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Ultra Long-Haul: An emerging business model accelerated by COVID-19

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ARTICLE INFO

Keywords:
Business models
COVID-19
Ultra long-haul
Innovation
Airlines

ABSTRACT

The COVID-19 outbreak has sent shockwaves throughout the aviation industry, sending a myriad of liquidity-strapped airlines into administration or part government ownership. In turn, this paper argues that the novel phenomenon of Ultra Long Haul (ULH) operations already maintains the necessary characteristics to generate a competitive advantage that will not only succeed, but outperform other business models, in a post COVID-19 era. Our modelling and scenario analysis results suggest that point-to-point ULH services, with access to a strong domestic feeder system, will not only require minimal adjustments to cope with COVID-19, but will simultaneously produce higher seat-load factors and yields, heightened network flexibility, and unique health benefits tied to its ability to bypass densely populated hub airports.

1. Introduction

Well before the global onset of COVID-19, many had begun to question the dynamics of the commercial aviation industry (Bogaisky, 2019; Jasper and Phillip, 2019). On the one hand, flying was as cheap and accessible as ever before, affording an unprecedented amount of the international community with the opportunity to experience the wonders of travel and a globalised business world. On the other, the industry became oversaturated with supply, as a product of a surplus in airlines all attempting to drive down prices (e.g. Hunt and Truong, 2019), in a bid to gain market share. Invariably, the price wars that would ensue forced substantial downward pressure on yields, resulting in a myriad of airlines enacting significant cost-cutting measures, or even going as far as asking for financial support from their governments. The industry was already walking a tight rope, with weakening balance sheets and bankruptcies becoming increasing commonplace among airlines, but as hindsight would have it, the worst was yet to come. With this in mind, the outbreak of COVID-19, and its subsequent impact on global air-travel, pertains some of the most existentially threatening consequences to have ever hit the industry (IATA, 2020b). As such, the near-immediate plummet in passenger demand due to travel restrictions and closed borders, has sent a plethora of liquidity-strapped airlines into administration or part government ownership, including all the large US carriers; with most airlines around the world forced to run skeleton operations. To this end, if one thing seems certain about the implications of the Coronavirus, it is that aviation will likely never come to resemble its recent, former self and will look different to future scenarios presented in the extant literature (e.g. Linz, 2012). Industry contraction and consolidation will take place, airline fleets will be rethought, and business models will need to be redesigned; accounting for an industry that will experience reduced and volatile levels of demand, be more reliant on inelastic travellers, and prioritises human health factors to never-before seen levels (IATA, 2020b). With this in mind, this study will take the position that Ultra Long-Haul (ULH) operations, a relatively novel phenomenon, already maintains the characteristics necessary to succeed in a post COVID-19 era, even in a context in which the virus is never truly eradicated.

As such, “the term Ultra Long-Haul refers to flights of 14.5 h or more... with a minimum greater-circle distance of 12,842 km” (Bauer, 2019, p. 6). These segments typically “seek to directly connect cities in far reaching corners of the earth, leveraging the enhanced capabilities of new-age aircraft, thereby saving time-sensitive passengers hours of total travel-time when compared to a traditional one-stop, Hub & Spoke itinerary” (Bloch, 2020, p. 8). Despite often commanding a price premium, Ultra Long-Haul became an especially preferable option among corporate travellers, which in turn worked to shape the available network of ULH routes around the world. As such, distant financial and business hubs were sought to be connected directly, symbolised by Singapore Airways’ launching its record-breaking, but commercially unsuccessful, SQ21/22 Singapore-New York (Newark) service in 2004.
Since then, several ULH routes have emerged, as well as re-emerged including Singapore’s SQ21/22 service in 2018 after having been cut in 2013, but none more commercially successful than that of Qantas’ landmark QF9/10 Perth-London service (Flight Global, 2020). Since its inception in 2018, this 14,500 km flight, the first to ever directly connect Australia with Europe, has exceeded all expectations by claiming Load Factors in excess of 90% and generating higher Net Promoter scores (measure of the willingness of customers to recommend a company’s products or services to others) than any other international route served by the Australian flagship carrier.

To this end, ULH services have proven to be greater than just a more efficient option for the time-sensitive traveller. From the customer standpoint, the on-board experience has been heightened holistically throughout both the hard and soft product, with the prioritisation of human factors having become “central to an airline’s approach when developing ULH projects” (Bloch, 2020, p. 35). From the airline’s perspective, ULH segments largely simplify operations, removing the need to stop-over in foreign countries, eliminating the financial and environmental burden of an additional take-off and landing, whilst providing a scope to generate product differentiation from competitors; including the ability to afford less physical exposure to others and resultanty, a reduced risk of passengers contracting COVID-19. The remainder of this paper is structured as follows: Section 2 provides a brief background into the implications of COVID-19 on the aviation industry and Section 3 discusses the advantages of the ULH business model in such an environment, followed by a discussion of the potential limitations and pitfalls of ULH services in section 4. In Section 5, we aim to provide forward looking analysis to assess the potential success of ULH projects in a range of post-COVID-19 scenarios, and Section 6 offers some conclusions and suggestions for further research.

