



European airline response to the COVID-19 pandemic – Contraction, consolidation and future considerations for airline business and management

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ARTICLE INFO

Keywords:

Airlines
COVID
Demand
Business responses
Europe

ABSTRACT

The COVID-19 pandemic and the resulting travel restrictions and fall in consumer demand led to a dramatic and unprecedented reduction in passenger flights across Europe. As borders closed, national Governments advised against all but essential travel and passenger demand disappeared, European airlines were forced to quickly respond to the downturn and impose unprecedented cost saving measures to protect their business. The aim of this paper is to examine the ways in which major European passenger airlines responded to the height of the COVID-19 crisis in the period March – May 2020. Using data from Eurocontrol, the European network manager, the paper identifies the responses individual airline operators and parent companies took to contract and consolidate their operations. The findings show that changes to flight operations, rationalising the fleet, reducing staff numbers, and reconfiguring their networks and capacity were the most common responses. The paper concludes by discussing future considerations for airline business and management as European carriers seek to restructure their operations and adapt to a new post-COVID reality.

1. Introduction

On March 15th 2020, in response to the sudden downturn in passenger demand which accompanied the rapid spread of the Coronavirus pandemic across Europe, LOT Polish Airlines suspended its scheduled international and domestic passenger flying programme with immediate effect. The following day, CSA Czech Airlines and Montenegro Airlines similarly suspended their operations. By the end of the month, 18 European-registered airlines had suspended all of their passenger services. Across the continent, no airline was immune from the pandemic's impact. Of the carriers that remained operational, capacity reductions of up to 99% compared with equivalent weeks in 2019 and mass aircraft groundings were recorded (Eurocontrol, 2020). As the global public health crisis deepened and individual European countries introduced national lockdowns and closed their borders to citizens of foreign States, airports across the continent scaled back their passenger operations (and in some cases temporarily closed to commercial traffic) and many became temporary parking lots for grounded aircraft (Adrienne, Budd, & Ison, 2020).

In Europe, as elsewhere, airlines responded to the sudden drop in demand and concurrent reduction in revenues by seeking to avoid

direct operating costs and reducing as many of their indirect operating costs as possible in order to preserve cash. As well as grounding aircraft, many operators lobbied national Governments for financial support, placed staff on furlough or made them redundant and sought to rationalise their network by withdrawing operations from certain airports and cutting routes. However, the ways in which airlines responded to the crisis varied. Some merely suspended normal operations while others sought to actively divest themselves of expensive aircraft, staff and other assets and dramatically reconfigure their network offer. The speed with which some carriers sought to introduce or accelerate restructuring or 'right sizing' measures led to accusations of opportunism from certain quarters and a further deterioration in what were often already strained industrial relations (Paton, 2020). The parlous financial state of some carriers prior to the pandemic as well as their institutional size, inertia and contracts with staff, suppliers, lessors and airports meant that the range of short-term actions airlines could take was limited. The aim of this paper is to investigate the range of short-term responses that were enacted by European carriers in response to COVID-19 and consider their implications for future airline business and management.

In order to address this aim, and following this brief introduction,

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<https://doi.org/10.1016/j.rtbm.2020.100578>

Received 29 June 2020; Received in revised form 29 September 2020; Accepted 29 September 2020

Available online 03 October 2020

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the paper is structured as follows. Section 2 reviews the extant literature on airline responses to disruptive events. The empirical data, based on the responses of 40 European-registered airlines and parent companies at the height of the initial COVID-19 pandemic in spring 2020 is presented in section 3. The findings are discussed in Section 4 before the implications for future airline business and management are considered by way of conclusion in Section 5.

2. Literature review – airlines and disruptive events

Commercial air transport is, by its very nature, a derived demand. Passengers and goods fly around the world not because the journey itself is desired but because there is a compelling need for them to be somewhere else and air travel provides the means for them to move between geographically distant places safely, quickly and cost-effectively at agreed standards of service. However, since the inception of scheduled commercial flights in 1914, the global air transport sector has been vulnerable to a range of disruptive events. In the early days of passenger services, flights could only occur during daylight hours and in fair weather conditions. Strong winds, poor visibility and convective weather (including thunderstorms) would routinely disrupt timetables and lead to unscheduled or precautionary landings while technical problems with aircraft and internal administrative issues also resulted in frequent schedule perturbation (Budd, 2011).

