What is an Origin/Destination Model?

What is an O/D model and why is it difficult to estimate true O/D?

An origin/destination (O/D) model is created to understand the air travellers’ true origins and destinations for any specific airport, city, or region. For example, on a flight from Vancouver International Airport to Los Angeles International Airport there will be numerous passengers with many different origins and destinations. One passenger may only be travelling from Vancouver to Los Angeles, another could be connecting in Los Angeles to fly to Nadi, Fiji Islands, while a third may have started their journey in Kelowna and connected in Vancouver to travel to Los Angeles and onwards to Bogota, Colombia. In this simple example, the one single flight Vancouver – Los Angeles serves the demand for at least three different O/D’s: Vancouver – Los Angeles; Vancouver – Nadi; and Kelowna – Bogota. Measuring only the volume of passengers travelling Vancouver – Los Angeles would overstate the Vancouver – Los Angeles O/D while not reflecting the demand on the other O/D’s flowing over the route. An O/D model, however, estimates the true travel volume by city pair based on the passengers’ entire journey and allows airlines, airports and tourism organizations to better understand, plan for, and serve their markets.

Estimating true O/D demand is, however, a challenging endeavour for several reasons:

• Within Canada, and most other countries, there is no single source that provides this information requiring the estimates be modeled from several incomplete data sources.

• O/D data is captured through travellers’ booking or ticketing information but as there are numerous purchasing and booking channels, (i.e., the Internet, travel agencies, calling the carriers directly) capturing this data in one single source is impossible.

• Travellers may purchase their ticket from one location (i.e., their hometown’s travel agency) but then drive to an airport, other than their local airport, to originate their air journey. If, for example, the other airport has better service or availability of cheaper fares, passengers may be willing to add a drive journey to their trip for the cost savings or improved overall convenience. Such behaviours unfortunately mask the passengers’ true origins.

• Passengers flow over a complex network of flights. There are numerous different routing options (i.e. open jaw¹, multiple stopovers, circuitous itineraries) that a passenger can take that disguise or confuse the final destination.

• Complete routing information is not available for certain types of carriers, typically charter and low cost carriers which do not directly participate in airline interline programs.

In order to correctly estimate O/D market sizes for an airport or city pair, one has to be aware of the need to use various data sources, recognise the limitations within each data source and also understand the dynamics of the information.

¹ Open jaw tickets is an airline ticket in which the traveler returns from a city other than the one he or she arrived at, or in which the final destination is not the same as the original departure city.
ORIGIN/DESTINATION MODEL – CON’T

How is an OD estimate generally created?
The foundation for modelling O/D market sizes is ticketing or booking data. Ticketing data refers to all air tickets sales made by travel agencies through global distribution systems\(^2\) (GDS). Booking data is similar to ticketing data; however it represents passenger bookings as opposed to actual sales (tickets). When working with booking data, there has to be consideration for cancelled tickets. We refer to ticket data and booking data, collectively as GDS data, as both sources reflect transactions made via the GDS.

Historically, tickets issued by travel agents represented approximately 80% of all airline tickets issued for scheduled flights worldwide. However, the increasing growth in low-cost carriers and an industry shift towards increasing carrier direct ticket sales has caused the share of GDS sales to fall. While GDS data still represents one of the most comprehensive databases of airline ticketing and booking volumes, the information needs to be augmented and cross-checked with data from several other sources. As the representativeness of the GDS data varies by market, carrier mix, and world region, the factors used to model the GDS data need to be developed uniquely and specifically for each O/D being examined.

Airport site statistics, flight schedule data (sourced, for example, from the Official Airline Guide), U.S. Department of Transportation’s (DOT) T100 on-flight and U.S. DOT’s O/D passenger statistics, Statistics Canada’s O/D databases, Statistics Canada’s customs entries data and population statistics are all data sources incorporated in the modelling exercise. This information typically provides total passenger volumes for an airport, flight leg, region, or country and is used for balancing totals and scaling ratios. To fully understand a market, direct consumer research is also often required. Pulling together the various data sources, cross-checking them and assessing their statistical value are essential elements in developing an O/D model.

How is an O/D model useful to various types of organizations?
Knowing the true origin and destination of passengers is important for air service development initiatives. O/D market sizes allow an airport to demonstrate to the prospective carriers the network value of service to their airport. It is also an important input to market share models used by airlines and airports to predict the profitability of a route or network. An O/D model, however, is not only useful for airports and airlines; many travel and tourism organizations also find these models of benefit. A travel and tourism organisation would use the information in an O/D model to measure the impact of promotional campaigns, provide support for joint promotional initiatives with other industry partners, and target their marketing spend to the most important markets.

\(^2\) Major computer reservations systems (CRS) operations that book and sell tickets for multiple airlines are known as global distribution systems (GDS).