2. COVID-19 context

To understand how Ultra Long-Haul operations can fit into a post COVID-19 era, it is first important to recognise the implications of the pandemic on the greater industry, whilst equally acknowledging the potential for several additional waves of the virus to reappear again down the line. With this in mind, it is clear that the entire value-chain of the aviation sector has been compromised, with each individual stakeholder facing their own existential challenges; from airports having been forced to close terminal doors, to manufacturers facing immediate shutdowns of extensive production lines. If there is a single common thread that currently ties all these various aviation players together, it is the reality of facing an industry that will perhaps never return to its former self. If scale, size and efficiency was the gold standard of aviation in a pre COVID-19 era (e.g. Merkert and Pearson, 2015), then optimisation is what must be recognised as the new-normal and necessity. Invariably, this holds dire consequences for some, with the prospect of industry-wide contraction and increased cost-bases to all but run those on the periphery out of business or into government ownership. However, with such struggle comes an opportunity for the industry, at a collective level, to innovate and better design itself to reflect the true nature of demand and global need for air-travel.

Naturally, such a task requires a willingness to adopt new age thinking (King and Baatartogtokh, 2015) and to deploy disruptive technology (Adner, 2002), so to stimulate a recovery that is equally capable of fostering an industry that generates improved returns, greater than the weighted average cost of capital (as achieved pre-COVID-19), whilst simultaneously reducing its environmental footprint in a meaningful way. In turn, one of the most pressing tasks that the industry must address is predicting when and where the first significant levels of demand will re-emerge, post the international travel restrictions of COVID-19. The list of possibilities is as extensive as it remains unclear. However, what does appear evident is the prospect of sustained, reduced demand levels, which in turn poses a second confronting question: What shifts in business models must take place? While Daft and Albers (2015) argue that airline business models converge over time, we aim to show that airlines will benefit from first movers advantage in terms of their product offering and business model in a post-COVID-19 environment.

Of particular interest to this paper is the durability (or lack thereof) of the Hub and Spoke model, on the premise that heavily scaled international feeder networks, as seen in Europe for example, will become impractical, more expensive to operate and face significantly lower Seat Load Factors. Simultaneously, the alternative concept of Point-to-Point travel looks set to become more attractive, with airlines and customers alike being afforded a unique array of advantages provided by direct flights in a post COVID-19 era. The extant literature has largely focused on the disruptive capacity of low-cost long-haul offerings (see for example, Whyte and Lohmann, 2015; Wensveen and Leick, 2009), but we argue that the Hub and Spoke model will become increasingly under threat from full service, point-to-point offerings. Adding to this, the development of aircraft technology also increases the viability of Point-to-Point and by extension, Ultra Long-Haul operations. Whereas Hub and Spoke has historically looked to larger wide-bodies, typified by the four-engine duo of the B747 and A380, trends in aircraft acquisition point to the smaller, more fuel-efficient B787 Dreamliner and A350. With their extended range and lower operational cost-base, these new-age twin-engines inherently promote the practicality of Point-to-Point and ULH flying, thereby opening up the financial viability of longer-thinner routes. To this end, the Point-to-Point side of the business model debate appears to have taken a stronger footing, such that it has not only become as economically and operationally viable as ever before, but that simultaneously, the economies-of-scale and economies-of-density dependent Hub and Spoke model finds itself in a position of unprecedented vulnerability. Pairing that with an inevitable shift in consumer behaviour, in which services favouring health and human factors will become increasingly demanded, it appears a new context is upon aviation, whereby Point-to-Point, ULH services can become an increasingly prominent and scaled feature.

3. Advantages of Ultra Long-Haul services

In the pre-COVID19 era, the development of new ULH services had been fostered by a range of political, economic, social, technological, environmental and legal advantages. In order to reflect the existing advantages provided by Ultra Long-Haul services, which remain relevant to an industry emerging beyond the COVID-19 outbreak, we conducted a PESTLE analysis with the results being illustrated in Table 1 on the following page.

