Flying, the multimodal way!

Environmental aspects, multimodality and aviation

Annika Paul
Bauhaus Luftfahrt
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Why is it important to consider and integrate **multimodal aspects** in future air transport planning?

What is the role of **environmental factors** in future passenger behaviour?
The concept of intermodality / multimodality

- Multimodality and intermodality mostly used in the same way
  - (1) the capacity of travellers to use alternative transport modes to perform the same trip;
  - (2) the consecutive use of different means of transport for the same trip.
Why do environmental aspects play an important role?

• Possible effects of **changing environmental awareness and regulations** on demand for air transport
  
  • Compensation
  • Substitution away from air
  • No air travel at all
  • No air travel on short-haul routes
Environmental considerations in transport

- Passengers fly despite concerns about the personal impact on climate change (Alcock et al., 2017; Cohen & Higham, 2011)
- Known as value-action gap (Büchs, 2017)
- Regional differences (WTP) is ~15 – 25 € per tonne of CO₂ (Fatihah & Rahim, 2017)
- Increase in income & age have positive influence on WTP (Fatihah & Rahim, 2017)

- #Flygskam; Swedish campaign "flygfritt 2020" (no flights in 2020)
- Fridays-for-future
- Pro-environment. election results
- Demand for stricter regulation

Source: Kluge, U. and Habersetzer, A., 2019, Air Transport Research Society Conference
Passenger behaviour and mode choice

Environmental incentives and regulation

- **Passengers**
  - (Voluntary) compensation schemes
  - Overall carbon budget / allowance

- **Operators**
  - Offsetting
  - Emission trading
  - Carbon taxes

Impact on the (future) aviation system

- Routes and stage length
  - Least CO₂ emissions options
- Aircraft types
  - Most efficient in terms of fuel consumption (per passenger)
- Future fleet composition
- Airport access mode choice
  - Pooling options, public transport

Source: https://www.momondo.de/flight-search/MUC-LAX/2020-12-15/2020-12-22?sort=co2_a
Potential effects on the ATM system

Environment
- Gate-to-gate CO$_2$ emissions
- Horizontal en-route flight-efficiency of the flown route
- Number of people exposed to significant noise

Cost efficiency
- Gate-to-gate ANS cost per flight

Operational efficiency
- Flight time per flight (minutes per flight)

Capacity
- Changing fleet composition and aircraft mix
  - Airside performance: gate / apron / taxi time / runway capacities
  - Landside performance: gate / terminal
  - Airspace performance: IFR movements, network throughput
- Predictability and punctuality
  - Advanced network operations planning
Modus project

Analyse how the **performance of the overall transport system** can be optimized by considering the entire **door-to-door journey** holistically and considering **air transport** within an integrated, intermodal approach, by

1. Identifying and assessing (future) **drivers for passenger demand and supply of mobility**, and how these affect passenger mode choice,

2. Applying and further advancing existing models to determine the **demand allocation** across different transport modes, especially air and rail, and the effects on the overall capacity of these modes, and

3. Developing and assessing **performance and connectivity indicators** which facilitate the identification of gaps and barriers in meeting high-level European (air) transport goals, and solutions to gaps can be addressed.

**Website:** https://modus-project.eu/