During the 20th century, progressive technological advances in aircraft design and propulsion combined with innovations in communication, navigation and surveillance (CNS) technologies enabled aircraft to fly further, faster, longer and higher and overcome many of the potentially-disruptive effects of adverse weather. However, as individual aircraft's vulnerability to weather-related disruption decreased, the global air transport system grew in scale and complexity and it became increasingly vulnerable to other external events that were beyond its sphere of influence or control. These disruptive events vary in scale, severity and duration from localised effects resulting from road traffic accidents on airport approach roads to system-wide disruption caused by IT failures or the sudden introduction of new security protocols or mandatory quarantine measures.

The complex and interconnected nature of contemporary airline networks means that any disruptive event, irrespective of cause, has the potential to propagate and result in system-wide impacts and network disintegration (Sun & Wandelt, 2018). Airlines address such vulnerabilities using a range of proactive and reactive disruption management techniques. The main objective of these interventions is to anticipate or react to the impact of disruptive events and avoid (or reduce as far as possible) the impacts of schedule perturbations on flight operations (Wu, 2010). The deployment of schedule recovery techniques depends on both the nature and the likely duration of the schedule disruption. In every case, the primary objectives are to minimise additional costs to the airline and mitigate passenger inconvenience and dissatisfaction.

Over the last two decades changing international geopolitical relations, the introduction of new security protocols (BBC News, 2017), volcanic eruptions (Budd, Griggs, Howarth, & Ison, 2011), 'natural' disasters (including monsoons, floods and earthquakes) (BBC News, 2019), fuel price rises and in/security of fuel supplies (IATA, 2019), terrorist attacks (Blalock, Kadiyali, & Simon, 2007), security threats in host tourist nations (BBC News, 2015), IT failures (BBC News, 2020), air traffic control delays and, most pertinently in light of the 2020 Coronavirus pandemic, the global transmission of infectious disease (see Warren, Bell, & Budd, 2010) have all resulted in disruption to the global airline network. Such external events have the potential to cause delays and inconvenience to passengers, lead to financial losses for carriers (see Sun & Wandelt, 2018), create reputational damage to airports and airlines and place additional cost pressures on operators. In extreme cases, disruptive events may result in airlines entering bankruptcy or insolvency protection or ceasing to operate.

In the context of the COVID-19 pandemic, the potential for aircraft

and airline passengers to act as vectors of human infectious diseases was first recognised in the late 1920s when long-distance flights began to be operated between Europe and destinations in Africa, the Middle East, and India. In response to the identification of this new threat to national biosecurity, a range of sanitary interventions, including Port Health screening of passengers, aircraft disinsection (the eradication of live insects using chemical sprays) and mandatory traveller inoculations against infectious diseases including yellow fever and typhus, were introduced to try and safeguard both individual passengers and global public health (see Budd, Bell, & Brown, 2009). Between the turn of the millennium and the outbreak of the novel Coronavirus in 2019, at least four major outbreaks of infectious disease (SARS, H1N1 and H1N5 influenzas and Ebola) had impacted on the commercial aviation sector (see Bowen & Laroe, 2006; Mangili & Gendreau, 2005). Crucially, the key differences between these outbreaks and the COVID-19 pandemic are that the earlier outbreaks were shorter in duration, relatively localised (as opposed to global) in extent and less epidemiologically severe in that they exhibited lower rates of in-community transmission and asymptomatic infection. Moreover, although SARS, influenza and Ebola were disruptive in the short-term, they did not lead to wide-spread, enduring or dynamic international travel restrictions, border closures, national 'lockdowns', or changing requirements regarding passenger quarantine, or have a lasting impact on passenger confidence or consumer willingness to fly. In contrast, it has been postulated that passenger demand for air travel following COVID may not rebound to pre-pandemic levels until 2023 at the earliest (IATA, 2020).

Given the potential for air services to be disrupted by a multitude of internal factors and external events, airlines must plan for a host of eventualities to ensure, as far as possible, business continuity and the safe and timely resumption of regular operations once the critical event has passed. Business resilience, scenario planning and the provision of regular desktop and practical disruption management exercises have become integral to airline planning and operations and a range of proactive and reactive disruption management techniques are deployed to manage irregular situations and address airline schedule perturbation (see Kohl, Larsen, Larsen, Ross, & Tiourine, 2007; Wu, 2010; Wu & Maher, 2020). However, most extant studies (for example Clausen, Larsen, Larsen, & Rezanova, 2010) have examined the utility of complex schedule recovery algorithms or have provided case study examinations of an individual airline's responses to disruption and have not considered the combined effects of multiple airlines' short-term reactions on the air transport system.