With the airline industry having recorded eleven consecutive years of profitability, largely driven by lower fuel costs (Merkert and Swidan, 2019) and strong economic growth in various parts of the world, a viable foundation for the launch of ULH services has been iteratively developing. To this effect, as the price of jet fuel declined in the recent past, it has historically been met with the launching of new, additional long and ultra-long haul routes, as represented by carriers such as Qantas and Singapore Airlines. Moreover, the development of aircraft types including the 787-9 and A350ULR has enabled carriers to launch new ULH flights with a higher chance of achieving profitability on routes that were previously not commercially viable, having been operated by the comparatively inefficient A340-500 and 777-200LR (Bauer, 2019). With respect to lower fuel cost per available seat mile (ASM) and increasing long-range capabilities, the 787-9 and A350ULR in particular can be considered as the most suitable aircraft for ultra long-range operations between unique city-pairs, with its capacity to afford lower real transport costs. Concerning the economics of new aircraft technology, the 787 for instance can reduce operational costs by 15% on average, thereby creating a context in which longer-thinner routes are increasingly feasible (Maertens, 2019).

From an overall standpoint however, political, economic and technological developments are the three major pillars of the commercial airline industry. With this in mind, recent developments in the pre-
COVID-19 era have shown more carriers becoming open to bypassing major hubs, thereby moving away from what can be recognised as more traditional route and network architecture. In turn, airlines have gone about connecting highly profitable city-pairs that often share strong “political, social and economic ties”, as well as having “premium demand in both directions”, however were otherwise regarded as secondary markets (Bloch, 2020). In turn, this has afforded passengers with the option of flying non-stop to more final destinations, thereby eliminating the need to transfer at a hub airport. With this in mind, we carried out an analysis on the passenger density at hub airport terminals, thereby representing their inherent inability to foster the likes of social distancing rules. Covering the timeframes of pre (Dec-19), during (Mar-20) and a prediction for beyond (Jul-20) the COVID-19 era, Table 2 represents the monthly scheduled international passenger numbers at the Top 20 largest international hub airports, which in turn infers the terminals’ effective passenger density levels. The December 2019 figures portray both total passenger (Pax) in million and international passenger (IPax in million) numbers, which serve to distinguish the airports that also maintain a high share of domestic travellers, such as Bangkok Airport. International passengers per terminal m² figures have predictably suggested that during the global pandemic, air traffic has been severely impacted, which has had the one advantage of helping hub airports facilitate the recommended 1.5m of physical distancing between passengers. This has been further achieved through the optimisation of terminal design and passenger flows. However, the figures also identify for several hub airports that have faced a high level of passenger density prior to the Coronavirus, of which might again become a challenge as soon as July 2020, according to passenger demand forecasts and scheduled air services for that period. As illustrated in Table 2, this can be especially associated with the likes of London Heathrow, Bangkok, Taipei and Hong Kong, as represented on the following page:

Table 2 Indicates that passenger density of hub airport terminals will increase again upon the re-emergence of demand, our interviews with the management of Dubai (DXB), Singapore (SIN) and Frankfurt Airport (FRA), have further revealed that the average transfer passenger will typically encounter a minimum of 5 or 6 ground staff; in addition to the passengers they will be in proximity to. This estimate is based on the average transfer passenger going through the following processes at the connection hub:
4. Potential limitations of Ultra Long-Haul services

As with any business model, there are some risks and potential pitfalls associated with ULH services that warrant discussion. In terms of the extant literature, there is a broad stream of sources focused on low-cost long-haul operations (e.g. Francis et al., 2007; Whyte and Lohmann, 2015), of which can be used to partially address ULH operations. For one, low-cost long-haul operations have been said to be more exposed to fluctuations in jet fuel prices due to the long segments, whilst concurrently attributing a relatively high percentage of its overall operating costs to fuel (Soyk et al., 2017), thereby posing a threat to operations in the event of an oil price spike. Moreover, the operation is suggested to have potential revenue generation risks, of which are mainly linked to the operations’ reliance on ancillary revenues. Interestingly however, Soyk et al. (2018) revealed for North Atlantic low-cost long-haul segments, no revenue disadvantage could be found at all for LCCs when compared to FSNCs operating the same routes. Finally, the extant literature reflected upon the poor financial performance of Norwegian Air Shuttle, of which has proven to be a popular case (e.g. Renold et al., 2019) in representing the economic and logistical challenges of operating low-cost long-haul. While this evidence is useful, it is limited to LCCs and long-haul operations, whereas the focus of this paper is rather on full service, ULH operations.

