Innovations in Airline Revenue Management Since 2020

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2020 and 2021 were unprecedented in aviation – never before have we seen such a dramatic and sustained drop in passenger traffic.

But now we have a surge in demand. March 2022 saw record-levels of bookings for some US carriers...

How Did Airlines Respond? The “AGIFORS” Perspective

The First 100 Days: How Airlines Responded to the COVID-19 Crisis

Airline executives around the world discussed the impact the pandemic...

About the author: Laurie Garrow is a professor at the Georgia Institute of Technology and the president of AGIFORS, a nonprofit organization that focuses on airline research.

Many travelers returned to the skies in 2021. The Sunday after Thanksgiving, 2.4 million individuals were screened by the Transportation Security Administration, a number just shy of the 2.5 million who were screened on the same day in 2018, as reported by the Bureau of Transportation Statistics.
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Airline OR Innovations Soar During COVID-19 Recovery

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Abstract

[The Airline Group of the International Federation of Operational Research Societies (AGIFORS) held four conferences during May to July 2021 that focused on how COVID-19 was impacting and reshaping the airline industry. Dozens of airline representatives from around the world spoke about how fundamental changes in passenger demand and booking patterns are reshaping the airline industry and driving innovation and research needs. Customers are booking much closer to departure and are canceling or exchanging their tickets more frequently than before COVID-19. Volatility in demand has increased as travel restrictions change and border reopen. Consequently, greater uncer-]
Airline Panelists from Across the World
Changes in Demand are Reshaping the Industry

- Lead time for bookings have exhibited high volatility
  - 80 days at beginning of the pandemic
  - 30 days when travel volumes were drastically lower than historic norms
- Elimination of exchange fees give travelers new flexibility on booking ... and rebooking flights
- Border closures and ever-changing travel restrictions lead to surges in demand ... and surges in cancellations
Just About Everything Changed …

Where should we fly?

Is historical data worth anything?

What is demand going to be?

How many crew do we need when are planes are parked, but could be reactivated soon?

Should we put a lot capacity in the market, even if it means cancelling flights close to departure?
Innovations in Demand Modeling

Can I use past data for forecasting the future?

YES! Fiig and Wittman decompose forecast into resilient and volatile components to use historic data for predicting demand during COVID-19.
Innovations in Demand Modeling

Can we use any other data to help us predict demand?

YES! Airlines have used TSA volumes, % population vaccinated, number of COVID-19 cases, % purchasing WiFi onboard, and many other data sources but shopping data appears to be the key…
Shopping Data – Multiple Uses

During the first and second wave in the U.S., we saw a lot of correlation of bookings to searches in coronavirus dashboards. And the big breakout term for recovery was ‘vaccine appointment.’ We took those trends and incorporated them as one-week leading indicators for bookings. – Alex Matson, Alaska Airlines

Lakshmanan (Sabre) combines shopping data with historic booking data for market size analysis using machine learning methods (XBoost algorithm) and reduces mean absolute percentage error to 6.3 from 17.2 using just historical data.

Etihad and Richard Ratliff (Sabre) gave presentations describing how shopping data could be used for dynamic pricing and availability and other applications.
Looking Ahead in RM

The one good thing about a crisis is people now see why dynamic or continuous pricing is relevant and how it would complement an RM system. – Dennis Buitendijk, Qatar

General sense that there will be a “new normal” after the pandemic, with more flexible products, shorter booking lead times, and more uncertainty in demand predictions until close to departure.

Many airlines are placing a greater focus on dynamic pricing and continuous pricing (Air Canada, United, Qatar).

New approaches are being developed to use simulated data as a complement to or replacement for RM controls and to set RM controls under different future scenarios (Air Canada, Jonas Rauch, PROS).
Connections Among RM, Scheduling, and Operations in the News

JetBlue shares slump after airline drastically cuts 2022 growth plans

KEY POINTS
- JetBlue is scaling back its 2022 growth plans to no more than 5% to avoid further flight disruptions.
- The airline previously said it expected to grow as much as 15% this year.
- Airlines have been forced to rethink growth plans as they grapple with weather delays, tight staffing and higher fuel costs.

FAA calls meeting with airlines to discuss flight disruptions in Florida as travel booms

Connections Among RM, Scheduling, and Operations

Demand April 2022 vs. Pre-Covid

- West Palm Beach: 132%
- Miami: 113%
- Tampa: 107%

Operational Stats April 1-3 (US carriers)

- Delayed Flights: 25%
- Average Delay: 62 min
- Cancelled Flights: 6%

The more flights we schedule to meet demand...

The less reserves we have to recover in irregular operations...

Image credit: Shutterstock
Looking Ahead for RM and Scheduling

Need to design schedules that are robust to different recovery scenarios and maintain flexibility for downline processes.

Much closer collaborations between RM and scheduling that were built during COVID-19 expected to continue.

Role of big data is increasing and being used to train more junior staff.
What Lies Ahead for 2022?

Nearly 17,000 employees at Delta chose to depart the company through a voluntary package. The average tenure of departing employees was almost 25 years, with nearly 400,000 combined years of service to Delta – Georgia Center of Innovation’s Aerospace Team

Reactivating an airline is expensive! Maintenance costs are looming ahead. Not to mention that fuel prices are now on the rise...

Workforce shortages place additional cost pressures on airlines
  • Bonuses for new pilots, significant overtime pay to pilots

Early retirement packages reduced cost in the short term, but a lot of institutional memory also left a gap in institutional knowledge
  • Impacts seen not just at airlines, but at FAA and airports as well
  • Role of big data is increasing and being used to train more junior staff (American Airlines with operations control center)
The Big Unknowns

We are probably not returning to the past, but a new normal

- How are we going to manage an environment where few restrictions are placed on products and booking lead times are shorter?
- What will business travel look like in the future?
- Will international travel requirements remain fragmented and if so will new services emerge for travelers to manage the entire experience?

From a methodology perspective, there is a lot of interesting work occurring on continuous pricing and continuous optimization. Will continuous optimization provide speed and integration opportunities we haven’t thought of before?
Thank You!

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