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Airport business models and the COVID-19 pandemic: An exploration of the UK case study

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ABSTRACT

The COVID-19 pandemic had been a major crisis for the air transport industry due to its global reach, duration, and continuing uncertainty. Demand for air travel fell globally by around 90% in the period immediately following the introduction of lockdown restrictions which induced significant revenue loss for the industry and led to widespread bankruptcies and job losses. Within this extremely challenging business environment, commercially operated airports have struggled.

This paper investigates how airport management has been impacted by this sudden and prolonged fall in the demand for air travel. Specifically, the UK case was studied through the Business Model Canvas, with documentary evidence supplemented with 31 in-depth interviews from the Government, airports, airlines, and other aviation organisations and from a variety of stakeholder roles within airports across the country. Interviewees were asked about how airport business models responded to COVID-19 and how they were likely to change in the future as a consequence.

The findings suggest that COVID-19 encouraged airports to restructure key components in their business models. Fundamentally, airports have significant fixed costs, and it has been especially challenging to run terminals and operations with little or no revenue from conventional channels. The study finds airports were introducing more flexibility into their cost base while diversifying their revenue streams into areas such as developing business parks and enhancing retail portfolios. This is leading to a restructuring of airport business models to improve resilience to future systemic shocks. Overall, 4 future airport business drivers and approaches have emerged: 1) Cost-effectiveness and minimisation, 2) Diversification of revenue streams and intensified commercial activities, 3) Enhanced digitalisation and operational efficiency, and 4) Sustainability focused approach.

1. Introduction and background

International transport systems represent major drivers for infections to spread around the world. From the start of the COVID-19 pandemic, local and international travel restrictions were adopted by governments to stop the spread of the virus (Chinazzi et al., 2020). Consequently, revenue passenger kilometres in the air transport sector globally experienced a 65.9% fall from 2019 to 2020 “by far the sharpest traffic decline in aviation history” (IATA, 2021) in the period immediately following the introduction of the lockdown restrictions which induced significant financial loss for the industry (Graham et al., 2020). Moreover, studies also pointed out the possible long-term negative financial impact of the pandemic on the global air transport market, with no guarantee that airport passenger volumes will quickly bounce back to pre-pandemic levels (Iacus et al., 2020). This also shows the significant long-term financial impact of the pandemic on the air transport industry. According to IATA (2022), the number of international passengers decreased to 27% of the 2019 numbers in 2021; Eurocontrol (2021) presented scenarios in which the positive recovery to 2019 levels could only be achieved in 2023 and the negative case recovery would continue until 2027. Within this extremely challenging business environment, commercially operated airports have struggled.

With respect to air transport, historically the Business Model (BM) concept had been more focused on airlines because of their dynamic nature, whilst airports were typically viewed as having stable business structures and hence were comparatively less interesting to researchers. However, this perspective changed in the 1980s, once factors such as increasing privatisation and the shift in airline BMs such as low-cost

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carrier adaptations triggered fundamental changes in airports and led them to restructure (Graham, 2013; Núñez-Sánchez, 2015; Thelle and Sonne, 2018). Given the centrality of BMs in the development of corporate strategy within the air transport sector, their role during the highly damaging COVID-19 pandemic represents an interesting lens to consider how the sector is adapting in this time of crisis.

The COVID-19 pandemic led to multiple implications for organisations in the air transport industry such as traffic and revenue loss, causing some of them to stop their operations altogether. This led the airport industry, which had grown accustomed to a reasonably stable environment and systems, to experience a highly disruptive occurrence. This situation motivated certain airports to consider the need to restructure their corporate strategies while assessing the impact such a restructuring would have on internal and external factors (Forsyth et al., 2020; Suau-Sanchez et al., 2020). BMs were known for their adaptability and their usage for understanding the main components of enterprise which shape a company’s future strategy (Zott et al., 2011). Overall, it is possible to say that an understanding of the BM drivers for airports can lead to more profitable and sustainable organisations in the long term while creating more resilient businesses in light of demand shocks such as the COVID-19 pandemic. To this end, this research explored the impact of COVID-19 on airports through the lens of the airport business model to understand what has occurred and to develop recommendations as to how airport BMs might evolve as a result.

1.1. The covid pandemic and UK air transport sector– impact and challenges

The lockdown measures in the UK first began in March 2020 and restricted nonessential activity in closed spaces while starting a national lockdown. Previously there were not any restrictions on social life or travel (GOV.UK, 2022b). Consequently, travel, commercial businesses and human contact were severely curtailed. As part of this response to the pandemic, countries followed a closed-borders policy which led to a sudden and severe decline in air travel (Chen et al., 2020; Wilson and Chen, 2020). Fig 1 shows some of the key lockdown stages and air travel restrictions in the UK until they were first relaxed in June, 021.