In that context and as mentioned above, Singapore Airways’ ULH service connecting Singapore-New York (Newark) from 2004 until 2013,

Table 2
Passenger density in terminals of the top 20 international hub airports

| IATA code | Dec-19 Pax (m) | Pax/m2 | Dec-19 Pax (m) | Pax/m2 | Mar-20 Pax (m) | Pax/m2 | Jun-20 Pax (m) | Pax/m2 | Jul-20 Pax (m) | Pax/m2 |
|-----------|----------------|--------|----------------|--------|---------------|--------|---------------|--------|---------------|--------|
| DXB       | 10.91          | 5.53   | 10.91          | 5.53   | 6.64          | 3.37   | 1.35          | 0.68   | 6.75          | 3.42   |
| LHR       | 9.40           | 17.23  | 8.82           | 14.77  | 6.23          | 10.42  | 1.09          | 1.82   | 7.33          | 12.27  |
| SIN       | 8.45           | 6.62   | 8.45           | 6.62   | 3.91          | 3.07   | 1.54          | 1.20   | 6.15          | 4.82   |
| ICN       | 8.31           | 9.51   | 8.31           | 9.51   | 2.55          | 2.92   | 1.48          | 1.69   | 6.53          | 7.48   |
| HKG       | 8.05           | 11.33  | 8.05           | 11.33  | 1.55          | 2.18   | 0.48          | 0.68   | 6.24          | 8.79   |
| CDG       | 7.97           | 5.60   | 7.32           | 5.14   | 4.94          | 3.47   | 0.87          | 0.61   | 6.72          | 4.72   |
| AMS       | 7.17           | 11.03  | 7.15           | 11.00  | 5.41          | 8.33   | 1.17          | 1.80   | 6.50          | 10.01  |
| BKK       | 8.27           | 14.68  | 6.75           | 11.99  | 3.31          | 5.89   | 0.61          | 1.08   | 5.41          | 9.61   |
| FRA       | 7.33           | 5.64   | 6.41           | 4.93   | 3.95          | 3.04   | 0.76          | 0.59   | 6.32          | 4.87   |
| IST       | 7.63           | 5.30   | 6.00           | 4.17   | 3.29          | 2.28   | 0.84          | 0.59   | 5.41          | 3.76   |
| TPE       | 5.80           | 15.37  | 5.80           | 15.37  | 2.37          | 6.27   | 0.75          | 1.99   | 4.54          | 12.03  |
| KUL       | 8.05           | 14.23  | 5.80           | 10.25  | 3.05          | 5.39   | 0.36          | 0.63   | 3.48          | 6.16   |
| DOH       | 5.35           | 8.92   | 5.35           | 8.92   | 3.86          | 6.44   | 0.79          | 1.31   | 4.54          | 7.57   |
| MAD       | 6.66           | 5.42   | 4.86           | 3.96   | 2.99          | 2.43   | 0.55          | 0.45   | 4.08          | 3.31   |
| PVG       | 8.73           | 11.44  | 4.56           | 5.97   | 1.06          | 1.39   | 0.57          | 0.74   | 3.53          | 4.63   |
| KUL       | 5.27           | 5.73   | 4.36           | 4.74   | 2.47          | 2.69   | 0.59          | 0.65   | 3.08          | 3.34   |
| LGW       | 4.44           | 17.23  | 4.20           | 16.29  | 3.24          | 12.58  | 1.28          | 4.95   | 4.35          | 16.86  |
| MUC       | 5.29           | 16.34  | 4.03           | 12.44  | 2.41          | 7.44   | 0.22          | 0.67   | 4.13          | 12.76  |
| JFK       | 7.05           | 12.66  | 3.96           | 7.11   | 2.74          | 4.93   | 0.36          | 0.64   | 3.46          | 6.21   |
| BKN       | 5.16           | 7.66   | 3.67           | 5.46   | 2.27          | 3.38   | 0.62          | 0.92   | 3.61          | 5.36   |

Source: Scheduled passenger data from CAPA/DAG; terminal size data from airports or port authorities themselves.

1) Passenger leaves the aircraft and passes an airport or gate agent
2) Passenger passes through a set of security and checks, in order to clear connections
3) Passenger then passes through security and baggage checks
4) Passenger is airside and explores various retail, food and beverage options
5) Passenger boards the aircraft, with airport and or gate agents in proximity

In turn, it can be suggested that by choosing to forego a connection at a busy hub airport, a passenger is selecting the relative safest option, especially with respect to contracting COVID-19. To this end, the notion of ULH networks provides a major health advantage. In recent response, Etihad and Emirates have respectively decided to operate ‘direct itineraries’ from Sydney and Melbourne to London, such that their aircraft would only stop in Dubai or Abu Dhabi for refuelling. As such, this mitigates the risks that come with the territory of passengers needing to disembark at their respective hub airports, but it also further heightens the value of the direct ULH service, such that those ‘connecting’ via DXB or AUH would be forced to remain on-board; thereby not benefiting from the ability to ‘stretch their legs’ at a midway point.

