

Climate Adaptation Synthesis Factsheets

Effects of Climate Change on Aviation Business and Economics

Impacts of climate change on aviation business and economics include both physical risks such as flight delays or airport closures and related costs, and contractual, regulatory or legal compliance risks. There may also be risks due to the scarcity of critical resources. Aviation business operations and financing may be affected by all of the potential climate change impacts identified in the Climate Effects Factsheets. In the shorter-term, impacts to business and economics are more likely to be associated with disruptive events, such as extreme weather events like storms or extreme heat, which can lead to delays, cancellations and infrastructure damage. In the longer-term, gradual but persistent effects, such as temperature change or sea level rise, may lead to business and economic impacts such as changes in tourist demand and damage or loss of infrastructure.

Potential Impacts

- Increased weather volatility as a result of climate change can have effects on all aspects of operational performance such as scheduling, flight planning, connectivity of flights, safety planning and trajectory optimisation.
- Climate change can also cause direct impacts to critical aviation infrastructure, causing secondary effects on business and economic capabilities. For example:
 - Sea level rise may require an airport to reinforce or relocate airport infrastructure, which may be expensive and require temporary limitations on airport capacity while work is ongoing.
 - High-heat days can increase cooling costs in terminals and other infrastructure such as Air Traffic Control (ATC) towers, whilst employees may also be impacted by higher temperatures.
 - Changes in, or deviation from, the prevailing wind direction at airports can affect runway utilisation and schedules, reduce airport and aircraft operating efficiency, capacity, and may impact safety. It may also change the criteria for approach and departure procedures and reduce flight arrival and departure punctuality, all of which will incur costs.



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Interconnections:

- If one airport is directly impacted by climate change, other parts of the network may be affected indirectly, which can cause ripple effects across multiple business and economic sectors.
- In particular, if there is disruption at a hub airport this will have a knock-on effect for the flights which depart from that airport, the destination airports, and passenger connections, all of which can have a financial cost.
- Impacts may also affect the wider transport network.

Financial challenges as a barrier:

- There are financial costs associated with adaptation and the costs of implementing adaptation strategies could be prohibitive.

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Adaptation and Resilience Measures¹

- Limiting business and economic effects involves good planning and well-informed business decisions, which may benefit from activities such as climate risk assessments.
- For infrastructure decisions such as retro-fitting, redesign or relocation, a decision-making process such as a cost benefit analysis may be required, along with taking into account factors such as cost versus level of resilience and criticality (See the Risk Assessment and Adaptation Measures Factsheet).
- Operational measures to increase robustness and flexibility, and measures such as information sharing and training to improve operational resilience may have an initial financial cost, but by improving resilience they may ultimately reduce overall financial costs.
- Airports to consider planning measures to have adequate energy, food and water supplies to care for stranded passengers during extreme weather events which may close the airport for a significant time, and to coordinate with airlines in the event of needing to evacuate passengers before or after an extreme weather event.

Financial challenges as a barrier:

- To mitigate the financial challenge of adaptation, top management buy-in will be necessary.
- It may not be possible to adapt all infrastructure and systems such that no projected impacts of climate change are ever realized.
- While the scientific community is in broad agreement that the global climate is changing, there is still some uncertainty surrounding when climate change effects are projected for specific regions and what the resulting impacts may be for the aviation sector.
- Resilience will likely be a combination of adapting infrastructure and developing processes and plans to respond to impacts quickly and efficiently as they happen.
- It will be necessary to make decisions based on costs and benefits in order to ensure critical elements are protected.

¹ Specific adaptation and resilience measures for each impact are covered in the associated factsheet and in the full Synthesis document.