Existing research has shown that airline operators respond to external shocks, which temporarily suppress passenger demand or result in the introduction of new protocols, by concentrating on routes which can be operated safely and which exhibit the greatest demand and highest yields. Marginal or unprofitable routes are quickly withdrawn. As a result, carriers may be forced to temporarily suspend certain types of operation and/or ground aircraft. After the 9/11 terrorist attacks and the 2008/09 financial crisis, for example, airlines responded to reduced consumer demand and the resulting overcapacity by temporarily grounding aircraft and suspending services. As well as immediately impacting on operations, disruptive events and associated downward pressures on costs invariably impact on labour as airline operators seek to reduce the size of their workforce and/or renegotiate existing terms and conditions of employment (Harvey & Turnbull, 2015, 2020). In the medium-to-longer-term, aircraft leases, fuel hedging contracts and airport charges may also become potential targets for renegotiation (see Francis, Humphreys, & Ison, 2004; Graham, 2020; Kelly, 2020).

The extent and duration of the COVID-19 global public health emergency has tested even the most robust and comprehensive contingency plans and caused an unprecedented cash-flow and cost crisis for airlines worldwide. Some carriers (including Colombia's Avianca) entered administration as a direct consequence of the pandemic while others have sought to furlough staff, cut costs, divest of disposable assets, and conserve as much liquidity as possible. In June 2020, for

example, it was reported that British Airways, which was reportedly losing £20 million a day in cash (Paton, 2020) and facing a £211 million-a-month wage bill (Osborne, 2020), was seeking to sell items from its multimillion-pound art collection to realise additional capital (Hotten, 2020).

While such cost reforms invariably result in a leaner, more cost-conscious operation they may also lead to reduced passenger choice as services are reconfigured to better match demand. As a consequence, flight operations, fleet, labour and the geographic scope of an airline's network become a key focus of efforts to adjust to a new operating environment and it is these four elements which form the framework for the subsequent analysis.

3. Data

In order to ascertain airlines' immediate responses to COVID-19, 40 airline brands and parent airline groups registered in Europe (which includes the EU, EEA and other States including Ukraine and Turkey) was used as the basis for analysis. Europe is an interesting case for analysis as: its aviation market is relatively mature and liberalised; the network of inter-European services is dense; it features a range of full service, low cost, charter and regional airlines which are predominately owned by private-sector investors; and the continent is characterised by multiple geographically proximate sovereign states, each of which imposed its own travel restrictions, border closures and lockdowns at different times and in different ways in response to the evolving pandemic.

The source data for our analysis were the 'State and Airline Responses to Covid-19' summary documents which were published between 20th March and 5th August 2020 by STATFOR, Eurocontrol's statistics and forecasting unit (see <https://www.eurocontrol.int/publication/summary-state-and-airline-responses-covid-19>). The documents contained two sections – one which listed the responses individual European States had taken in response to COVID-19 (which included the date from which national lockdowns had been introduced or mandatory quarantine measures for overseas arrivals imposed) and a second which listed the responses of 'airlines of interest' to the pandemic. The airline specific data was collated by STATFOR from the official websites and press releases of the airlines concerned as well as from 'reliable airline news websites' including ch-aviation, air journal, and flightglobal (STATFOR, 2020, personal communication).

The Eurocontrol data was selected based on its veracity and credibility – as the network manager for Europe, Eurocontrol data and statistics are utilised by a wide range of international aviation and political stakeholders. However, to ensure that our dataset was as complete and as comprehensive as possible, the authors triangulated the Eurocontrol data with additional web searches of official airline press releases and national newspaper reports of publicly-announced changes to these airlines' flight operations. Given the dynamic and evolving situation with respect to COVID, the data on both State and airline responses changed on a daily basis and in order to gain an insight into European airlines' responses, it was necessary to select one date as the basis for analysis. Although only representing a single snapshot in time, the situation on 29th May 2020 was purposively selected for analysis as it corresponded to the height of the pandemic in Europe when large numbers of aircraft were grounded, flights suspended and European borders largely closed to citizens of foreign States. As such, it provides a unique insight into the immediate short-term responses of European carriers to the disruption.

