



Indicator Information Sheet

Subject:	Air Transport Development
Kind of indicator:	Sustainable Development Indicator
Spatial objective:	Worldwide
Object:	Effects of Air Transport on the Economic Development
Theme:	Interrelation between Air Transport and Economic Development

1. Purpose of the indicator category

In this indicator sheet the question is discussed, which interrelations are given between air transport and economic development and which role air transport plays for a sustainable economic development. On the one hand, many interrelations could not be quantified, like the importance of air transport in global logistic chains. On the other hand, there exist data sources to describe the role of air transport in the whole economy, like the contribution of the aviation system to GDP development or the number of employees in the air transport sector.

This indicator sheet deals mainly with the last topic. Unfortunately, the availability of data in order to cover this theme in depth is rather limited. Therefore, only the interrelation of economic and air transport development could be analyzed at this stage of the indicator work process. However, it is planned to extend the perspective of analysis in this field with additional data later.

2. Description of the indicator development

In 2008, the contribution of air transport to the global GDP amounted to US\$ 425 billion, which represents 0.7% of the world's GDP.¹

In comparison to the other indicator sheets, a world region perspective will be presented in the following as data was not always available for a global point of view and the analysis of world regions seems to be more significant when statements on the relation between the air transport development and the economic development should be made. Corresponding data is available for the time between the years 2000 and 2009. The described regions are based on the defined ICAO world regions with a very rough resolution.

Regarding the further methodology, it was necessary to adapt the GDP and population data, published by the World Bank and the UN Population Division and extracted from the UNEP Global Geo Data Portal, to the ICAO regions in order to harmonize the available data sources. Meanwhile, the allocation of the transport numbers to the world regions was accomplished by the location of the airline, which has transported the goods.

When interpreting the data given below, it has furthermore to be considered that the transport related data could be caused in other world regions than the one to which it is accounted. One example for this describes the following case: freight from Asia to Europe could be transported via a hub airport in Middle East. In this case the freight will also be counted in the region Middle East, although the related economic activities (production, consumption) are located in other world regions.

¹ Source: OECD Statistic on GDP (2008).



Taking these challenges into account, a first set of indicators, regarding the interrelations between air transport and economy, was built:

1. Development of freight tonne kilometres per inhabitant in several world regions

This indicator shows the development of the air freight transport activity in general. A higher specific freight tonne kilometres (FTK) volume means a higher effort of air freight per inhabitant on global scale. This effort increase can be caused by a higher necessity for fast transport operations. This, in turn, could be the result of a higher level of economic activity.

2. Economic specific flight development per world region

This indicator analyses the relation between economic activities in general and the development of the air transport supply side. For this purpose, the GDP development is brought into connection with the flight development per world region. Within this equation it can be observed if a GDP growth stimulates the air transport sector with regard to movements.

3. Economic specific freight tonne kilometre development per world region

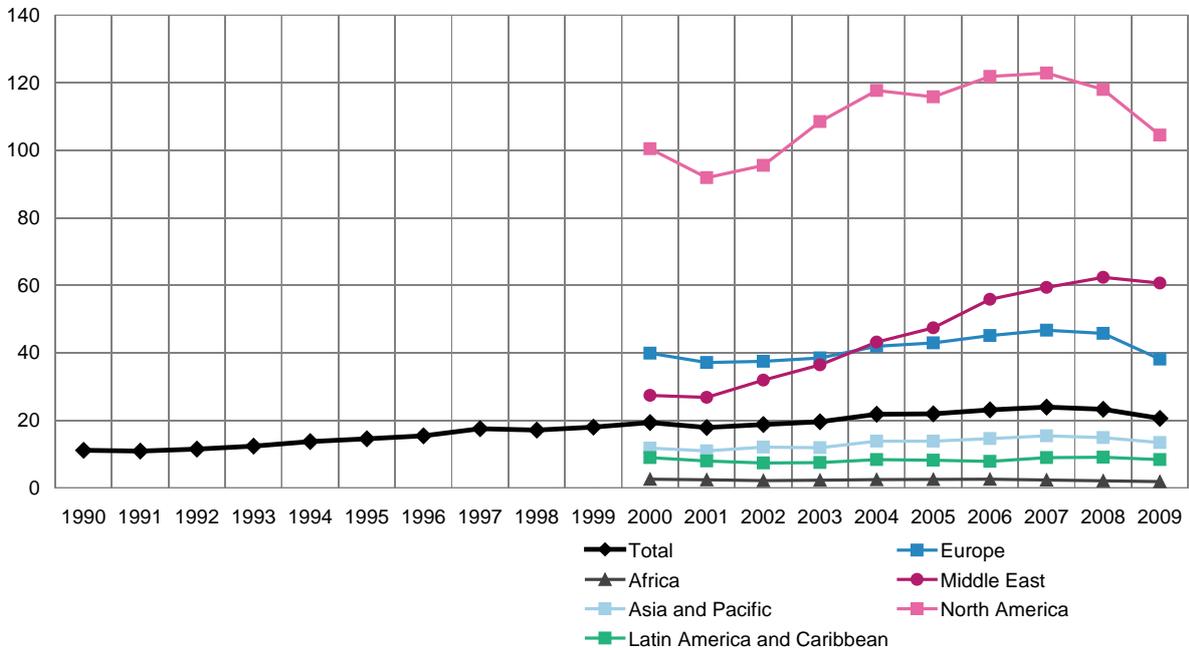
The indicator “Economic specific freight tonne kilometre development per world region” expresses the relation between economic activity and air transport demand. In this context, the underlying indicator shows if an increase of GDP leads also to an increase in air transport demand which is expressed by the development of freight tonne kilometres.