The air transport industry has been particularly hard hit by the COVID-19 pandemic, especially by the restrictions on international travel (Chinazzi et al., 2020). It has been widely accepted as the most destructive crisis that the air transport industry ever faced (Forsyth et al., 2020; Suau-Sanchez et al., 2020; Hotle and Mumbower, 2021). In particular, following points made COVID-19 different and more damaging than any previous virus outbreak for the air transport industry and airports: 1) being long-lasting – 2 years so far and counting – while the end date remains unknown; 2) the world to experience a much broader economic crisis; 3) the lack of knowledge on COVID-19 and its contamination pathways; 4) each country or region choosing to adapt their own rules and restrictions on social distancing, travel restrictions and quarantine rules; and 5) lack of preparation for a long-lasting, wide-ranging demand shock.

Moreover, previous studies also mentioned that the uncertainty of the COVID-19 pandemic led to diverse forecasting predictions on the recovery (Graham et al., 2020a; Iacus et al., 2020). The uncertainty of traffic returning with minimal notice forced airports to maintain their high-cost operations and staff while the traffic never recovered enough to balance the costs. Additionally, this showed another important issue concerning how the slow reaction to the pandemic might have led to financial losses and operational ineffectiveness at the start of the pandemic in some cases and so might impact finances in long term.

2. Methodology

The “Business Model (BM)” concept frequently used in both academic and industrial research across multiple sectors e.g. medicine (Sabatier et al., 2010) and computing (Rappa, 2004) with each sector having specific characteristics. The definition of the BM term and components continued to develop since the late 1990s (Shafer et al., 2005) while became a popular concept following the new approaches used by online companies and innovative processes in the early 2000s (Doganova and Eyquem-Renault, 2009; Teece, 2010; DaSilva and Trkman, 2014). Even in 2011, Zott et al. (2011) mentioned that there is a lack of an agreed formal definition of what BMs entail. There is an ongoing fuzziness of the phenomenon due to the confusion with other concepts such as strategy and process as it is a relatively new phenomenon and an ongoing research area (Casadesus-Masanell and Ricart, 2010; DaSilva and Trkman, 2014). While no generally agreed structure of BMs is present within the literature, this research utilises the concept as a material that could be used to explore the change in the face of a demand shock and resilience concept for future business models or crises. In this study, a set of broad BM themes are adopted as a starting point covering “a new unit of analysis, offering a systemic perspective on how to ‘do business’, encompassing boundary-spanning activities (performed by a focal firm or others), and focusing on value creation as well as on value capture” (Zott et al., 2011, p.1038).

The BM concept and types in the air transport industry categorised diversely in the literature. Airlines have been mainly explored under the low-cost and full-service models while the concept and divergence of these models are in a constant exploration stage (Urban et al., 2018; Vatankhah et al., 2019; Magdalina and Bouzaima, 2021). On the other hand, airports had been categorised and analysed according to diverse factors. For example, location, traffic type, market structure, ownership, and size were some of these factors (Gillen, 2011; Czerny, 2013; Kalakou and Macário, 2013). However, the literature either considered one of these diverse model categorisations or chose a specific model to explore a certain market, airport BM divergence and adaptations.

Previous studies implemented diverse BM components to explore corporate strategies and provide a suitable base for air transport-related research. Mason and Morrison (2008) explored the divergence of low-cost airline business models by conducting product and organisational analysis to determine the departure points in airline business models (e.g., LCC, ultra-LCC or full-service) and provide a common approach for airline BM analysis. On the other hand, Urban et al. (2018) applied a cluster analysis to observe airline model divergence while Kalakou and Macário (2013) chose to analyse airports with the same model by looking into key business approaches such as commercial offers, aeronautical revenue channels or relationships with commercial partners and passengers. This study also suggested a new BM approach and components. Additionally, Mason and Morrison (2008) mentioned the challenge of determining BM divergences due to the constant changes in the industry environment. Some of these studies supported external factors’ influence on the industry and these factors’ inclusion in the BM analysis. However, it is possible to say that there had been a continuing need to develop a common conceptual BM structure for the air transport industry which this study also aims to explore. Further, this study had a unique opportunity to explore this concept and change as the COVID-19 pandemic conditions forced industries to return to their core BMs. This provided an opportunity to explore the change in each key component while observing managers, policy, stakeholder reactions during a unique and disruptive market environment.

