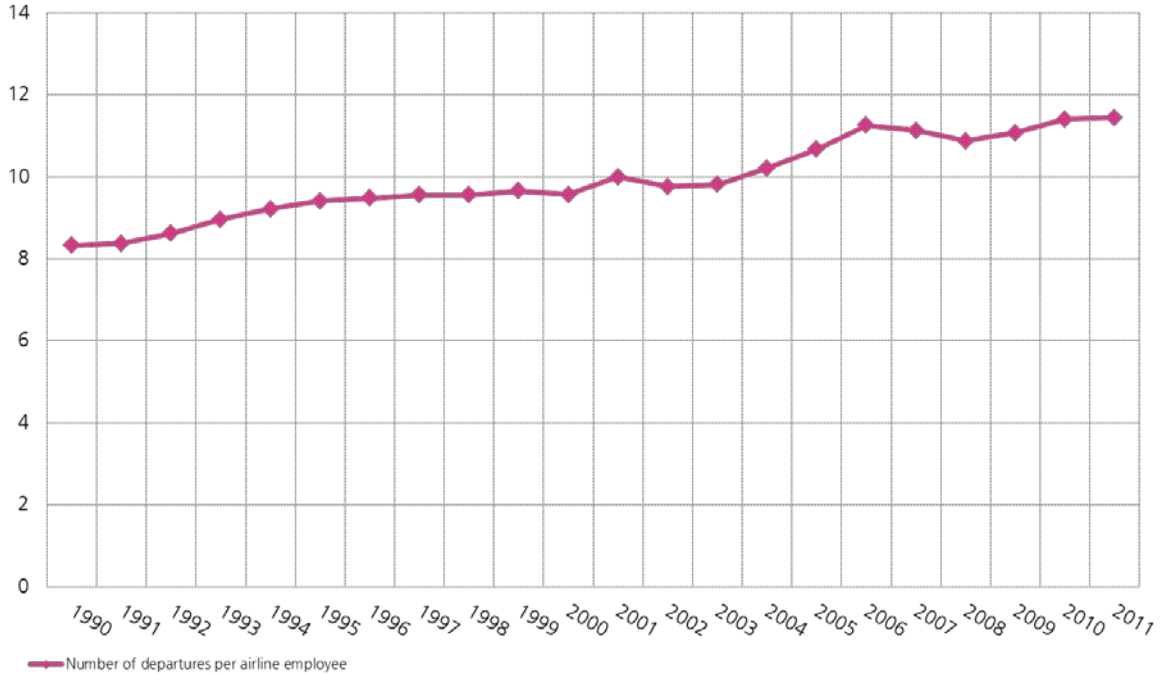
Even after 9/11, the average total tonne-kilometres did not decline. After 2001 the development even took a major step upwards until 2005, when the growth went back to a normal level like in the years before 2001. This is remarkable, since almost every other indicator shows a decline after 9/11.



Indicator 5: Average number of departures per airline employee

Source: Own calculations based on IATA.

