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Will airline hubs recover from COVID-19?

Connecting traffic has been particularly hard hit by COVID-19. We believe the hub model will remain relevant postcrisis, but airlines will need to update their operations and network strategies.

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COVID-19 has drastically decreased airline traffic across all routes, but the volume of connecting passengers has been among the hardest hit. Questions have arisen as to whether the current crisis will lead to structural changes within the industry. On the network side, this includes a debate about when and if connecting traffic will return, and whether a rethink of the hub-and-spoke model may be necessary.

In a hub model, airlines use banks of incoming and outgoing flights to offer passengers a large number of possible itineraries. This model has been a cornerstone of full-service carrier networks across the globe for several decades. The demand for connecting flights on key intercontinental routes has been stable or rising in recent years because of both the many logistical and financial advantages for airlines and passengers and recent improvements in passenger experience. Even before the crisis, however, the future of the hub model was the subject of a long-running debate. Some experts have argued that changing aircraft technology favors point-to-point (P2P) flights, that environmental concerns threaten circuitous connecting itineraries, and that hub congestion and the stress of tight connections might limit the further growth of hub carriers.

We believe that, though there will be short-term pressure on hubs and fewer hubs in the longer term, the model will remain relevant in the postcrisis world. The benefits of the model for airlines and passengers remain largely intact, and long-term trends—including rising demand for thinner routes and the increasing market share of leisure travel—support the continued importance of hubs.

Going forward, the relevance of the model will depend on the ability of airlines to adapt their operations to the realities of the next normal. In the short term, airlines will need to seek out new sources of insight to guide the tactical rebuilding of their networks. In the longer term, success—and in some cases survival—will require a reassessment of market positioning, aircraft technology, and pricing, as well as a better use of available data.

Connecting flights are hardest hit

The airline industry is among the most affected by the COVID-19 crisis, and global air-passenger volume in August 2020 was still down around 64 percent compared with the same period in 2019. Yet the impact of the crisis has differed by type of travel. Domestic travel, for example, was down 51 percent year over year in August, while international travel was down 81 percent.

The volume of connecting passengers (which has fallen 81 percent year over year) has also been more affected than nonstop traffic (which has fallen 61 percent). The larger impact on connecting travel has been due to falls in both demand and supply. On the demand side, part of the explanation is the decrease in long-haul, intercontinental itineraries, where connecting is more common. Passengers are also exhibiting a stronger preference for nonstop travel, both to avoid the perceived double risk of contracting the coronavirus and because the increased complexity of travel restrictions and quarantine rules can be confusing to even the hardiest traveler. On the supply side, the limited flight schedules currently in place have broken the connecting banks of many airlines. In August 2019, for example, a passenger on an incoming flight to Frankfurt could connect to around 35 flights within a connecting window of one to four hours; the possible connections fell to just 11 by August 2020.

Connecting trips will not vanish during the course of the crisis, however. Many of those needing to travel—especially between less-popular origins and destinations—are more likely to take connecting flights than they would have been before the crisis. The number of nonstop city pairs served has dropped from around 28,000 in August 2019 to around 20,000 in August 2020.

Precrisis: Advantages for both airlines and passengers

To a certain degree, the larger drops in demand for and supply of connecting flights, versus nonstop, are in line with other longer-term trends.

The share of connecting traffic at the global level has been falling in recent years—save for select intercontinental flows, which had been largely stable or growing before the crisis. This shrinking share can be attributed to the growth of P2P carriers, with low-cost carriers seeing a particularly significant increase in their market share (Exhibit 1).