Indicator 1: Development of freight tonne kilometres per inhabitant in several world regions

Source: Own calculations based on ICAO, UN.

Freight tonne kilometres per inhabitant



The long-term development of the freight tonne kilometres on a global scale shows an increase of the transport volume per inhabitant from 15 FTK to 20 FTK between 1990 and 2009 with a slight decrease in the last years. This development could be influenced by an increase of the global production and external trade level. However, the demand for air transportation in terms of freight tonne kilometres grew in general within the presented 20 year time period as the picture shows.

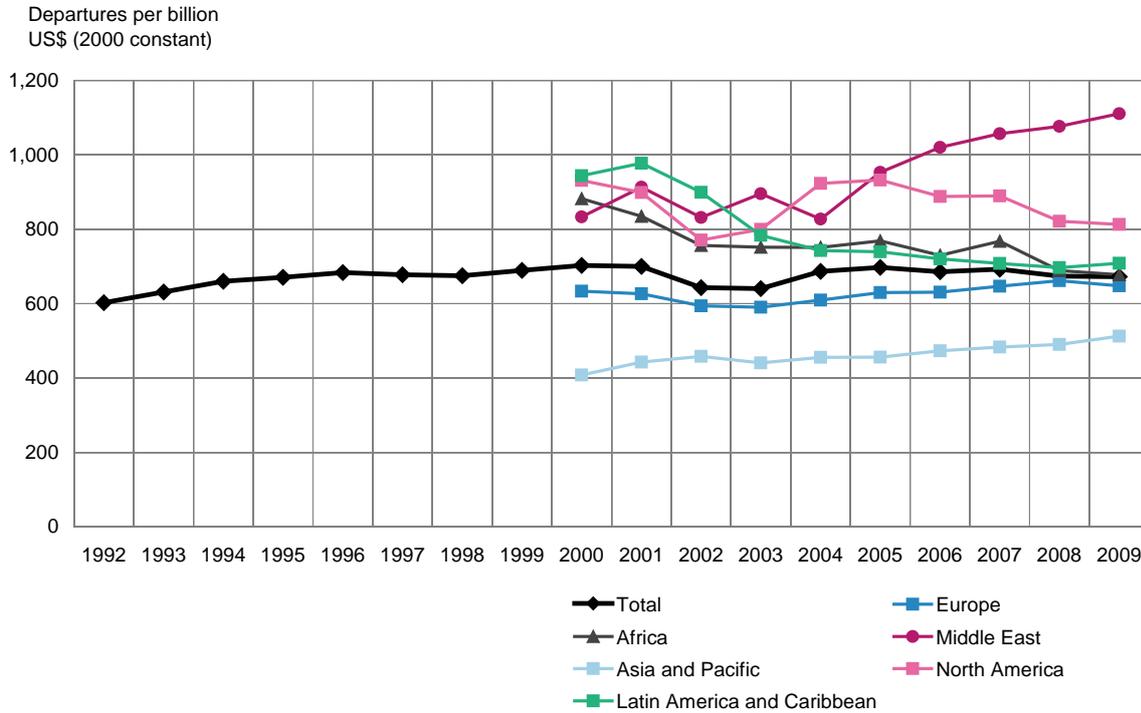
When regarding the graph in more detail, it becomes also visible that there is a big difference between the specific freight tonne kilometres in North America in comparison to the average (global) level and to other regions. This can be explained with a higher level of transport intensity per person in North America in general and/or a higher volume of handled global air freight.

Also for Europe an above average air freight transport intensity can be observed. In addition, the Middle East region shows a high increase in air freight transport intensity. This increase corresponds with an increase of offered flights at the hub airports in this region which became very important in the last years for the whole global air freight network. So, the graph shows very clear geographic differences. Furthermore, the effects of the development of the global economy is illustrated by the given trend curves. While the FTK per inhabitant grew in general over the years, the period 2008/2009 shows for all regarded world regions a small downward trend due to the economic crisis which affected the air freight sector, like many other industries, significantly.