Departures per employee



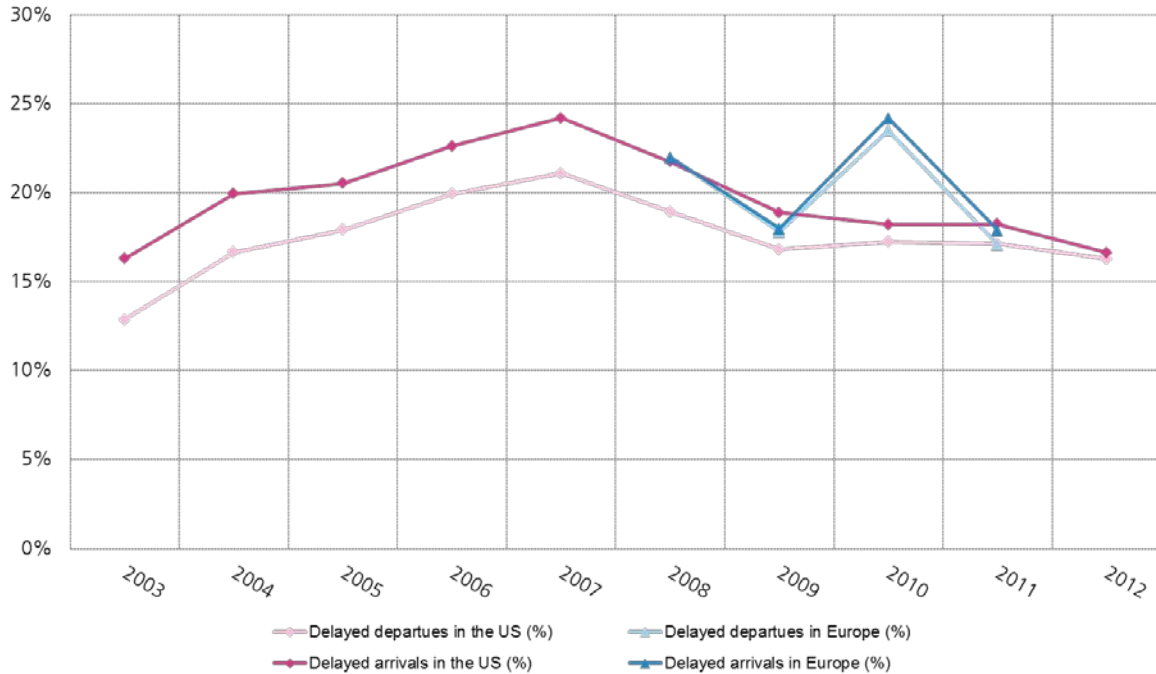
When regarding Indicator 5 it can be observed that the average number of departures per airline employee increased steadily over the time, starting with 6.7 departures per employee in 1990 and resulting in an almost doubled value of 11.1 departures in 2009. This development must be classified as a positive tendency as it shows a higher working productivity in the air transport sector which directly affects the cost efficiency of the airlines. However, it has to be considered that a part of the increase of this indicator also could be caused by the outsourcing of employees from airlines to other companies. This effect, which could not be adjusted with help of available data, cannot be seen as a real increase of productivity but is most probably partly included here, as outsourcing is a general tendency which can be observed for many business sectors within the last decades. Furthermore, the flight distances might have become shorter, so that each employee can work more flight legs, since they take less time. As low cost carriers usually operate shorter routes than network carriers and the number of low cost carrier-served routes has increased over the last years, this fact might also explain the higher number of departures per employee.



Indicator 6: Punctuality

Indicator 6: Percentage of departures and arrivals delayed more than 15 minutes within the US and Europe

Share of delayed flights



Sources: US Bureau of Transportation Statistics (BTS) and EUROCONTROL CODA

Indicator 6 shows flight punctuality data, subdivided by departure and arrival delays for the years 2003 to 2012 for the US and 2008 to 2011 for Europe. In former years the level of late arrivals was higher than the level of late departures. In the last years this gap seems to be getting smaller. The delay development in the US in general shows an increase between 2003 and 2007. Between 2007 and 2012 the punctuality of the flights increases again. In 2012 only 16% of all flight have had a delay higher than 15 minutes. The comparison of the US and the Europe data shows a higher volume of delays in Europe in 2010. This delay peak was caused primarily by a volcanic eruption and the following ash cloud in April 2010.



3. Main sources of the discussed indicators

- IATA: World Air Transport Statistics, 55th edition and editions of the previous years ([Metadata description](#))
- ICAO: Annual Report of the Council (2012), ICAO database ([Metadata description](#))
- US Department of Transportation (DOT), Research and Innovative Technology Administration (RITA), Bureau of Transportation Statistics (BTS)
- EUROCONTROL: CODA Digest, different years

4. Alternative sources to build similar indicators in the given indicator field

- Air Transport World: World Airline Report ([Metadata description](#))
- Ascend: Online Fleets Database ([Metadata description](#))
- EUROCONTROL: Performance Review Report ([Metadata description](#))
- Sabre Airline Solutions: Sabre Airport Data Intelligence (ADI) database ([Metadata description](#))



Annex

Indicator 1: Average number of departures per aircraft per year

Year	Aircraft departures ^a (in 1,000)	Total aircraft ^b	Number of departures per aircraft
1990	12,468	8,591	1,451
1991	12,184	8,687	1,403
1992	12,817	9,032	1,419
1993	13,097	9,279	1,411
1994	13,479	9,657	1,396
1995	13,859	9,853	1,407
1996	14,529	10,478	1,387
1997	15,399	10,993	1,401
1998	15,745	11,150	1,412
1999	16,208	11,376	1,425
2000	16,375	11,666	1,404
2001	16,262	11,200	1,452
2002	15,412	11,338	1,359
2003	14,480	10,822	1,338
2004	15,533	10,904	1,425
2005	15,720	10,584	1,485
2006	15,895	11,231	1,415
2007	15,994	11,397	1,403
2008	16,081	11,153	1,442
2009	15,795	11,235	1,406
2010	16,873	12,289	1,373
2011	17,733	12,327	1,439

Source: Values after 2009 belong to the latest edition of the IATA WATS. Values from 2000-2009 belong to the IATA WATS 54th Edition (2010). All other values belong to the IATA WATS editions of the previous years (1991-2000).