The 40 airlines and parent airline groups, together with details of their principal country/ies of registration and business model (Full Service Carrier (FSC), Low Cost Carrier (LCC), charter or regional airline) appear in Table 1. Collectively, these 40 carriers and parent groups were based in over 20 different countries and accounted for 85.2% of European passenger market share in, 2019 (Eurocontrol, 2020). One characteristic (and potential limitation) of the data was that

Table 1

European airlines and airline groups included in the analysis.

Carrier	Country of registration	Business model
Aer Lingus	Ireland	FSC
Air Dolomiti	Italy	Regional
Air France	France	FSC
Air Malta	Malta	FSC
Air Moldova	Moldova	FSC
Air Serbia	Serbia	FSC
airBaltic	Estonia	FSC
Alitalia	Italy	FSC
Austrian Airlines	Austria	FSC
Blue Air	Romania	LCC
British Airways	UK	FSC
Brussels Airlines	Belgium	FSC
Croatia Airlines	Croatia	FSC
CSA Czech Airlines	Czech Rep	FSC
easyJet	UK/Austria/Switzerland	LCC
Eurowings	Germany	LCC
Finnair	Finland	FSC
HOP!	France	Regional
IAG	UK/Spain/Ireland	FSC
Jet2	UK	LCC/Charter
KLM	Netherlands	FSC
LOT	Poland	FSC
Lufthansa	Germany	FSC
Montenegro Airlines	Montenegro	FSC
Norwegian Airlines	Norway/UK	LCC
Pegasus	Turkey	LCC
Ryanair Group	Ireland	LCC
SAS	Denmark/ Sweden/Norway	FSC
Sunexpress	Turkey	LCC
SWISS	Switzerland	FSC
TAP Air Portugal	Portugal	FSC
Transavia	Netherlands/France	LCC
TUI Airlines	Germany/Belgium/UK	Charter
Turkish Airlines	Turkey	FSC
Ukraine Intl Airlines	Ukraine	FSC
Virgin Atlantic	UK	FSC
Volotea	Spain	LCC
Vueling	Spain	LCC
Widerøe	Norway	Regional
Wizz	Hungary	LCC

the Eurocontrol documents included entries for both parent companies and individual airline brands within them (for example they featured IAG as well as British Airways, Iberia and Aer Lingus). Clearly, this afforded the potential for double counting. However, on reading the documents, it was apparent that the entries for the parent groups concerned the tactical response of the whole company while the entries concerning individual airline brands contained specific details of how the individual carriers within the group were responding.

Of these airlines, 24 were solely or predominately Full Service Carriers. 12 were low cost operators, 3 were regional airlines and one was a multinational charter operator. 13 carriers (see Table 2) were members of a larger European airline group (note that UK-based Virgin Atlantic, although one of a number of airlines under the Virgin brand, is not included here as other airline operators in the Virgin group are not registered in Europe).

16 of the full-service carriers were also members of a global airline alliance. 9 airlines (Lufthansa, SWISS, Austrian Airlines, LOT, Croatia Airlines, SAS, TAP Air Portugal, Turkish Airlines and Brussels Airlines) are part of the STAR alliance. Air France, KLM, Alitalia and CSA Czech Airlines are members of SkyTeam while British Airways, Iberia and Finnair are members of oneworld. The potential significance of this is addressed in section 4.1.

For each airline and parent group listed in Table 1, information concerning the 4 key operational attributes that were identified from the literature review in Section 2 (see Table 3) was sought from the textual data and entered into a spreadsheet to permit further analysis.

Table 2

European airline groups included in the study (airline brands within each group that are not included in this analysis are indicated in *italic font*).

Group	European market share (2019)	Airlines
Lufthansa Group	11.1%	Lufthansa SWISS Austrian Airlines Eurowings Brussels Airlines <i>Germanwings</i> (Note: Germanwings operations were initially suspended and then terminated during the pandemic)
Ryanair Group	8.5%	Ryanair Ryanair UK <i>Lauda</i> <i>Ryanair Poland</i>
International Airlines Group (IAG)	7.3%	British Airways Iberia Aer Lingus Vueling <i>LEVEL</i> <i>LEVEL Europe</i> (Note: it was reported that this carrier will cease trading in summer 2020)
Air France-KLM Group	6%	Air France KLM Transavia (comprising Transavia France and Transavia Netherlands) HOP!

Table 3

The 4 operational attributes that formed the framework for analysis.

