Demand Triggers for Airport Investments – Best Practice

Introduction

Airport development projects are often complex and costly. They involve many stakeholders, long design and construction lead times and are developed in the midst of evolving markets and technological change. It is therefore important to determine the timing of an expansion project through a process that ensures that the right capacity is delivered at the right time.

Development triggers for airport projects need to be carefully considered. Using simple rules of thumb to trigger major infrastructure projects is a flawed approach that can result in extra or unnecessary costs, and capacity that is provided either too early or too late.

This document summarizes IATA's view on best practices for infrastructure development triggers.

Section 1. Pre-requisites

In the Airport Development Reference Manual (ADRM), IATA recommends that development plans and phasing should always be linked to traffic volumes, not specific years. Forecast traffic growth needs to be carefully considered in coordination with a detailed assessment of the capabilities of different systems and the required level of service. To ensure the investment process delivers the desired outcomes, the following prerequisites should be in place.

- An internationally recognized method should be established and used to define the peak hour and the Busy Day (e.g. IATA defines the Peak Hour as the Busiest Hour in the second busiest day during the average week of the peak month; other authorities use the 30th busiest hour, etc.).
- The airport should prepare long term traffic forecasts that should be reviewed as a minimum every 5 years with annual checks against actual traffic that would trigger a more comprehensive update when substantial differences are observed. The forecast should be developed for (however not limited to) the following items:
  - Number of passengers
    - In annual terms (million passengers per year – MAP)
    - During the peak hour
    - Design Day Schedules for years 5, 10 and 20
  - Aircraft movements (ATMs)
    - In annual terms
    - During the peak hour

        - Design Day Schedules for years 5, 10 and 20
    - Cargo
        - In annual terms
        - During the peak hour
        - Type of cargo
    - Aircraft Parking Stand Demand during the Busy Day
- A detailed demand / capacity assessment should be conducted to establish the design capacity of the existing facilities. This assessment should also be undertaken when new infrastructure projects are put into operation or significant operational / technological improvements are improving the capacity. At Slot Coordinated airports this assessment should be done regularly. Demand / capacity assessments may be done on the following facilities:
    - Airfield (including runway and taxiway systems)
        - In annual terms
        - The peak hour capacity of the airfield will be defined by the sub-system (i.e. runway, taxiways, taxilanes) that has the lowest peak hour throughput capacity
        - Note that close collaboration with ATC providers will be required to ensure capacity on the ground can be matched by capacity in the air and that ATC limitations are incorporated in the trigger process
    - Passenger Terminal(s) (including all passenger processing infrastructure such as check-in, security, emigration, immigration, baggage reclaim; as well as curbside, number of gates, Baggage Handling System, Airport People Mover)
        - The peak hour capacity of the terminal will be defined by the sub-system (check-in, security, curbside, gates) that has the lowest peak hour throughput capacity
    - Aircraft Parking Stands
        - Stand demand during the design busy day
    - Cargo facilities (processing throughput and staging capacity)
    - Fuel handling facilities (including peak supply capacity, number of days storage capacity, dispensing capacity into plane)
- Any previous demand / capacity studies should be completed (or validated) by an independent 3rd party in consultation with the airline users and their representative organizations.
- It is the airport operator's responsibility to ensure that any expansion provides balanced capacity in all elements of the airport value chain.

Section 2. Definition of the trigger and its elements

Well established international practice is to use demand figures as a trigger to initiate a process that may result in airport expansion. This process will have to take into consideration any development costs related to the requirements triggered by demand. In addition, this process is usually linked to the capacity of the existing infrastructure. An important point is to ensure the trigger definition is flexible enough to accommodate the very different

local circumstances applicable to each specific airport.

The forecast traffic growth and the lead time required for each individual infrastructure element are two of the key parameters to take into account. In addition, the process should also allow airlines operating at the airport to request an evaluation of any service deficiencies that adversely impact their operation.