The growing market share of connecting flights on intercontinental routes is largely due to the success of the hub-and-spoke model, which has contributed to the emergence of megahubs, such as those as in Dubai and Istanbul, over recent decades. Centralized traffic allows airlines to reap a range of benefits:

— offer maximum connections with the minimum number of flights

— fly routes that would otherwise not be viable based only on local demand, thereby increasing the frequency of flights to popular destinations

— concentrate passenger flow volumes, enabling the use of larger aircraft with lower unit costs and increasing schedule efficiency, reducing unit costs even further

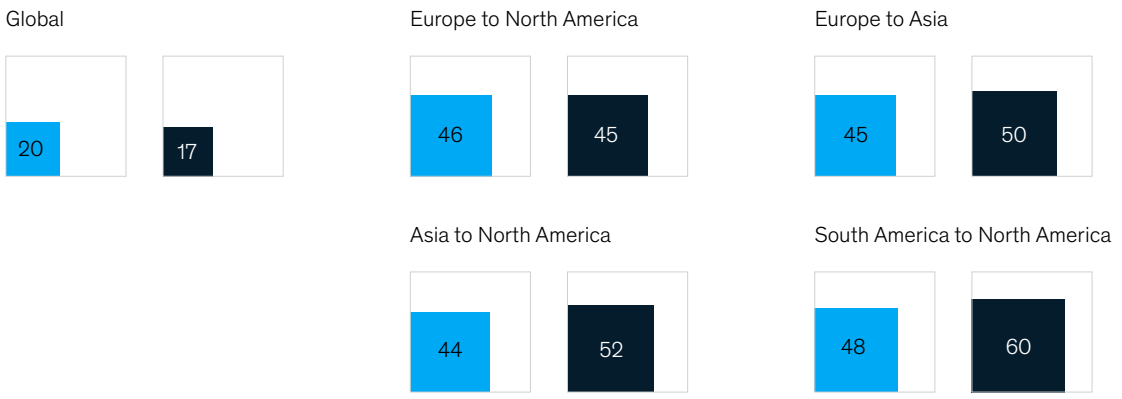
In addition, modern revenue-management systems help airlines select passengers on connecting trips to ensure that most planes depart at the fullest possible capacity. These efficiencies generally flow through to passengers, who can then pay less—and fly on a larger number of itineraries through one booking—by connecting through hubs rather than traveling on nonstop routes.

Airlines that use hubs are also paying more attention to improving the experiences of connecting passengers. Given the choice, most passengers prefer nonstop flights, but long, uncomfortable layovers are quickly becoming a thing of the past. Three major aspects of customer experience have seen particularly stark improvements: the ability to check bags through to the final destination at initial check-in; enhanced hub-airport design, with some now including movie theaters, swimming pools, and gardens; and on-time arrival performance, reducing stress and missed connections.

Exhibit 1

Global connecting traffic at the global level has been falling in recent years, but intercontinental flows are largely stable.

Share of connecting ticket passengers[1] by flow, by September of each year, % 2005 2019



[1]Connecting passengers are counted twice (once arriving, once departing), so shares of overall connections are higher when looking at handled passengers.
Source: International Air Transport Association Passenger Intelligence Services

Postcrisis: Remaining relevant among technological and environmental threats

Despite its benefits and the spate of recent improvements in customer experience, a number of industry observers point to several trends that could weaken the role of the hub—some of which have been strengthened, and some undermined, by the current crisis:

— *Evolving aircraft technology.* New, smaller, long-range aircraft—such as 787s and A321(X)LRs—offer the potential to fly thinner, intercontinental city pairs nonstop. Touted as potential hub destroyers, the role these aircraft play may be accelerated by COVID-19, which is bringing forward the retirement of very large, wide-body craft designed for hub operations, such as A380s and 747s. P2P airlines make up the majority of users of the new aircraft: 65 percent of the active and ordered A321(X)LRs are P2P types.

— *Customer preferences.* All else being equal, most customers prefer nonstop flights. But all else has historically *not* been equal. For one, airlines recognize this preference and have generally charged a price premium for nonstop flights. Hence, customers will usually find cheaper connecting itineraries for intercontinental travel. This nonstop premium has increased over recent years, as pricing optimization has better identified and segmented price-agnostic nonstop travelers (such as business travelers). The COVID-19 pandemic may have upset this trend, however; airlines will need to rethink pricing to fill nonstop flights, potentially reducing the nonstop premium and thereby undercutting demand for connecting flights operating on the same route.