This paper adopted Osterwalder and Pigneur’s (2010, pp. 16–19) BM Canvas (BMC) components to explore how airports adapted their corporate strategies to the COVID-19 pandemic. A qualitative approach chosen for this study, whereby the 9 sub-sections of the BMC (the building blocks in Fig. 2) mapped to a semi-structured interview which was used to engage industry stakeholders. This framework selected as it was a commonly used model to shape and understand the change in an

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1. Note, subsequently there have been several more rounds of restrictions as the pandemic evolved.
organisation as well as industries (Daou et al., 2020; Vidgen et al., 2020). The BMC provided an understanding of the key issues facing a business such as competition and product diversification to assist in future strategic decisions. Furthermore, this paper explored how the COVID-19 pandemic had an impact on each business component while assessing the emerging issue of business continuity during a demand shock.

A study design was implemented in the research, with a focus on the UK air transport sector. Altogether 31 industry-wide in-depth semi-structured online interviews were conducted with participants from airports, trade representatives, cargo and commercial airlines, stakeholders such as ground handling companies, and government and consultants (see Table 1). Airports mentioned in interviews were of different sizes, and ownership types and from different parts of the UK. Therefore, there was a mix of airport types in this research which contributes to the factor of exploring similarities and differences in airport reactions to the pandemic. Participants were recruited using a mix of purposive and snowball sampling. All interviews were conducted using online conferencing software between July 2020 and June 2021.

This work aimed to develop an in-depth understanding of the impact of the COVID-19 pandemic on airport BMs in the UK. The Osterwalder and Pigneur (2010) BMC framework used to frame the interview questions into three groups of nine: 1) providing a view of the industry and airports before the COVID-19 pandemic; 2) considering the main BM components during the pandemic; and 3) investigating the recovery, future challenges, after recovery views for the future BMs.

The interviews were transcribed and then thematically analysed using NVivo software (see Fig. 3) whereby a comparative analysis was conducted using the codes from the main themes to identify possible correlations and relationships that were present (Braun and Clarke 2006; King and Horrocks 2010).

3. Results

The findings were structured under UK airport market drivers and BM approaches. The first heading included the main forces on the industry during the pandemic while the BM heading focused on the changes during and after COVID-19.

3.1. Key UK airport market drivers during the COVID-19 pandemic

The most significant impact factor had been the sudden demand

Fig. 1. UK lockdown timetable, restrictions and air travel (adapted from GOV. UK, 2022a).

Fig. 2. Business Model Canvas Components (Adapted from Osterwalder and Pigneur, 2010, pp.16-19).
shock which was followed by a lack of global passenger traffic for 2 years. In interviews, experts first stated the key problem as empty airline seats and no passengers at airports due to the restrictive travel rules and lack of customer confidence whether these participants were from airports, airlines, or regulatory organisations. As mentioned in the research interviews and pandemic literature, while the demand shock had been the largest factor, other market drivers also played a destructive and supportive part in the market. It was fair to say that the loss of revenue was central, though quite a few secondary challenges also emerged. The attention often went toward the demand shock which meant these secondary challenges get overlooked. Initially, these market drivers had been categorised into 6 key themes as follows: passenger, government, pandemic and infection-related issues, financial situation, stakeholders, and economic environment (see Fig. 4). Therefore, this section explored the key airport business drivers during the pandemic which had been shaped by managerial insights and interviews conducted during the pandemic environment.

Firstly, government decisions and international regulations were crucial drivers for the industry. As one participant mentioned: “... the government is the most important right now because they put the guidelines in place ...” (Airport Chief Officer, P1). The government had been the driver of the changes and restrictions which led airports to adapt their operations to fit the new travel and social distancing rules. Thus, it may be noted that there was a sudden reintroduction of the state directly to a sector which had over its recent history experienced a lightning of regulations.

After this, stakeholders such as trade associations and international industry organisations become an important part of communication during the pandemic. For instance, communicating the industry needs and financial hardships with the government or following new regulations or providing solution-based approaches for airports to implement. Participants pointed out that these organisations had to take an increased active communication and a collaborative role which was different from previous times.