1. Impact on flight operations:
<ul style="list-style-type: none"> • If the airline was operational as of 29 May 2020 (i.e. performing any revenue services, whether passengers or freight) and if not, the date from which services had been suspended. • If the airline had received any form of state aid or financial support by 29 May 2020. • Planned date of service restart (if stated).
2. Impact on fleet:
<ul style="list-style-type: none"> • If the airline had made any announcement regarding changes to its fleet, such as aircraft retirements, delivery deferrals or cancellation of new orders.
3. Impact on labour:
<ul style="list-style-type: none"> • If there had been any announcement on changes to labour/workforce, for example with respect to staff furlough, redundancies or proposed changes to terms and conditions of employment (such as reduced hours or pay cuts).
4. Impact on Network and Capacity:
<ul style="list-style-type: none"> • If the airline had made any announcements concerning its future network and capacity (for example, if it was withdrawing services or reducing flight frequencies from particular airports, operating bases or city-pairs in its network).

4. Findings

The findings of the analysis are presented in accordance with the framework described in [Table 3](#).

4.1. Impact on flight operations

Of the 40 airlines and airline groups examined, 32 had completely suspended their operations and only 8 were operating commercial services as of 29 May 2020. The 8 that were operational were doing so at significantly reduced capacity (94% reduction in the case of IAG and 90% reduction in the case of Air France and KLM) and in some cases were only flying domestic routes. Interestingly, the airline responses differed in terms of the duration of any suspension and the network and routes they maintained.

The average duration for which the airlines suspended all flights was 80 days, with the shortest period lasting for 53 days and the longest

101 days (data correct up to 29 May 2020). This represents an unprecedented disruption to European services – by way of comparison, the closure of parts of European airspace following the Icelandic eruption in April 2010 only lasted for 7 complete days during which around 20% of scheduled flights were able to operate ([Budd et al., 2011](#)).

19 of the 32 airlines in the sample which suspended all flight operations did so during a two-week period from 15 to 30 March 2020. The majority of these airlines were smaller FSCs based in countries with limited or no domestic operations that performed mostly inter-European and intercontinental services. Carriers with domestic operations typically only suspended international passenger flights. Some of the domestic connectivity that was retained was performed under the public service obligation (PSO) scheme, which provides publicly-subsidised ‘lifeline’ services to remote communities while the rest were on routes that were required for freight. Consequently, the airline in the dataset that was least affected by the pandemic was Norwegian regional operator Widerøe who continued to fly many of their services between remote and regional airports within Norway.

Of the other carriers that remained operational, Sunexpress of Turkey (which is part owned by Lufthansa and Turkish Airlines) and Eurowings of Germany (a carrier in the Lufthansa group) cancelled all international services but retained some domestic services. Ryanair curtailed the majority of its flying programme in late March and only operated a limited number of services from the Republic of Ireland and the UK. SWISS cut 97% of its flying programme and, between 23 March and 31 May 2020, only flew 7 European services and 1 intercontinental route. During May, Finnair flew only 4 domestic and 10 European routes while TAP Air Portugal operated 4 domestic routes between 1 April and 31 May and (from 1 May 2020) two international services connecting Lisbon to London and Paris. Lufthansa maintained limited domestic passenger connectivity within Germany but increased freight flights to China. Aer Lingus and KLM were among several major operators to reconfigure long-haul passenger aircraft (an A330 and B747-400 s respectively) to import consignments of Personal Protective Equipment (PPE) from China.

Of the 5 airline brands in the Lufthansa Group, only two (Lufthansa and SWISS) did not stop flying. Likewise, within the Air France-KLM Group, some mainline Air France and KLM services were retained but Transavia (France and Netherlands) was temporarily grounded. Global alliance membership appeared to add another dimension to an already complicated picture. All three major global airline alliances maintained

some European connectivity on key routes during March and April 2020 courtesy of one member of the alliance.

Given the low margins and high cost base of airlines, any disruption to operations will have a significant financial impact (c.f. Budd et al., 2011). The inability to generate usual revenue streams while still incurring costs meant that cashflow quickly became critical and a number of airlines lobbied national and regional Governments for financial support. Of the airlines and groups analysed here, 10 (25%) had received (or had been granted) some form of taxpayer-funded support as of 29 May 2020. The nature of the financial intervention varied from renationalisation (Alitalia), to the German Government purchasing a 20% stake in Lufthansa and providing a loan to TUI (Germany), to Government-backed credit facilities. In the case of Air France, the French Government made state aid support conditional on the airline committing to cutting 40% of domestic flights by 2021. In the case of Croatia Airlines, the carrier's planned privatisation was postponed until later in 2020.