— *Environmental concerns.* Passengers on a connecting flight will generally fly more kilometers than they would on a nonstop option. The average distance flown by connecting passengers on flights from Europe, for example, is 16 percent longer than that of nonstop flights serving the same routes.[1] Longer distances naturally mean more fuel consumption, which means greater carbon-dioxide emissions. *Flygskam* ("flight shaming") and environmental issues were major concerns for both airlines and passengers before COVID-19, and this is unlikely to change. Some countries have even added environmentally friendly conditions to their postcrisis aid packages, which may encourage national efforts to comply with existing emissions goals. A loan to Air France from the French government, for example, depends on the airline reducing domestic flights.[2]

— *Hub congestion.* Before the crisis, the International Air Transport Association projected that just four of the world's largest 100 airports would have sufficient capacity to meet passenger demand by 2028.[3] These concerns are less immediately relevant in the aftermath of the COVID-19 crisis because of the sharp reduction in air traffic and the slow projected recovery.

— *Stress around tight connections.* Published connection times have been unrealistic at times, inducing much stress at the more-congested hub airports. Even slight flight delays can make tight connections untenable, significantly detracting from customer experience.

Nevertheless, the current crisis need not spell the end for the hub model. Its economic benefits—an efficient model for airlines and attractive prices for passengers—remain largely intact.

New aircraft technology may actually empower hubs rather than threatening their importance. Whereas large aircraft (such as A380s, which are now being phased out) were deployed primarily on hub-to-hub routes, smaller long-range jets (such as 787s) could open up new opportunities to serve long-haul routes economically and directly, such as from Tokyo to Boston (Exhibit 2). Schedule data, however,

[1] Weighted passenger average for September 2019; considers all connecting ticket passengers and compares flown distance on itinerary with great-circle distance of first origin to final destination, regardless of whether a nonstop exists.
[2] "Coronavirus aid: Air France 'must cut domestic flights to get state loan,'" *BBC,* May 4, 2020, bbc.com.
[3] *Building capacity for the future,* IATA Global Airport & Passenger Symposium, Warsaw, Poland, October 15–17, 2019, iata.org, p.18.

suggests that the vast majority of these capacity types is deployed to and from hubs, indicating that these types can also strengthen hub operations.

Long-term flight trends also support the continued relevance of hubs. First, travel between smaller cities continues to grow faster than travel between larger cities. In terms of passenger demand, cross-regional flows between the largest 100 cities—where there are an abundance of nonstop flights—grew at an annual rate of 4.7 percent from 2005 to 2019. Although smaller in volume, flows between cities that are not in the top 100—which are well suited for hubs to serve—grew 8 percent annually over the same period (Exhibit 3).

Second, price-sensitive leisure travel—which is more closely linked with connecting flights—is expected to recover and grow more quickly than business travel in the coming years.[4] A longer-term trend is at play here, too: international leisure air trips to and from the United Kingdom grew 3.4 percent per year from 2000 to 2019, whereas international business trips grew just 0.2 percent per year.[5]

Updating the hub model

Airlines and airports must not be complacent. Many hubs, particularly those without substantial domestic markets, will struggle in the short term. Those that cannot adapt their operations and reshape their networks are at real risk of not surviving the lean years that are still to come. In addition, there may be fewer hubs in the long run as the industry consolidates further, multihub systems are rationalized, and P2P carriers cannibalize connecting traffic with efficient long-range aircraft. Short term, airlines and hubs will need to tactically rebuild their networks. But to set themselves up to thrive in the next normal, they must also reassess their longer-term network privileges and operational strategies.