“Governments look at the COVID-19 pandemic as a health crisis; however, it is also an economic crisis. Therefore, airports need to communicate with them [through] trade associations [who are] coordinating the industry and collates the use of industry.” (Airport Chief Officer, P1)

Passengers were another factor that was reshaped by the market conditions and in return influenced airport decisions and operations. Both the demand side, travel behaviour and expectancies significantly changed during the pandemic as studies had shown (Graham et al., 2020; Iacus et al., 2020), which required airports to implement new measures to survive during and after the pandemic. Additionally, interviews revealed further demand-focused drivers such as the sudden and significant drops in passenger numbers, lack of customer confidence, concerns and confusion over changing pandemic rules and potential long-term impacts on travel behaviours (see Fig. 4). Participants from airports emphasised that the concerns over the lack of customer confidence which shaped their strategic approach to problems and

### Table 1

| Role                  | Company     | Role         | Company         |
|-----------------------|-------------|--------------|-----------------|
| Managing Director     | Airport     | Department Head | Aviation Organisation |
| Chief Officer         | Airport     | General Counsel | Regulatory Organisation |
| Director              | Airport     | Senior Manager | Regulatory Organisation |
| Department Head       | Airport     | Department Head | Trade Representative |
| Chief Officer         | Airport     | Director      | Trade Representative |
| Group                 |             |              | Trade Representative |
| Chief Officer         | Airport     | Manager      | Trade Representative |
| Managing Director     | Airport     | Director      | Trade Representative |
| Managing Director     | Airport     | Director      | Trade Representative |
| Department Head       | Airport     | VP           | Airline |
| Managing Director     | Airport     | Chief Officer | Airline |
| Group                 |             |              | Airline |
| Managing Director     | Airport     | Head of Strategy | Stakeholder |
| Expert                | Independent | Senior VP    | Airline |
| Department Head       | Consultancy | VP           | Airline |
| Director              | Consultancy | Senior VP    | Stakeholder |
|                       |             | Head of Strategy | Local Enterprise |

Fig. 3. Research methodology.
solutions during the pandemic.

“The collapsing of international travel had a devastating impact across the industry. Then the next important factor is the loss of passenger confidence…” (Regional Airport Director, P9)

On the other hand, it was notable that the impact of these issues on airports also depended on the type of traffic and passenger. Some studies suggested that regional airports might be more vulnerable to crises and airline exits (Cervinka, 2019). However, during the pandemic, a participant from a regional airport mentioned that having a high domestic traffic percentage positioned them in a relatively better financial condition and provided an advantage in the short term.

“…we are [in a] relatively good condition because of our domestic traffic … the next challenge could be the international traffic as leisure passengers spend more in the Food & Beverage, shops, duty-free etc. Therefore, the lack of international travel is the biggest challenge.” (Regional Airport Director, P9)

From an operational continuity aspect, pandemic-related factors such as epidemiological challenges were raised by the participants. Additionally, participants pointed out the limited experience European market and airports previously had with this level of epidemic or pandemic crisis. Participants mentioned that the operational challenges and the highly volatile market environment had been shaped in part by these unknown factors. For example, lack of knowledge on the modes of transmission and protection techniques, lack of a vaccine at the start, and the subsequent disproportionate vaccine rollouts or new variants were some of these impact factors on travel that have extended the recovery period to the current day (Schlagenhauf et al., 2021).

“No one knew the impact of this virus on people and different theories existed in the beginning. For instance, some said people need to wear a mask, or not to wear a mask as the transmission patterns are different. No one knows the virus and what it does…” (Airport Director, P2)

The market environment could be listed as another force during the pandemic because the short- and long-term forecasting and planning had been driven by the situation in the market. For instance, concerns were raised over the future loss of revenue which might be caused by the economic recession, financial crisis, changing passenger behaviour, staff, and third-party provider challenges during the interviews. Therefore, some of the participants expected air transport to have longer recovery compared to other industries.

“It is complete devastation in terms of the lockdown with nobody travelling. The air transport industry has probably been the first and hardest hit industry and might be the last to recover.” (Airport Manager, P11)

Moreover, when participants were asked about their views on the short- and long-term market conditions after the COVID-19, the majority of participants expected pre-pandemic market drivers to continue while suggested new drivers to be added, or priorities to be changed. For example, previous market drivers such as sustainability or slot allocation issues might continue while capital investment plans underpinned by previously forecasted growth might ease due to low traffic and slow-growing load factors. Additionally, changing passenger behaviour and customer confidence issues had been greatly emphasised as future market challenges due to the COVID-19 impact. Further, new market drivers emerged that were related to sustainable financial growth in the recovery, the importance of resilience and intensified cost control measures as a result of this crisis.

“There is no passenger confidence because of the policies, travel corridors, quarantine etc … Even when a passenger books in advance, there is no guarantee that they can travel.” (Regional Airport Director, P24)

“COVID-19 is part of business resilience, but sustainability is still the underlying issue industry has to face in the long term.” (Air Transport Consultant, P15)

These market factors were being shaped by the new market environment such as the lack of certainty about recovery timelines, forecasting issues, the uncertainty of international, domestic, and business travel demand, infection control measures, potential airline exits, high fuel prices and the possibility of global economic recession. Overall,
there is an agreement that some pre-COVID-19 factors will remain prominent for airports while new factors linked to pandemic-specific issues are now present with heightened importance.