Remarks:

^a All annual percentage variations presented in WATS Section 1.2. have been adjusted to eliminate the effects of changes in membership

^b Values for Membership, Operating Fleet and Employees considered at 31 December.

The number of departures is given for all services on the international and domestic level.

**Indicator 2: Average number of passengers per aircraft per year**

Year	Passengers carried ^a (in 1,000)	Total aircraft ^b	Number of yearly passengers per aircraft
1990	928,227	8,591	108,046
1991	895,925	8,687	103,134
1992	955,755	9,032	105,819
1993	990,505	9,279	106,747
1994	1,060,743	9,657	109,842
1995	1,107,137	9,853	112,365
1996	1,184,760	10,478	113,071
1997	1,273,051	10,993	115,806
1998	1,287,881	11,150	115,505
1999	1,337,021	11,376	117,530
2000	1,411,031	11,666	120,952
2001	1,354,148	11,200	120,906
2002	1,344,312	11,338	118,567
2003	1,308,160	10,822	120,880
2004	1,457,634	10,904	133,679
2005	1,515,251	10,584	143,164
2006	1,577,288	11,231	140,441
2007	1,626,694	11,397	142,730
2008	1,632,862	11,153	146,406
2009	1,620,096	11,235	144,201
2010	1,779,774	12,289	144,827
2011	1,909,617	12,327	154,913

Source IATA: Values after 2009 belong to the latest edition of the IATA WATS. Values from 2000-2009 belong to the IATA WATS 54th Edition (2010). All other values belong to the IATA WATS editions of the previous years.

Remarks:

^a All annual percentage variations presented in WATS Section 1.2. have been adjusted to eliminate the effects of changes in membership

^b Values for Membership, Operating Fleet and Employees considered at 31 December.

**Indicator 3: Passenger load factor**

Year	IATA Passenger Load Factor ^a	ICAO Passenger Load Factor ^b
1990	65.6%	
1991	64.3%	
1992	64.7%	
1993	64.5%	
1994	66.6%	
1995	67.4%	67.0%
1996	68.7%	68.0%
1997	69.6%	69.0%
1998	68.9%	68.0%
1999	69.3%	69.0%
2000	71.2%	71.0%
2001	69.2%	69.0%
2002	71.7%	71.0%
2003	71.6%	71.0%
2004	73.3%	73.0%
2005	75.1%	75.0%
2006	76.0%	76.0%
2007	77.0%	77.0%
2008	76.2%	76.0%
2009	76.0%	77.0%
2010	78.2%	78.0%
2011	78.0%	78.0%

Source IATA: Values after 2009 belong to the latest edition of the IATA WATS. Values from 2000-2009 belong to the IATA WATS 54th Edition (2010). All other values belong to the IATA WATS editions of the previous years.

Source ICAO: Values after 2009 belong to the latest edition of the Annual Report of the Council. Values from 2000-2009 belong to the Annual Report of the Council (2009). The other results for the years 1995-1999 are an excerpt from the ICAO database. Small deviations between both sources exist for some years but are rather small and do not alter the reliability of the indicator.

Remarks:

^a All annual percentage variations presented in WATS Section 1.2. have been adjusted to eliminate the effects of changes in membership. The passenger load factor is given for total scheduled services (domestic and international) offered from IATA members.

^b The passenger load factor is given for scheduled services (domestic and international) of airlines of ICAO Member States. ICAO Source - ICAO Air Transport Reporting Form A plus ICAO estimates for non-reporting States.