In terms of physical distancing, ULH premium services offer another key advantage in terms of its economic and on-board dynamics. As such, the industry has recently seen the idea of removing both the middle seat, and every second row, raised as a method of combatting COVID-19 the industry has recently seen the idea of removing both the middle seat, and every second row, raised as a method of combatting COVID-19. With this in mind, several airlines have recently attributing a relatively high percentage of its overall operating costs to fuel (Soyk et al., 2017), thereby mitigating the risks that come with the territory of passengers needing to disembark at their respective hub airports, but it also further heightens the value of the direct ULH service, such that those ‘connecting’ via DXB or AUH would be forced to remain on-board; thereby not benefiting from the ability to ‘stretch their legs’ at a midway point.

4. Potential limitations of Ultra Long-Haul services
was ceased as it was deemed to be commercially unsuccessful (Waldron, 2015). Significantly, a large contributor to the downfall of the operation was the jet fuel price, but it is worth mentioning that the service re-emerged as Singapore’s SQ21/22 service in 2018 (for details on this and the strategic deployment of the Airbus A350-900XWB aircraft see Baxter and Srisaeng (2018)). What is more, we believe that the low-cost long-haul “dual model integration” approach (Douglas, 2010) or alternatively, airline-within-an-airline approach (Merkert and Pearson, 2014), would be very useful in the context of a full service ULH operation. As such, the ULH service business model and its operations could co-exist under a holding model of a full-service carrier and thereby complement a regional, domestic and potentially LCC portfolio network. The economic risk and commercial viability of the standalone ULH services could thereby be managed more effectively, as it would not only act as a risk sharing exercise, but also a network feeding and cross-branding activity.

In addition to economic pitfalls, the potential health risks of ULH services not only in regard to passengers, but also with respect to crew and pilots, has been debated at length in the extant literature. At this stage, it is worth pointing out that health considerations related to the inflight experience are not specific to ULH services, and have been researched for a long period of time, of which more recently has been heightened by the COVID-19 outbreak (e.g. Grout and Speakman, 2020). As a result of this, there are not only established in-flight hygiene protocols that the airlines need to adhere to, but also there has become a heightened need to showcase a focus and awareness for the needs of public; adapting to their evolving prioritisations throughout the COVID-19 era. In the context of ULH services, survey evidence has shown that failure to sleep, dehydration, hunger, lack of movement and queuing for toilets are the most pressing factors potentially affecting passengers’ wellbeing and health whilst on-board (Zhang and Jiang, 2019). Airlines and aircraft manufacturers will find this evidence useful as they will be able to design their aircraft cabins accordingly, whilst equally being able to afford education and preparation advice for passengers prior to their journey.

Medical research has further shown that sleepiness and fatigue pose not just a potential health issue for passengers, but perhaps more importantly, for pilots on long-haul flights (Holmes et al., 2012; Gander et al., 2013). To this end, perceived crew wellbeing and workloads have been considered in the extant literature (van den Berg et al., 2019), of which are actively used in enterprise bargaining agreement negotiations around ULH services (based on interviews we had with Qantas), as well as in monitoring and mitigation strategies of airlines (Signal et al., 2014). This means that potential health issues can be overcome, of which was confirmed to us in an interview with staff from the University of Sydney’s Charles Perkins Centre, of who were leading the health and safety research investigation for Qantas ULH test flights from SYD to LHR and JFK. As such, they equally made mention of the fact that new age aircraft technology would also prove to be crucial in the eventual success of ULH operations, such that they had the genuine ability to reduce the effects of jetlag, fatigue and dehydration.

5. Ultra Long-Haul markets post COVID-19

Ultra long-haul operators like Qantas position themselves in the premium market segment by commanding a higher fare for the direct
flight (Bauer, 2019). To compensate for this price premium, Qantas have offered added value relative to its competitors on its Perth to London route through an array of unique benefits, spanning across both hard and soft product features (Bloch, 2020). With this in mind, the fundamental objective of ULH carriers is to pitch a better bid for customers’ business by offering perceptibly more customer value to a set of targeted customer segments. In this case, the feasibility of premium pricing is influenced by competition, customer perception of value, economic conditions and the dynamics between the relevant city pairs. Also important to consider is the existing demand for direct services, the access to efficient aircraft (Boeing 787-9 and Airbus A350-900ULR), and the nature of bilateral agreements between countries, exchange rates, oil price developments, industry consolidation and joint-venture partnerships, increasing economic activity between countries, as well as geopolitical tension (e.g. US-China). By taking the last point into account, the worsening of the US-China relations, potentially accelerated by COVID-19, could contrastingly lead to a boost in US-India relations. These developments could stimulate a myriad of new economic activities, which could thereby generate demand for new ULH services between the West Coast of the US and India as shown in the third part of Fig. 1 (e.g. BLR-SFO).