3.2. Airport business models

The UK airport market had different characteristics compared to the situation in other nations. Most importantly, the UK air transport market had been highly liberalised, leading airports to have varying ownership situations in other nations. Most importantly, the UK air transport market models (Graham and Dennis, 2007; Ison et al., 2011). For example, small and remote airports continued to operate under local associations or government rules. While some airports primarily operated to provide public services (post, cargo, health care or emergency), others focused almost entirely on commercial operations and increased their revenue streams dramatically in the past twenty years. The types of airports and their ownership models included in this study had been diverse. Therefore, it could be possible to say that focusing on the UK airport market provided an opportunity to analyze multiple airport BMs. This also enabled the assessment of diverging impacts, key points to adapt resilient models and future implications of the COVID-19 pandemic within a wider context.

“Each airport has distinctive characteristics in the UK … Heathrow is a hub airport with a high volume of connecting passengers … Then there are different-sized regional airports … one might have less than 2 million passengers at the peak whereas another almost reaches 10 million passengers at the peak. Therefore, even regional airports are very distinct. Glasgow is a hub for the charter market which shows the power of the local economy as it is in a populated area with high disposable income … there is another small regional airport which is used majority by residents for short business trips and dominantly leisure …” (P2)

3.2.1. UK airport business models during the COVID-19 pandemic

Overall, interviewees commonly agreed that airports had experienced an unprecedented crisis because the COVID-19 pandemic was unlike any previous experiences with its combination of demand disruption, low traffic volumes, instability in conditions (e.g., travel restrictions) and long recovery time. Thus, the COVID-19 pandemic acted as a motivator that disrupted market conditions and led airports to modify their business structures and operations during the pandemic.

“… industry experienced a currency crisis, Gulf War where many airlines were close to bankruptcy, but this had been worse. The only resolution was to get the cost down as much as possible while keeping the cash and obtain a simple policy …” (Regional Airport Director, P9)

Participants were asked questions about their recovery measures, strategies and plans during the pandemic and after the pandemic. Notably, airports seemed to start with business preservation measures in early pandemic conditions; however, the long-term pandemic conditions and slow recovery led airports to evolve their BMs while considering future innovative model approaches after recovery (see Fig. 5).

“We had business contingency plans for everything but not on this level. We had 9/11 which was a sudden closure, we had snow which no one flew for days or all sorts of disturbances; however, no one had ever seen this before … Everyone had business contingency plans for diversions, stopping for a day, drones as the air transport business had been through multiple challenges … There was also SARS and Ebola but nothing on this scale …” (Airline Manager, P13)

Consequently, participants pointed out that the first reaction to the pandemic had been a short-term solution-based reaction. After the initial period of high uncertainty following the outbreak of COVID-19, it became apparent that airports would need to adapt to a prolonged and highly unstable environment. Amankwa-Amoah (2020) mentioned that companies’ reaction starts with a short-term reaction by conducting organization-based control over operations while the future strategies and reactions are shaped more in the longer term. Some of the initial points and reactions to the pandemic were:

“… we are entering into territory we have never been in before. I do not think anyone would have imagined [the] pandemic to be this prolonged” (Airline Manager, P13)

“… a lot of work had been done to get a common understanding of the measures that should be put in place at an industry and local level. First, it was restarting the business whenever we needed to restart it. Second, the recovery and return to previous business levels. Each scenario requires different assessments.” (P2)

Once it became clear that the pandemic would result in prolonged disruption to air travel, the narrative within the industry shifted to survival-based measures with a focus on the core product, strict cost measures and protecting cash while adjusting to the new health measures and restrictive rules around travel. Lastly, it has been mentioned that this disruptive impact led airports to adapt and even create innovations after the recovery period. For example, accelerated sustainability targets in the calm industry environment, and technological improvement ideas to have a speedy recovery and efficiency could lead to innovative service designs. Furthermore, BM literature pointed out the disruptive effects or evolving power of events and characteristics of an environment on businesses which might lead to the formation of innovative models (Duncan, 1972; Markides, 2006; Doz and Kosonen, 2010). However, this study explored the changes in each business component to provide a comprehensive analysis of the pandemic’s impact and the implications for sector trends.
“The impact on hub operations had been severe while not all of them at the same level or not as severe as airports that rely on point-to-point traffic. For instance, while one large airport had been severely affected another was worse due to its passenger type … also, some regional airports did well due to managing to exploit their cargo connections while the air cargo increasing markedly … and some airports become car parks for planes.” (Regulatory Organisation Director, P25)