A key issue for all airlines was when, and under what conditions, individual countries would relax lockdown restrictions and reopen their borders to international flights and to citizens of foreign States. The national specificity of the border closures and quarantine requirements undoubtedly presented a challenge to the resumption of operations. Some airlines which had suspended or reduced services were optimistic about resuming services in summer 2020. LCC Wizz Air, for example, was one of the earliest to resume limited flights from London Luton in early May. Other airlines took a more conservative approach. As of May 29th 2020, TUI planned to resume flights from the UK from 11 June and resume Belgian operations from 18 June. IAG, meanwhile, was reportedly not planning a 'meaningful' return to service until July 'at the earliest' (Eurocontrol, 2020) while Virgin Atlantic was not intending to resume services until August 2020 following the UK Government's decision to introduce a mandatory 14-day quarantine/self-isolation period for all overseas arrivals (including UK citizens and UK residents) from June 8th 2020.

Given the complexity, the situation with respect to service resumption was dynamic, and shaped by changing rates of infection and individual country responses to reopening their borders and permitting international flights. Agility and flexibility became increasingly important attributes and, as it is time consuming both to place aircraft into parked condition and return them to flying condition (Adrienne et al., 2020), airlines including British Airways and Ryanair retained around one third of their fleet in flying condition to enable a quick resumption of flights should conditions permit. Other carriers, unsure about if and when consumer confidence would rebound, announced a phased return of services, beginning initially with domestic and high-demand routes, albeit at much lower than normal capacities and frequencies. Norwegian, for example, reported that it only intended to operate 3% of its pre-COVID capacity when services resumed in summer 2020 while easyJet planned 40% and IAG planned to fly 45% of capacity in Q3 of 2020.

No airline could have anticipated how the coronavirus situation would evolve or how it would impact on national requirements with respect to border reopening and mandatory quarantine requirements for travellers and when services did resume, changes in national regulations impacted on planned schedules. By September 2020, for example, EasyJet and Ryanair both announced reductions in their flying schedules, with easyJet reporting they done so in response to constantly changing quarantine requirements which had undermined consumer confidence and led to lower than anticipated demand (Kollewe & Topham, 2020).

4.2. Impact on fleet

Given the suspension or dramatic reduction in flight operations, many airlines temporarily grounded some or all of their fleet of aircraft. At the height of the crisis, over 5000 aircraft had been placed into

temporary storage across Europe (Eurocontrol, 2020). The temporary groundings and uncertainty over future demand levels promoted a number of airlines to re-evaluate their current fleets and future aircraft requirements. As of May 29th 2020, 13 of the 40 airlines had announced changes to their fleet size and/or composition. Three types of responses were apparent:

- *Permanent withdrawal from use of particular aircraft.* One response to the pandemic was to phase out (or accelerate existing plans to phase out) the oldest and largest aircraft in their fleet as these are generally the least fuel efficient, the most expensive to maintain and operate, and the types most likely to be scheduled to perform long-distance international services for which there was little demand or travel restrictions prevented their operation. By May 29th 2020, 4 carriers in the dataset had communicated an intention to permanently withdraw certain types of aircraft from their fleet. All of the airlines concerned were flag-carrying FSCs and involved their largest and/or oldest 4-engined jets. Air France, announced plans to accelerate the phase out of its remaining A340 fleet and the immediate retirement of its A380s. Virgin Atlantic stated its intention to withdrawal seven of its B747-400 aircraft while KLM and BA announced the retirement and extended grounding respectively of their remaining B747-400 fleet. Although such decisions eliminate the direct costs of operating these aircraft, returning aircraft to lessors, or selling them on to other operators or parting out (scrapping) specialists, also incurs costs. Indeed, the surplus of redundant airframes entering the second-hand market will depress the residual value of airframes. Lessors also generally require aircraft to be returned to them in an 'as leased' condition and so time consuming and expensive engine swaps may be required to reunite airframes with the engines they were delivered with.
- *Fleet reduction and/or standardisation.* 6 airlines announced plans to reduce or rationalise their aircraft fleet. Alitalia planned to resume services with only 80% of their pre-COVID fleet. Austrian Airlines planned to reduce their total fleet to 60 aircraft by 2022 while Blue Air of Romania sought to halve the number of aircraft they operate. Brussels Airlines reduced their fleet to 38 aircraft while EasyJet reduced its fleet by 14% to 302 aircraft. Lufthansa reduced its fleet by 100. In addition, some carriers that had operated a mixed fleet pre-COVID responded to the crisis by rationalising their fleet around a single type of aircraft. This will have the effect of ultimately reducing maintenance and training costs but may impact on route availability. Riga-based airBaltic, for example, announced plans to accelerate their fleet transformation to become a sole A220 operator in response to the crisis. Any fleet transformation programme is expensive but, by consolidating operations using a single aircraft type, the carriers will be able to access the sort of fleet cost minimisation advantages experienced by low cost operations who typically only fly a certain type or family of aircraft.
- *Deferred delivery of new aircraft.* In light of the pandemic and considerable uncertainty around service resumption dates and future passenger demand, airlines were clearly cautious about accepting additional capacity. 3 airlines were reported to be deferring the delivery of new aircraft. IAG, for example, were reportedly deferring delivery of 68 new aircraft to 2023, Ryanair were postponing delivery of additional 737MAX airframes until 2021 while EasyJet were delaying their fleet expansion plans. The ability to defer new deliveries in this way gives carriers some flexibility in their fleet which allows them to absorb the fall in demand. However, deferring deliveries has cost implications and are not cost neutral solutions. The implications of deferred delivery for the aerospace manufacturing and supply chains also needs to be acknowledged.