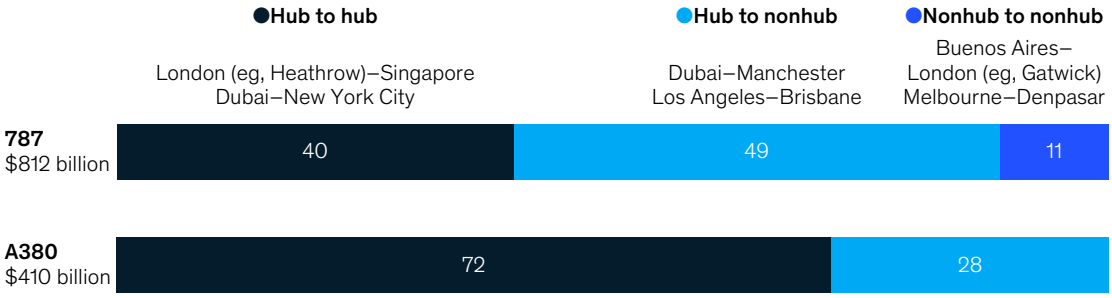
Short term: Reshape networks

Hub airlines should reassess the economic performance of their hubs as they begin to rebuild their flight schedules. Many airlines and airline groups currently operate multihub systems, some of which are in close proximity, leading to considerable duplication. Airlines may find that they could operate more profitably—and serve

Exhibit 2

The deployment profile of large and smaller wide-body aircraft differs, but the vast majority of capacity continues to touch hubs.

Scheduled available-seat-kilometers (ASKs) in 2019 by route type,[1] %



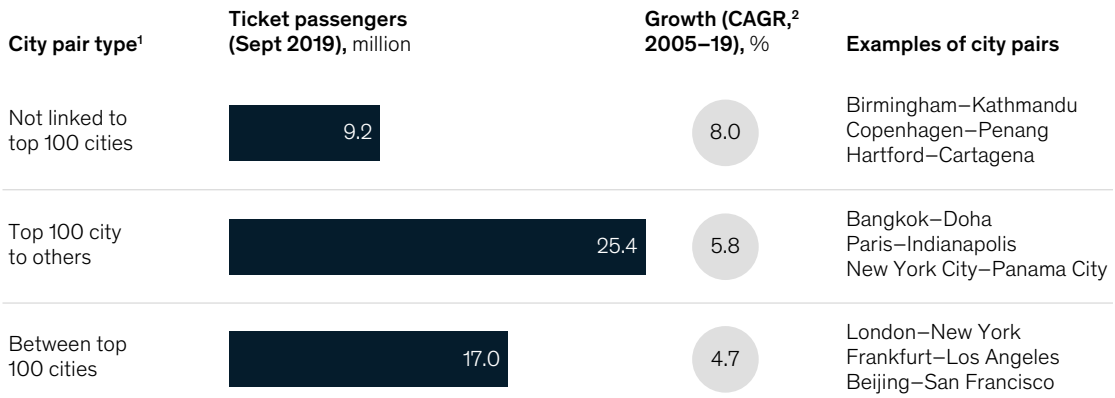
[1]Hub status is a subjective characterization. For the purposes of this chart, an airport is seen as a hub if it meets two characteristics: it is one of the top 100 largest airports globally by ASK, and it has a segment-based passenger-transfer share of at least 15 percent.
Source: International Air Transport Association Passenger Intelligence Services; OAG

[4] Andrew Curley, Rachel Garber, Vik Krishnan, and Jillian Tellez, "For corporate travel, a long recovery ahead," August 13, 2020, McKinsey.com.
[5] Travelpac, UK Office for National Statistics, 2020, ons.gov.

Exhibit 3

Cross-regional flows between cities that are not in the top 100 are well suited for hub connections and have outgrown other flows.

Size and growth of cross-regional true origin and destination flows, by type of city pair



[1]Classification of cities done based on September 2019 volumes; analysis at the city level, not airport (eg, London, not Heathrow Airport).
[2]Compound annual growth rate.
Source: International Air Transport Association Passenger Intelligence Services

more routes—by specializing hubs further or switching some hubs to a focus-city model. In such a model, flights are scheduled purely based on local demand to and from a city, with connections based on day-to-day opportunities (rather than being used as a network design principle).