Firstly, it is important to highlight that every airport was different. Therefore, it is possible to say there might be multiple types of reactions to the crisis as well as adaptations to BMs as mentioned below:

“The impact will be determined by the specific business mix at each location as each case had been unique. There will be some common themes while there will be different results because of the unique nature of the business proposition. For instance, the possible impact on Manchester compared to Liverpool or Aberdeen.” (Regulatory Organisation Director, P25)

Secondly, certain BM components were similar in airports across the sector and emerged as common themes from the airport management view. For example, the cost minimisation, returning to basic operations, lack of customer confidence, intensifying new health measures and stakeholder relationships could be presented as some of these common themes. In terms of costs, all airports started scrutinising their spending line by line during the COVID-19 pandemic. Additionally, operational adaptations were key to cost-cutting measures. On the other hand, airports struggled to scale back to a skeleton operation given the rigidity of the cost base.

“Running an airport just to keep it open has a high cost as keeping the airport open is 80% of our cost. Therefore, the business works only when there is a certain scale and grows over time … if there are no passengers, this is not only not having growth but not having volume at all. Thus, the airport will be stranded with a large cost.” (Airport Chief Officer, P1)

Furthermore, a conceptual scenario was designed to highlight the change in airport BM components during the COVID-19 pandemic as shown in Fig. 6.2 This design showcased the impact and modifications in the main BM components and presented the links with each other. This model could be extended with 2 new factors (see Fig. 7): impact factors (macro-micro environmental factors) and resilience factors (financial sustainability, resistance, adaptability, and technology). This could further be explored in future studies to determine how these could contribute to shaping resilient airport BM structures. Further, some of these forces identified could lead airports to shape new strategies which could further be explored in future studies to determine how these could contribute to shaping resilient airport BM structures. This led airports to depend on non-aeronautical revenue and focus on safety measures to provide a safe environment and reassure people of the safety of flying.

“The only resolution is to get the cost down as much as possible, cash reserve and a simple policy.” (Regional Airport Director, P9)

It is possible to observe new relationship dynamics between key BM factors in Fig. 6. For example, customer segments (passengers, airlines, and concessions), operations (activity) and finance. According to the participants, these modifications had been done with individual approaches at the start of the pandemic. For example, some airlines requested airports to do fever checks for their passengers even though this was not initially a mandatory regulation (1). However, it has been mentioned that the government started to request new measures such as testing, vaccination proof or quarantine from passengers as the infection rates rapidly increase and lockdowns become stricter.

“We are sharing with the customer through the website that we are open and following Health recommendations in terms of social distancing, cleaning and working with the airlines.” (Small Airport Director, P8)

Following the adoption of these new rules, airports and airlines had to invest in additional measures (2). Airports established new relationships with health clinics to provide onsite COVID-19 testing for international travellers. On the other hand, most of the additional health measures were dependent on an airport’s type of traffic, financial capability, and infrastructure. A large airport manager mentioned the possibility of implementing disinfection scanning devices at the security. However, small airports might not need to invest in these types of high-cost health measures depending on their traffic numbers, terminal space, or airlines’ demand for additional measures. It is important to consider that any additional and high-cost investment during the pandemic might create pressure on airports’ finances.

“We had some breakthroughs such as UV scanners to clean our equipment and escalators … implemented new operating procedures, specifically in high-volume areas such as security. There could be a shift in how we run our airports in the future with the new technologies emerging around cleaning etc.” (Airport Department Head, P28)

“Airports had to spend money on increased cleaning and hygiene measures. For example, the cost of antiseptic gel or increased cleaning with more antiseptic stuff when there is no income.” (Aviation Organisation Director, P17)

Additionally, revenue had been a challenge during the pandemic as most of the activity at the airport stopped after airlines were grounded and could not operate (3). For example, commercial partners required financial support and airports offered discounts and some offered rent-free options at the start of the pandemic. This might be dependent on the airports’ financial capability as most small and medium airports might not support offering free rent as commercial revenue is a large percentage of airport revenues. It is important to point out that if these commercial partners such as retail, food, and beverage shops were to go bankrupt or stopped operating during the pandemic and passenger numbers dropped, then this loss of third-party providers could exacerbate the recovery period for airports.