4.3. Impact on labour

With so many aircraft grounded and flights suspended, and with

labour constituting a major component of airline costs, it was perhaps inevitable that airlines would seek to further reduce costs by decreasing the size of their workforce. 14 of the 40 airlines in the dataset were reportedly planning reductions in the size of their workforce by anything from 20% to 80% of their pre-COVID levels by May 2020. In the UK, easyJet and British Airways took advantage of the UK Government's furlough scheme, in which the UK Treasury paid 80% of furloughed staff wages up to £2500 a month for a set period of time, and furloughed a reported 7000 and 22,626 staff respectively (Osborne, 2020).

Most carriers referred to a percentage reduction in total workforce, without stipulating the job roles, job families or geographic location of the redundancies while some operators stated absolute numbers. Combined job losses at British Airways, TUI, SAS and Ryanair alone amounted to 28,000 individuals by May 2020. Air Malta announced that 80% of its pilots would be made redundant while all 4200 Brussels' Airlines employees were reportedly 'technically unemployed' for the duration of the carrier's grounding (Eurocontrol, 2020). The most common size of reduction in workforce announced by the European flag carriers was 30%. This figure was also reported by LCCs easyJet and Eurowings and UK FSC Virgin Atlantic. Aer Lingus stated that 20% of jobs would be lost while at Wizz Air the figure was 19%.

Rather than making staff redundant, some airlines chose to change working hours and terms and conditions of employment. The German national carrier Lufthansa announced reduced hours for 77% of its staff while Austrian Airlines imposed short time working for 7000 employees for at least 2 years. Pay cuts also featured in the airlines' responses, with Wizz Air announcing pilot, cabin crew and office staff salaries would be reduced by 14% while senior executive pay would be cut by 22% (Hollinger, 2020). Other Senior Management Teams announced pay cuts or pay freezes and two senior executives reportedly delayed their planned retirements to manage the emergency response.

It is important to note that the dataset only details changes to the employment of staff who are employed directly by the airlines. It does not capture job losses in the supply chain in areas such as aerospace manufacturing, ground handling, airports, and maintenance, repair and overhaul companies where the effects of the crisis are likely to be considerable (see Chapman & Wheatley, 2020). Commercial aeroengine manufacturer Rolls Royce, for example, announced 9000 jobs would be lost (Osborne, 2020).

4.4. Impact on network and capacity

At the time of data capture on 29 May 2020, European borders were still closed and airlines were anticipating a resumption of some services (subject to State agreement) from mid-June 2020. 34 of the 40 airlines reported no immediate changes to the geographic scope of their network post-COVID, although 12 of the 40 announced reductions in the capacity of services. 3 carriers announced plans to close bases – during the data collection period, British Airways and Virgin Atlantic announced they would no longer be serving Gatwick while Ryanair announced (although subsequently reversed) a decision to close Lauda's base in Vienna. All carriers bar one (which announced plans to actively expend its network and offer 40 new routes in the summer of 2020) had no plans in place to expend network coverage or introduce new city-pairs.