- As a minimum, demand triggers should be defined at least for the following airport systems:
  - Airfield (Peak Hour and Annual Movements)
  - Passenger Terminal (Peak Hour and Total Annual Passengers in MAP)
  - Cargo facilities (annual and peak terms)
  - Aircraft parking stands (contact and remote)
- The following formula may be used to define the demand triggers for Airfield (peak and annual), Terminal (peak and annual) and Cargo (peak and annual), and will need to be repeated for each one of these systems.
- Elements such as Lead Time, Design Capacity and CAGR will vary and is vital to ensure the trigger is applicable to that specific system (i.e. construction of a new runway must be triggered by aircraft movements figures and not passenger numbers)

$$\boldsymbol{Trigger} = \frac{\boldsymbol{Design\ Capacity}}{(\mathbf{1} + \boldsymbol{CAGR})^{\boldsymbol{Lead\ Time}}}$$

Where:

- Trigger is defined as a predefined **traffic** level that when it's reached activates the process described later in Section 3. This trigger can be reviewed annually if any of the values in the formula changes during the period.
- Design Capacity is each individual current capacity figure (airfield peak/annual, terminal peak/annual and cargo) calculated through a detailed demand / capacity analysis as defined in Section 1 or as the outcome of the trigger process.
- CAGR is the Compounded Annual Growth Rate for each individual system and time period. This should always be calculated during the forecasting exercise and based on the Lead Time of each airport system. It is very common that different CAGR will be forecast for passenger (annual or peak), aircraft movements (annual or peak) and cargo tonnage.
- It is critically important to obtain a precise estimation of the Lead Time. Lead Time is defined as the number of years required between the point when the trigger is reached until the moment the new infrastructure could enter into operation. Lead times may vary substantially and should be determined for each system (airfield, terminal and cargo). The lead time should consider the time required for the following elements, as a minimum:
  - Capacity review study (as described in Section 3).
  - Different steps of the consultation process with users.
  - Development and consultation of the financial assessment and business cases for each capacity development project.
  - Land acquisition (when required).

- Concept design.
- Options design.
- Detail design.
- Permission application and approvals.
- Environmental assessments and approvals.
- Procurement of the construction.
- Construction time.
- Commissioning.
- ORAT.
- Phased opening.

- The need for additional stands should be triggered when the forecast stand demand is expected to reach the existing capacity in a number of years equal to the Lead Time to construct additional stand capacity.

Section 3. Process after trigger activation

1. The trigger is activated when the traffic reaches any of the defined demand triggers.
2. The airport should immediately start the demand / capacity assessment, ideally undertaken by an independent 3rd party in consultation with users. It is crucial that this process is also considered when defining the Lead Time as it can take a significant amount of time.
3. As a result of this study the options are:
   a) The study finds that the capacity of the airport is higher than the previously established Design Capacity (i.e. resulting from operational changes, improved processes, use of technology, changing industry trends, minor infrastructure projects). The report should:
      i. Include the proposed new Design Capacity parameters (both in annual and peak hour terms).
      ii. Be consulted upon with the airline users seeking consensus.
      iii. Contain any points of disagreement after consultation.
      iv. Be submitted to the independent competent authority for validation and officially establishing the new parameters.
   b) The study findings show that the previously established Design Capacity is still valid. The report should:
      i. Be consulted upon with the airport users seeking for consensus.
      ii. Contain any points of disagreement after consultation.
      iii. Be submitted to the independent competent authority for validation and officially triggering the development of the following phase of development.
4. If infrastructure development is triggered, the airport needs to ensure the new phase of development provides sufficient capacity to accommodate growth in the years following the opening date
   i. Any new infrastructure development proposal must follow a comprehensive consultation process with the users to ensure it has a positive business case and the investment is affordable before any

construction starts. See Airport Infrastructure Investment - Best Practice Consultation Position Paper.

5. In both scenarios, a new set of trigger thresholds will need to be recalculated after the operational improvements or the new capacity is put into operation