“… the outsourced contracts (cleaning, maintenance, air traffic services etc.) had to be renegotiated and cannot be terminated as the airport wants to restart with the same partners. Airports have to support their partners to not go bankrupt while finding the balance. Retailers have a minimum annual guarantee and have to pay even if there are no passengers. Thus, airports make exceptions to the contract for them to be there once the business can restart. Then OPEX (operating expenses) and public authority-related payments have to be renegotiated.” (P2)

This led airports to depend on non-aeronautical revenue and focus on survival while preserving cash until the recovery period (4). Following this, new agreements with airlines had to be conducted to support their operations while new opportunities for expanding cargo operations emerged. As cargo demand and volumes increased, cargo airlines took advantage of the available slots and added new operations. However, this opportunity was mostly restricted to airports located on main cargo lines and transport links in the country. These situations regarding the management of existing stakeholders (e.g., retail tenants) and the opportunities for airports to branch out into tangential areas show the crucial role that collaborations had in the air transport industry during the pandemic (5).

“… we work closely with national and international associations and share information and provide input to them and vice versa.” (Trade Representative Director, P17)

“… Associations can help airports to establish and change health standards, passenger checks, and airport procedures. Governments and air

2 Note, numbers represent the actions and relationships explained in the text.
transport associations play a key role in helping and providing recommendations to each airport on these procedures. “(Aviation Expert, P7)

State aid had been another factor impacting the airports’ new relationships. The application of the furlough scheme in the UK provided airports with increased flexibility in terms of their staff cost base. This relieved a source of pressure and provided airports with the opportunity to quickly scale up their operations once restrictions were lifted by reactivating staff. This had been followed by monetary support and postponing debts which had been communicated by the industry organisations to the government.

“The furlough scheme provided by the UK government was very helpful. We could not have been able to retain the employees that we have retained without it.” (P2)

Lastly and most importantly, airports were unable to return to the previous traffic levels for over a year due to the significant traffic drops and the constantly changing flight restrictions. At the same time, airports had high-cost operations, and it was challenging for airports to operate with their fixed cost structure. Airports have generally reacted to this new-normal situation by scaling back activities wherever possible. For instance, any non-essential expenditure had been taken out such as business trips, office purchases, and large construction plans.

“We break down all costs to understand the costs that we can reduce or seek to reduce either in conjunction with our partners or stopping doing things … there is a cost to open an airport whether you have one passenger or one million passengers. Therefore, there is a fixed cost if you are going to operate on all hours.” (Large Airport Manager, P18)

On the other hand, there were factors such as social distancing, restricted operations, testing and quarantine procedures which had been...
a new area for airports (6). Most importantly, there was no certainty on the future of these adaptations: whether these will be temporary or permanently adapted into the previous structure and the best practice to do this.

“The [new] idea is that passengers can arrive 20 min before and get straight to the flight. Airports rely on passengers to spend money; however, this model might not work in the future as people [prefer to] get straight to their destination, avoid multiple touchpoints, and do not want to dwell in the airport now. These changes will largely depend on things such as customer behaviour, vaccine, how long we will be living with the virus, the time we get our rising infection under control or when people will feel confident that the risk is low. These things contribute to shaping the way that airports operate.” (P18)

Therefore, the airport industry had been under strong pressure to revise its business components during the pandemic to make them more resilient to prolonged demand shocks (7).

3.2.2. After-COVID-19 emerging business model scenarios

The findings suggested that COVID-19 encouraged airports to restructure the key fundamentals in their business models to survive. During the pandemic, the common BM approach had been going back to the core product with strong cost-cutting measures and operational scale adaptations to the flight activities for any size, capacity or differently located airport. However, participants mentioned diverse visions after the pandemic when it has been asked about the future planning and recovery. Overall, 4 future airport business approaches had been shaped to understand the upcoming trends for airport BMs (see Fig. 8): 1) Cost-effectiveness and minimisation, 2) Diversification of revenue streams and intensified commercial activities, 3) Enhanced digitalisation and operational efficiency, 4) Sustainability focused business approach. Moreover, it is important to point out that airports might practice one approach or blend more than one in the BM adaptation. These 4 approaches have been shaped to increase resilience while evolving previous approaches to satisfy the ongoing requirements of the industry.

The first is the cost-effectiveness and minimisation approach. The sudden drop in passenger and air traffic led to a lack of revenue; therefore, airports needed to return to basic operations while going over each line of cost. According to some participants, this led some of the small or medium airports to adopt the minimised cost. Some of the participants suggested that medium and small-size airports can achieve quick recovery in a crisis if they restructure their cost base and adopt these types of measures to attract airlines. During the pandemic, participants frequently mentioned that costs had been a significant challenge and airports had to redevelop their previous outlook on costs and learn to reshape these under pressure. The balance sheet had been weakened as the pandemic had arguably encouraged airports to be more risk-averse in terms of their commercial strategies, taking a more cautious approach to expenditure. Thus, airports have explored previous cost strategies and redesigned their cost, revenue, and cash approaches: for instance, increasing the number of strategic reserves and applying for increased overdraft facilities. This could be an opportunity created by the pandemic’s impact on airports’ cost base.