Fig. 1 represents the existing, announced and potential ULH routes for the near future (2021–2023). Significantly, Qantas, American Airlines and Air New Zealand all recently announced new services between a major and secondary city, however, all of these routes have been postponed due to the Coronavirus pandemic. Moreover, based on data collected from PaxSIS, CAPA and OAG, Fig. 1 has specified potential ULH routes that could be viably served by full-service network carriers in the foreseeable future. To this end, the majority of currently unserved ULH routes are between the Asia-Pacific and North America, which is largely driven by its diversified demand among both business and VFR travelers. As such, in the past five years alone, the capacity of the South-East Asia to US market has more than doubled. To date, this market has been dominated by hub carriers such as Cathay Pacific, of which have made use of fifth and sixth freedom traffic rights. To this effect, these carriers have largely offered one-stop itineraries between South East Asia, East Asia, the Indian Subcontinent, via their hub, onward to North America.

Another ULH market of interest is that of Europe to Australia. Logically, London’s Heathrow has long remained the most popular O&D between the two markets, having received more than 1.3 million two-way passengers travelling to and from Australia in 2018/2019 alone (Bauer, 2019). Beyond Heathrow however, the next most frequented markets from Australia currently stand as Paris, Manchester, Frankfurt and Rome, which chronologically round out the top 5. As such, these respective O&Ds all act as potential points of interest for ULH flights out of Australia, especially on the back of the financial and operational success of Qantas’ QF9/10 service from Perth to London. Importantly, with the potential exception of Rome, these markets maintain strong city pair dynamics with the state capitals of Australia, given their diversified levels of business, VFR and leisure connections. In turn, with a scaled domestic feeder system running in and out of Perth, one can viable entertain the notion of the West Australian capital acting as a direct and efficient ULH gateway for Europeans to enter the island-continent. Extending upon this concept, Qantas to-date has driven the commercial success of their London to Perth through its aforementioned feeder network on the Perth end. This provides the airline with a clear competitive advantage, given it can offer international travelers seamless connections to 14 further Australian destinations out of Perth. With this in place, Qantas’ would feel confident in their capacity to stimulate and maintain demand upon the launch of any additional direct services between the major European markets and Perth, of which would hold a combination of point-to-point and connection traffic. Having bypassed otherwise major, congested hubs, passengers on such ULH services would be provided with the most efficient, environmentally friendly and safest passage through to Australia. Importantly however, Qantas, like any airline looking to launch ULH

| Table 3 Scenarios for existing and future ULH services in the post-COVID19 era. |
|---------------------------------------------------------------|
| **Best Case** | **Worst Case** | **Likely Case** |
| - Quick Recovery (V-Shape, 3-6 months) | - Double-Dip Recovery (W-Shape, 12-18 months) | - U-Shape Recovery (6-9 months) |
| - Relaxing policies and ease of travel restrictions and bans (e. g. between Australia and Europe) | - Future remains highly uncertain after being hit by 2nd COVID-19 wave with worse outcomes | - Establishment of air travel bubbles between countries to kickstart travel between countries (e. g. Australia-UK or Australia/New Zealand–US) |
| - Lockdowns and restrictions remain in certain countries for several weeks or months (e. g. in countries along the Kangaroo Route) | - Passenger confidence at lowest level and very slow return of consumer confidence over a longer period | - Quick recovery of consumer confidence and motivation to fly ULH (e.g. VFR travel between Australia and UK) |
| - Business and VFR traffic bounce back quickly on ULHs instead of 2xLhs (e.g. 1-stop journeys) | - Companies maintain strict corporate policies regarding corporate travel activities | - Faster recovery in business and VFR travel, recovery of leisure over a longer period (international travel) |
| - Recovery phase leads to a ‘wave of business travel’ in short-term (recovery of companies/businesses) since meetings via videoconferencing are impractical in these crucial periods (e. g. large time zone differences between Australia and the UK) | - Replacement of technology (e.g. videoconferencing): A portion of business travel may never return in medium-term (5-8%) | - Increase in demand and higher willingness-to-pay for direct ULH services and domestic feeder services for ULHs (e.g. health-conscious business and VFR travellers) |
| - Increase in demand and higher willingness-to-pay for direct ULH services and domestic feeder services for ULHs (e.g. health-conscious business and VFR travellers) | - Loss of passenger confidence over ULHs in Economy Class due to additional health-related concerns (e.g. DVT, spacing) | - High consumer confidence to fly ULH (premium direct service) |
| - High consumer confidence to fly ULH (premium direct service) | - Increasing operational inflexibility due to implementation of additional health-safety measures at airports/traveler quarantine orders for crew | - Early signs of stabilization in expected spending for flights (e.g. in the UK and Australia) |
| - Early signs of stabilization expected for spending on flights (e.g. in the UK and Australia) | - Formal social distancing measures could make ULHs commercially unviable (e.g. blocking middle seats in Economy, Premium Economy and Business Class lead to higher operational costs per seat/passenger) | - Post-COVID19 consolidations and JV partnerships lead to decentralization and higher proportion of point-to-point traffic. feeder traffic mostly centralised in country of origin. |
| - Less availability of cheap air fares from competitors offering 1-stop itineraries (e.g. increase in air fares by up to 25%) | - Ongoing conflict and political tension in post-COVID19 era (e.g. in the Middle East and China-US), which leads to operational disruptions and inflexibility (e.g. diversion and cancellations of routes) | - Jet fuel prices return to pre-COVID-19 level over an prolonged period during the recovery phase, until 2023 (‘synching effect with demand/ capacity) |
| - Reduction in capacity/ frequency of competitors (e.g. PER-LHR market), triggered by COVID-19 | - Rise in jet fuel prices up to US$ 3.27 per Gallon (post-Global Financial Crisis level in 2011), making ULHs commercially unviable (64% of the variable direct operating costs as jet fuel) | - Reduction in capacity and frequency of competitors (e.g. PER-LHR market), triggered by COVID-19 |
| - Jet fuel prices return to pre-COVID-19 level between US$1.86 and US$ 2.25 per Gallon (March 2018-December 2019) | - Ongoing conflict and political tension in post-COVID19 era (e.g. in the Middle East and China-US), which leads to operational disruptions and inflexibility (e.g. diversion and cancellations of routes) | - Premium Class yields hold up better than Economy Class yields in post-COVID19 era (highest marginal returns of all cabin classes) |
| - Premium Class yields hold up better than Economy Class yields in post-COVID19 era (highest marginal returns of all cabin classes) | - U-Shape Recovery (6-9 months) | - Establishment of air travel bubbles between countries to kickstart travel between countries (e.g. Australia-UK or Australia/New Zealand–US) |

