
The Role of Nonstop Flights in Fostering Global Firm Innovation



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Nonstop flights can be a vital facilitator of innovation between international companies and their subsidiaries.

Deserted airport terminals, abandoned runways and empty luggage belts – the height of the Covid-19 pandemic saw international air travel virtually grind to a halt. But with China recently joining the rest of the world in reopening its borders, the industry seems to be firmly on the mend. The International Air Transport Association anticipates that overall traveller numbers will reach **4.0 billion in 2024**, topping even pre-pandemic levels.

Air travel is essential to connecting firm workers who reside in different locations by effectively and efficiently shrinking the geographic distance between them. But beyond merely bridging this physical gap, can it also play a role in helping global organisations overcome cultural, temporal and other dimensions of distance and contribute to positive innovation outcomes?

In **our study** (forthcoming in *Management Science*), we investigate the role of nonstop flights in facilitating innovation and collaboration between global

firms and their subsidiaries. If nonstop flights do affect global firm innovation, how does this effect occur, and what characteristics of firms and firm locations connected by direct flights influence the relationship between these nonstop flights and innovation outcomes?

Connecting the dots

For our empirical analysis, we obtained data on all active air routes globally from 2005 to 2015. This consisted of information on all flights emanating from 5,015 airports around the globe. We geo-matched these airports to the addresses of inventors based on patents filed for the aforementioned years. In doing so, we obtained two measures of innovative activities – global citations and global collaborations – for all patenting firms and inventors located near each of these airports.

To causally estimate the impact of nonstop flights on innovation across countries, we exploited a unique feature of the airline industry: Airport pairs less than 6,000 miles apart are more likely to be serviced by direct flights than pairs more than 6,000 miles apart. This is a result of the higher operating costs to service routes that are more than 6,000 miles long.

Indeed, our data reveals that airport pairs just below the 6,000-mile threshold have on average 260 to 550 more nonstop flights per year compared to airport pairs just above the 6,000-mile threshold. We estimate that for airport pairs that are situated around the 6,000-mile threshold, a 10-percent increase in the number of nonstop flights between the two locations leads to a 3.4-percent increase in citations and a 1.4-percent increase in collaborations. This effect is driven primarily by firms, not by academic institutions.

Linking innovation hubs

As we predicted, the relationship between direct flights and innovation outcomes across countries is more salient for firms and subsidiaries that have greater innovation mass. We measure this based on a company's R&D spending, as well as the number of inventors that filed patents with that firm.

This trend holds true for firms and subsidiaries situated within **innovation hubs** or in countries that can be deemed technology leaders. For example, we estimate that a 10-percent increase in nonstop flights between firms in two "leader" countries leads to a 17.95-percent increase in citations and a

4.96 percent increase in collaborations. In contrast, an uptick in nonstop flights has statistically insignificant effects for firms located in leader-follower and follower-follower country pairs.

Nonstop flights connecting firms with large innovation masses can help build a crucial bridge between the firms, whose inventors could otherwise find it harder to **meet each other face-to-face**. On the other hand, linking firms characterised by low innovation masses and in countries with relatively low GDPs and populations is unlikely to create significantly higher trade flow – as the countries may have few things to trade in the first place – and is unlikely to lead to increased citations and collaborations.

Cultural and temporal distance

We also show that nonstop flights can be particularly effective at facilitating innovation between firms and firm locations separated by temporal and cultural distance. We measure temporal distance by computing time zone differences between firm locations, while cultural distance is determined through the ethnic composition of inventors at firms and subsidiaries and using metrics from the World Values Survey.

Our results suggest that nonstop flights increase citations and collaborations for firms in temporally distant locations. For instance, we estimate that a 10-percent increase in flights for airport pairs with less than 1.5 hours of working hour overlap leads to a 5.25-percent increase in citations between firms and a 1.87-percent increase in collaborations between subsidiaries within a firm. However, nonstop flights do not seem to enable knowledge spillovers and collaborations between inventors that are temporally close to one another.

We also find evidence that nonstop flights can increase citations and collaborations among firms in locations that are marked by a high degree of cultural distance – such as when one location is immigrant-friendly and another location is immigrant-unfriendly. Interestingly, where both locations are unfriendly to immigrants, nonstop flights do not facilitate innovation.

If two inventors are culturally distant, they are likely to have different understandings of cultural elements including power relations and individualism, which can affect working habits and communication styles. Cultural disparities can therefore hamper information flow, contribute uncertainty to relationships and increase communication and collaboration

costs. By bringing individuals together to engage with each other face-to-face, direct flights can be a way to resolve and overcome the challenges of working with culturally dissimilar individuals.

Implications for firms and policymakers

Firms continue to benefit from knowledge diffusion and the production of global collaborative patents, but national borders remain a key source of friction. Our study shows that in the global context, nonstop flights can boost mobility and, in turn, the spread of knowledge through citations and collaborations among inventors.

If international flights fail to recover quickly in the aftermath of pandemics and economic downturns, cross-border knowledge spillovers and collaborations at certain firms could be adversely affected. For decades, airports and policymakers have offered incentives to airlines to start nonstop flights. Our study provides useful evidence for when policymakers should design incentives to attract airlines to begin these direct flights.

We suggest that flight connectivity is an important facilitator for firms to build bridges to distant contexts, but the effectiveness of those bridges depends on the characteristics of the companies and of the contexts being connected. As our study indicates, business travel to culturally and temporally distant places may be beneficial for innovation outcomes at firms with large innovation masses, especially when the travel connects two innovation hubs.

The Covid-19 pandemic has led to the **proliferation of tools** that have made it easier for individuals to communicate despite geographic distance, but direct flights can still play an important role in bridging cultural and temporal gaps, especially when synchronous work is required. While these interactions could begin virtually, future collaborative work and the deepening of initial connections may necessitate innovators being in the same location or time zone, which nonstop flights can help achieve.

Find article at

<https://knowledge.insead.edu/operations/role-nonstop-flights-fostering-global-firm-innovation>

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About the research

"**Innovation on Wings: Nonstop Flights and Firm Innovation in the Global Context**" is forthcoming in *Management Science*.