Severe capacity reductions (up to 97%), involving large scale fleet downsizing and reduction in flight frequency and the number of destinations served, were also reported. No airline in the dataset stated that it would return to pre-COVID capacity levels immediately. A gradual and phased return, starting with domestic and near-European services plus a limited number of flights to strategically important long-haul destinations (including New York and Hong Kong) appeared to be the preferred approach. Of course, all services are subject to the reopening of borders and resumption of normal operations. The introduction of mandatory quarantine requirements by individual states on passengers

arriving from certain countries, which are often given with relatively little advanced notice, has further complicated the resumption of services.

4.5. Individual airline responses

Interestingly, 40% (16 of the 40) most adopted a combination of the 4 measures. 15 did nothing beyond a temporary suspension of some or all of their passenger services. 9 carriers adopted one of the 4 measures under investigation. 5 airlines adopted 2 of the measures, 8 adopted 3 and 3 adopted all 4. The findings show that there was no 'one size fits all' response and carriers' reactions to the evolving coronavirus situation varied considerably even within the same operational categories. For example, specific national responses in terms of financial support were evident. The operators registered in the EU, for example, are subject to particular regulations concerning State Aid.

5. Conclusion

The immediate impact of the COVID-19 pandemic on European airlines has been unprecedented. Between March and May, airlines across the continent reduced or suspended operations and introduced rapid changes to their operation to reduce costs and protect their business. The pandemic resulted in a sudden and dramatic contraction in terms of fleet size, workforce and network coverage as airlines sought to contract and consolidate their operations. As a consequence, the European airline sector that emerges from the crisis is likely to be very different (at least in the short term) from the one that entered it, with all the concomitant implications this will have for national economies, passengers, tourism, and future aviation sector employment.

The immediate considerations for airline business and management are twofold. Firstly, the findings show that there is a need for international coordination as the national specificity of border closures and quarantine interventions was creating considerable challenges for operators and undermining passenger confidence. Consequently, a European (and preferably global) coordinated response in terms of any new biosecurity requirements or passenger screening measures would be desirable. However, there is evidence of divergence between the European and international response with IATA currently examining the idea of 'immunity passports' for passengers (IATA, 2020) while European airlines and airports trial temperature scans of passengers and the mandatory use of face coverings in flight (EASA, 2020). Even within Europe, individual countries have imposed their own requirements (for example on coronavirus testing at airports or the need to wear face coverings in airports and on-board aircraft).

This leads to the second point – how airlines will reassure passengers that flying is safe and encourage them back into the air. Already, it has been suggested that airlines will cut fares, but this is only a short-term response and with finances already precarious this is not viable in the longer term. Other interventions, such as more rigorous and frequent cleaning of aircraft and customer touch points in airports and on board will almost certainly be required. Temperature checks, face masks, social distancing, one-way systems, screens, hand sanitising stations, and UV (ultra-violet) cleaning of aircraft cabins, security screening trays and search areas have all been suggested as a way of safeguarding travellers and staff (EASA, 2020; McKinnell, 2020). However, any enhanced cleaning regime will impose additional costs and time penalties.

The proposal for greater social distancing on board aircraft by leaving the middle seat in a row of three vacant has been dismissed by some airline operators as being unworkable (see Davies, 2020) and there is unlikely to be sufficient space in airports to practice adequate social distancing. Some airports are already anticipating this challenge, with Manchester Airport in the UK announcing that passengers can pre-book a slot for security screening in advance of travel (Hodgson, 2020). Any intervention, of course, is likely to impose additional capacity, cost

and time implications and likely result in higher fares for passengers.

The management challenges that the COVID pandemic has presented to airlines have been unparalleled in their scale and complexity. Airlines have not only had to manage the operational implications resulting from specific national travel restrictions and border closures, which were continually revised in response to changing infection rates, but also the financial impact on their operation. As European countries begin to emerge from national lockdowns and reopen their borders to international travellers, the management challenges will quickly evolve from the immediate short-term crisis response management to ensuring the longer-term safe resumption of a commercially viable flying programme, the management of the wellbeing, safety and in-flight behaviour of crew and passengers, and the financial health of the airline as a whole. As the findings of this paper have shown, although all airlines faced a similar set of challenges, the range of actions and combination of responses they took to reduce costs and preserve cash during the period March-May 2020 varied significantly and the responses taken by individual operators were not specific to country of origin or business model.

Acknowledgements

The authors would like to thank the two anonymous reviewers for their helpful suggestions and comments on an earlier version of this paper.

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