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operations, would need to consider the implications of the foreign airports they would be serving. For example, Frankfurt acts a large hub for the German flag carrier, Lufthansa, of who is a member of the Star Alliance. In turn, Qantas, a one-world member, would have access to little or no feeder services, thereby relying on either strong final-destination traffic to Frankfurt, or the signing of new codeshare or interlining agreements for connections out of the German hub. Crucially, signing such agreements with airlines from other alliances lead to heightened levels of complexity for a single route, thereby increasing operational costs (estimated at 0.06 US cents/ASM) and inflexibility (Bauer, 2019). However, with the ever-changing network and alliance landscape, which includes a heightened level of cross-alliance collaboration, there could be an increasing potential for previously non-viable routes, such as Perth to Frankfurt, to come to fruition in the post-COVID19 era. Moreover, with Qantas’ plans to directly connect Sydney with London and New York, publicly recognised as Project Sunrise, having been postponed due to the implications of the COVID-19 outbreak, the potential for further ULH services out of Perth could become increasingly attractive for the airline. In turn, with the ongoing pandemic having caused such levels of uncertainty, we have conducted a scenario planning analysis for existing and future ULH services in the post-COVID19 era and the results are illustrated in Table 3.

Considering the key market characteristics and dynamics of previous crises, new market and strategic opportunities for ULHs could arise from the current COVID-19 crisis. Driven by the faster recovery of business and VFR traffic in the post-crisis era, an increase in demand for direct ULH services, which includes domestic feeder services, could lead to the launch of additional frequencies between cities (e.g. double-daily service between Perth-London) or new ULH-thin routes between major and secondary cities (e.g. South East Asia/Indian Subcontinent - US/Canada). The fast-changing behavior of health-conscious customers could also increase their willingness-to-pay for a higher fare, by up to 30%, if afforded a more efficient and safer option to travel. During the onset and recovery phase after the crisis, the majority of airlines across the globe have and will continue to cut capacity, frequencies or even suspend routes to non-essential markets. Importantly, this reduction in capacity and frequency could lead to another competitive advantage for a point-to-point ULH carrier, given its ability to attract higher SLFs whilst simultaneously commanding a price premium. All in all, it appears that irrespective of the pandemic’s future direction and longevity, ULH services present itself as a resilient and reliable option in a time of overall uncertainty and global health risks.