Rebuilding hub systems is considerably more complex than P2P networks—due both to the interdependencies among routes and to regional differences in COVID-19 prevalence and restrictions—and will therefore necessitate new sources of insight. The unprecedented nature of the crisis means that airlines' traditional methods of predicting demand, which typically involve extrapolation from historical patterns, are no longer appropriate. Airlines should instead invest in new tools that can provide real-time information to track travel demand.[6]

The new networks' bank structures can be less rigid and operate with longer connecting windows. Precrisis bank structures were often optimized for short, hour-long connections. The limited scheduling of the immediate-postcrisis period will make such short connections difficult, but data also suggest that most connecting passengers are content with a longer layover—decreasing the chances of stress and missed connections. Longer connection windows will not only facilitate the rebuilding of hub networks but also help airlines better deal with the cascading effect of flight delays, increasing long-term operational resilience.

Longer term: Reassess level of network privilege, role of new aircraft technology, and pricing

Beyond short-term planning to guide the reopening of their networks, airlines should also develop longer-term strategies to ensure that they are well positioned in the postcrisis environment. They should be guided by four principles.

Maximum network privilege should factor heavily into hub design. A key source of airline value creation is network privilege, an airline's ability to offer its passengers a unique service. For example, concentrating passengers through a hub enables a carrier to offer connections for markets that lack sufficient demand for a nonstop service—thereby creating a cycle of reward between passengers

[6] Riccardo Boin, Alex Cosmas, Alex Dichter, and Nina Wittkamp, "A new approach in tracking travel demand," May 29, 2020, McKinsey.com.

and the airline. Hub carriers should reassess the level of privilege in their network and reorient their services as necessary. Such measures are likely to include launching service to additional secondary cities via smaller aircraft. Copa Airlines, for instance, has been able to use its hub in Panama to create thousands of origin-and-destination pairs, more than half of which are privileged (compared with around 10 to 15 percent for most other airlines). As a result, Copa has become the only reasonable one-stop connection for passengers wishing to fly on many thinner routes between North and South America, and it has earned a return on invested capital above the cost of capital for every year except one from 2003 to 2019.

New technologies can bring financial and environmental benefits. Hub airlines are already starting to take advantage of the potential offered by smaller long-range jets. In 2019, for example, 80 percent of the seat-kilometer capacity of 787s was deployed to or from one of the 30 largest airports globally. Among other potential benefits, using these jets to serve long-haul markets directly can bolster network privilege. In addition, the improved environmental credentials of these jets will help hub operations become more fuel and carbon-dioxide efficient.

A more analytical approach to pricing can improve hub profitability. Airlines typically price well on their nonstop routes, but connecting markets are often an afterthought. Many airlines simply follow competitor pricing on connecting trips. In our experience, a more analytical approach to pricing connecting markets can boost profitability by one to two percentage points. Optimum postcrisis pricing may require recalibrating fares across both connecting and nonstop flights; structurally lower business demand may necessitate a lower premium on nonstop services.

Advanced analytics can improve customer experience. Airlines have an opportunity to further enhance customers' experiences through smart use of existing data. To decrease stress during tight connection times, for instance, operations control centers could dynamically adjust cruise speed, allocate gates to minimize the distance that passengers have to walk between flights, and fast-track passengers with challenging connections through security. A subset of airlines has already implemented some of these techniques, but they are applied inconsistently across the network.

COVID-19 continues to wreak havoc within the airline industry and has weakened airline hubs in the short term. However, we see a continued role for the hub model as traffic starts to come back. It is thus vital that hub carriers make the most of this opportunity to re-evaluate their networks and fleets. We believe that there will be fewer hubs in the long term, but that those that remain will be stronger and more profitable if they make the necessary short- and long-term adjustments to their model.

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