**Indicator 4: Average total tonne-kilometres per aircraft**

Year	Tonne-kilometres performed (millions) ^a	Total aircraft ^b	Average tonne-kilometres performed (millions) per aircraft
1990	201,590	8,591	23.5
1991	196,569	8,687	22.6
1992	215,835	9,032	23.9
1993	230,714	9,279	24.9
1994	252,200	9,657	26.1
1995	267,819	9,853	27.2
1996	295,361	10,478	28.2
1997	320,079	10,993	29.1
1998	325,627	11,150	29.2
1999	344,771	11,376	30.3
2000	370,841	11,666	31.8
2001	354,444	11,200	31.6
2002	367,090	11,338	32.4
2003	375,658	10,822	34.7
2004	430,622	10,904	39.5
2005	449,188	10,584	42.4
2006	474,631	11,231	42.3
2007	498,683	11,397	43.8
2008	496,487	11,153	44.5
2009	478,371	11,235	42.6
2010	541,125	12,289	44.0
2011	563,797	12,327	45.7

Source IATA: Values after 2009 belong to the latest edition of the IATA WATS. Values from 2000-2009 belong to the IATA WATS 54th Edition (2010). All other values belong to the IATA WATS editions of the previous years.

^a All annual percentage variations presented in WATS Section 1.2. have been adjusted to eliminate the effects of changes in membership. All figures are for all scheduled services (international and domestic) including all-cargo flights.

^b Values for Membership, Operating Fleet and Employees considered at 31 December.

**Indicator 5: Average number of departures per airline employee**

Year	Aircraft departures ^a (in 1,000)	Employees ^b (in 1,000)	Number of departures per airline employee
1990	12,468	1,498	8.3
1991	12,184	1,455	8.4
1992	12,817	1,486	8.6
1993	13,097	1,462	9.0
1994	13,479	1,462	9.2
1995	13,859	1,473	9.4
1996	14,529	1,532	9.5
1997	15,399	1,611	9.6
1998	15,745	1,647	9.6
1999	16,208	1,678	9.7
2000	16,375	1,711	9.6
2001	16,262	1,627	10.0
2002	15,412	1,578	9.8
2003	14,480	1,475	9.8
2004	15,533	1,521	10.2
2005	15,720	1,473	10.7
2006	15,895	1,412	11.3
2007	15,994	1,437	11.1
2008	16,081	1,479	10.9
2009	15,795	1,426	11.1
2010	16,873	1,480	11.4
2011	17,733	1,549	11.4

Source: Values after 2009 belong to the latest edition of the IATA WATS. Values from 2000-2009 belong to the IATA WATS 54th Edition (2010). All other values belong to the IATA WATS editions of the previous years (1991-2000).

^a All annual percentage variations presented in WATS Section 1.2. have been adjusted to eliminate the effects of changes in membership

^b Values for Membership, Operating Fleet and Employees considered at 31 December. The number of departures is given for all services on the international and domestic level.

**Indicator 6: Punctuality^a**

Year	Flight Operations in the US ^b		Delayed departures in the US (%)	Delayed departures in Europe ^c (%)
	Reported departures (ontime, delayed and cancelled)	Delayed departures		
2003	6,488,540	834,390	12.9%	
2004	7,129,270	1,187,594	16.7%	
2005	7,140,596	1,279,404	17.9%	
2006	7,141,922	1,424,777	20.0%	
2007	7,455,458	1,572,978	21.1%	
2008	7,009,726	1,327,198	18.9%	22.0%
2009	6,450,285	1,084,290	16.8%	17.8%
2010	6,450,117	1,111,948	17.2%	23.5%
2011	6,085,281	1,042,427	17.1%	17.1%
2012	6,096,762	991,834	16.3%	

Year	Flight Operations in the US ^b		Delayed arrivals in the US (%)	Delayed arrivals in Europe ^c (%)
	Reported arrivals (ontime, delayed and cancelled)	Delayed arrivals		
2003	6,488,540	1,057,804	16.3%	
2004	7,129,270	1,421,391	19.9%	
2005	7,140,595	1,466,065	20.5%	
2006	7,141,922	1,615,537	22.6%	
2007	7,455,458	1,804,028	24.2%	
2008	7,009,726	1,524,735	21.8%	22.0%
2009	6,450,285	1,218,288	18.9%	18.0%
2010	6,450,117	1,174,884	18.2%	24.2%
2011	6,085,281	1,109,872	18.2%	17.9%
2012	6,096,762	1,015,158	16.7%	

^a A flight is considered delayed if it arrived at (or departed) the gate 15 minutes or more after the scheduled arrival (departure) time as reflected in the Computerized Reservation System.

^b Source: US DOT RITA - On-Time Performance - Flight Delays at a Glance

^c Source: EUROCONTROL CODA Digest, different years. EUROCONTROL reported only the share of delayed departures and arrivals.

This Indicator Information Sheet was prepared by the MONITOR project partners NLR and DLR – Institute of Air Transport and Airport Research.

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