6. Conclusion

Significantly, the key selling points of Ultra Long-Haul aviation projects appear to not only maintain the characteristics necessary to survive the COVID-19 era, but to become increasingly attractive as the industry attempts to return to some new form of normalcy. To this end, whereas ULH may have previously been steadily growing in popularity prior to the onset of the pandemic, there is now strong reason and evidence to believe that the implications of the Coronavirus will accelerate the acceptance and use of the point-to-point, ULH approach. Building upon this idea, it is relevant to note that the COVID-19 crisis, perhaps ironically, provided a foundation for airlines around the world to test out their operational and logistical capacity to deliver ULH services. As such, a myriad of carriers conducted a range of special repatriation and cargo flights, of which comfortably fell into the Ultra Long-Haul bracket. This included, but was not limited to the likes of, EL Al, SWISS Airlines, and Air Tahiti Nui, of whom each conducted record breaking ULH flights. Importantly, these ULH flights provided both airlines and governments alike with the ability to deliver people back to their countries’ origin and maintain vital global supply lines, all in a safe and direct manner given the operations’ ability to bypass otherwise risky or infected stopover points. In turn, due to the numerous new ULH operations having been conducted throughout the COVID-19 outbreak, more airlines than ever before have obtained otherwise inaccessible sets of data on the nature of such services. As a direct result, this might spark even further interest in ULH operations from airlines who now recognise both the value in, and their ability to, deliver such services in a more scaled and commercial context.

We have also recognised the literature that has identified potential wellbeing and health risks related to ULH services for both passengers (jetlag, dehydration, lack of movement etc.) and crew (fatigue, sleepiness, workload etc.). More recent literature has, however, identified mitigations strategies, as well as aircraft manufacturer recommendations, for aircraft cabin design and airline strategies for educating and preparing passengers for such flights. Recent research for Qantas LHR-SYD and SYD-JFK flights have further shown that the health and wellbeing effects are controllable and overall, we feel that the potential health risks will be outweighed by the health and safety advantages of ULH services being able to directly connect two COVID-19 safe countries; thereby bypassing crowded and potentially infected international hubs.

To this effect, another implication of the increased use and popularity of Ultra Long-Haul is the potential emergence of ULH-specific hubs and gateways at otherwise secondary airports. Among an array of potential locations, Perth Airport acts as a primary candidate to become such an ULH hub, given its relative proximity to Europe in comparison to that of the major cities on the East Coast of Australia. Resultantly, the West Australian capital’s airport could look to position itself as Australia’s primary gateway for Europeans, offering direct services into Perth, serving both point-to-point and connecting traffic with its access to a scaled feeder system. Commenting on this prospect in a conducted interview, Perth Airport alluded to the likelihood of “non-stop services (gaining) further popularity post COVID-19”, on the premise that “passengers (may be) more) cautious of transiting through countries where the virus outbreak has been severe.” Perth Airport further elaborated by suggesting that “advances in aircraft technology (opened) up opportunities for Perth”, such that the airport was “perfectly positioned geographically to be the Western gateway to Australia,” especially for “European traffic”, as well as “South-East Asia, Africa and India.” To this end, Perth remains just one of several potential new ULH hubs that could emerge in a post COVID-19 era, with airports now increasingly open to new and innovative approaches that could help to attract additional airline supply and customer demand.

Overall, with ‘optimisation over scale’ set to become the gold standard for aviation, airline business models will be forced to adjust accordingly to the new-normal. Simultaneously, with the technological capacity in place, a sector prepared for disruption and redesign, and an industry body intent on becoming simultaneously more profitable and environmentally friendly, Ultra Long-Haul naturally synergises with the future visions and desires of aviation. While we have shown that higher load factors and yields would make the ULH business model more commercially viable than both traditional Hub and Spoke and LCC operations, we have also presented a series of health benefits that come with ULH services, which is crucial to the COVID-19 lens that we deployed for the analysis in this paper. Not only would ULH passengers be able to bypass busy international hubs, within which physical distancing may become an issue once traffic builds up again, but also onboard an ULH service whereby distancing is easier to implement given the aircrafts’ lower configuration levels. Finally, such operations would be more flexible in terms of being deployed on alternative routes should COVID-19 outbreaks restrict certain origins or destinations again, which we foresee as potentially being a part of the new normal. In terms of further research, an interesting avenue may be to extend upon Chang et al.’s (2017) work on long-haul network planning, by developing an ULH destination selection model that can be adapted with the changing COVID-19 environment. To this end, such further research and attention toward Ultra Long-Haul operations appears appropriate given its apparent prospect to both thrive and accelerate in a post COVID-19 era.
Author statement

Throughout the planning, research, writing, and editing processes, Mr. Linus Benjamin Bauer, Mr. Daniel Bloch and Dr. Rico Merkert each equally contributed to the ultimate development of the submitted paper. To this end, all parties were involved in each sequential step of the paper’s completion.

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