Indicator 2: Economic specific flight development per world region

Source: Own calculations based on ICAO, World Bank.



Indicator 2 shows that between 1992 and 2000 the departures per billion US\$ GDP increased slightly but more or less steady on the global level. Only after 2001, a slight decrease can be observed, which is most probably a result of the events of 9/11 that slowed down the air transport growth a little bit. Meanwhile, in the last years the level of flights per monetary unit oscillated around 700 flights per billion US\$.

By comparing different world regions with regard to the last decade it becomes visible that Europe and the Asia/Pacific region have an under average level of departures per US\$ GDP unit. For the other world regions an over average level can be observed. With one exception all trends seem to be converted to the average level: Only the region Middle East has a high increase in specific departures after the year 2004. This trend corresponds with the above described absolute increase in offered flights at the airports in this region.

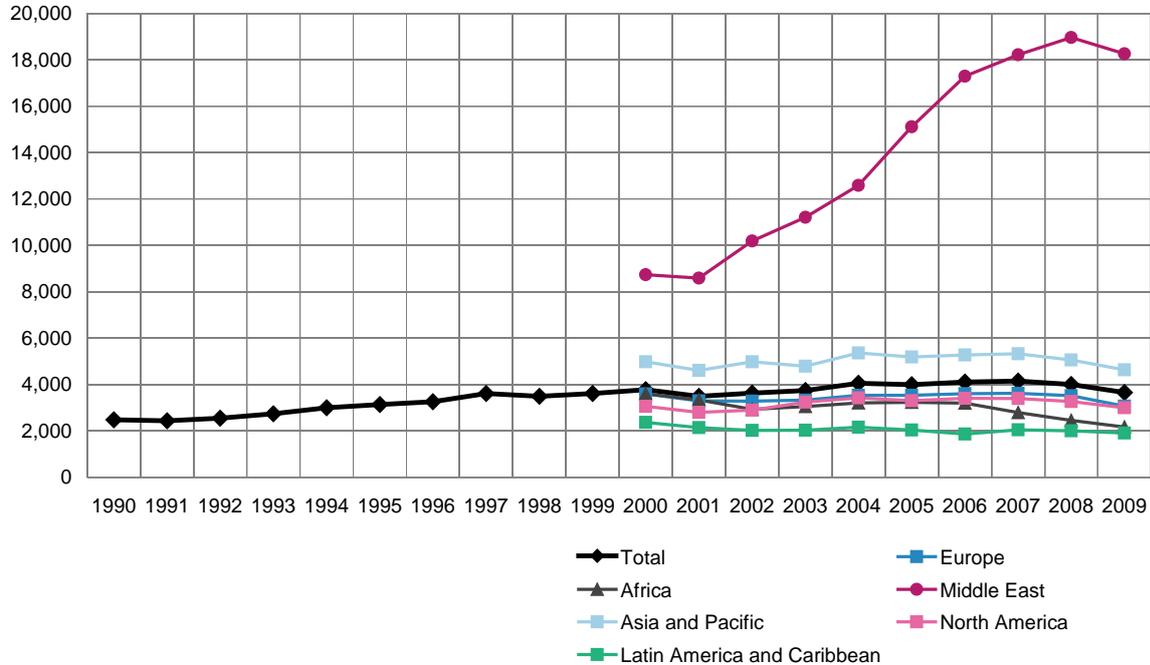
When interpreting the results further, it has to be considered that if the GDP value increases, a nearly constant level of specific departures means an increase of absolute departures.



Indicator 3: Economic specific freight tonne kilometre development per world region

Source: Own calculations based on ICAO, World Bank.

Freight tonne km per billion US\$ (2000 const.)



Indicator 3 shows that between 1990 and 2000 the level of FTK per billion US\$ GDP increased to nearly 4,000 billion on a global level. After 2000, the indicator oscillates around this value. Most world regions have between 2000 and 2009 nearly the same trend and not too much difference with regard to the average level. The only exception is the Middle East. This region starts in 2000 with a very high value of 9,000 FTK per billion US\$ GDP. Afterwards, the FTK volume grows significantly until 2008 where a peak of 19,000 FTKs per billion US\$ is reached. This increase could be explained by the offensive supply strategy of the freight oriented airlines in this region as it was also explained with regard to the indicator above (Indicator 2). However, the influence of the economic downturn in 2008/2009 also affected the Middle East and this even more strongly, as the demand for air freight dropped within this period. With regard to this development it can be observed that there is a strong linkage between the air transport development and the overall economic growth. This holds especially for regions where the GDP development is high.



3. Main sources of the discussed indicators

- World Bank: World Development Indicators on base of the UNEP Global Geo Data Portal (2011)
- UN: Population Data on base of the UNEP Global Geo Data Portal (2011)
- ICAO: Annual Report of the Council, ICAO online database (aggregated data)

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

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