“We learned about what drives the actual operational costs within the business ...” (Large Airport Director, P11)

“We break down all costs to understand the costs that we can reduce or seek to reduce either in conjunction with our partners or stopping doing things ...” (Large Airport Manager, P18).

Additionally, it has been predicted that airlines will be more reluctant to fly from regional airports as there might not be strong demand after the pandemic. Therefore, small, and regional airports can focus on cost-effectiveness while attracting airlines with lower fees to bring passengers.

“Passengers are our significant income, and revenues increase with passengers. Therefore, it is important to incentivize airlines by keeping aeronautical charges as low as possible.” (Large Airport Director, P11)

“After the pandemic, there is going to be more pressure on cost cuttings; however, airlines are facing massive challenges ... and passengers are going to be more price-sensitive than they have ever been ... If you try putting new charges, there is going to be push back and you cannot ask for any aeronautical increase from airlines ... The solution could be the cost-saving through efficiencies rather than increasing the revenue side of things through various customers ...” (Small Airport Managing Director, P8)

Second, is the diversification of revenue streams and intensified commercial activities. Before COVID-19, there was a continuous downward pressure on aeronautical revenues which had been strong in the recovery period: “P5: The issue with airports is having a dual till against a single till approach. We want single till as airlines are bringing the

Fig. 8. The future airport BM adaptations scenarios (Adapted from interviews).
passengers and without passengers, airports will not have commercial activities... therefore, these commercial activities should be used to help support airlines in the reduction of charges.” (Trade Representative, Department Head) There had been investments and improvements in the diversification of commercial streams before the COVID-19 crisis (e.g., enhancements to airport lounge services); however, as mentioned before, this crisis caused significant revenue loss and increased the need for quick recovery and cash build-up for the future.

“There had been investments and improvements in the diversification of commercial streams before the COVID-19 crisis (e.g., enhancements to airport lounge services); however, as mentioned before, this crisis caused significant revenue loss and increased the need for quick recovery and cash build-up for the future.” (Regional Airport Chief Officer, P3)

The diversification of revenue streams becomes possible in the future because of the downward pressure on aeronautical revenues and the search for additional revenue sources combined with the resolution of recovery from the pandemic. However, airports that have large traffic numbers, strong financial performance and cash reserves as well as having additional investment infrastructure or investment power might have more advantage to follow this type of approach.

“A diversified portfolio might not get the highest margin... but can keep a steadier stream of revenue. If airports have maintenance, slots for cargo, a mixture of long haul and short, they will keep a portfolio of clients in different market segments and less likely to be exposed to the failings of any of the subsets.” (Airline Vice President, P29)

“Airports have a lot of lands, and this can be a new or more intensive revenue even if there are no planes. Also, airports are well connected with transport links; therefore, perfect places for offices or buildings. Not now but if you make the planning different, the recovery can come from there...” (Trade Representative Director, P10)

The third is the enhanced digitalisation and operational efficiency approach. Most of the participants from large-sized airports mentioned that the enhancement of technological adaptations started for airports even before the COVID-19 crisis. This development is based on the need to improve different areas to transform the previous or old airport components and create efficiency in these areas. The improved operational performance including security, check-in and airside operations or new e-commerce and diversified revenue generation decisions are part of this model. It has been commonly suggested that this transformation process quickened with the pressure that COVID-19 created in the operations and revenue streams.

“There is going to be more automation... self-service backdrop will increase, e-tags that can follow the luggage location, online check-in... the integration of automation to improve airport processes... security lanes, security systems... technology process improvements to improve the flow of passengers through the airport... these allow us to provide efficient operation.” (P11)

It is important to point out that technological investments might not be suitable for every airport, especially in the pandemic recovery: “... there might not be any project based on capacity, extension or investment, in short, medium-term...” (P1). This is because participants from small and medium-sized airports mentioned that not every digital or commercial enhancement through automated technology fits their traffic type and passenger needs. Small or Medium sized airports with a specific type of passenger show no need for improved e-commerce activities other than basic services such as online shopping. However, airports with large traffic numbers have a variety of passenger types and needs which provide different opportunities to explore in terms of e-commerce or technologically advanced revenue adaptations. On the other hand, the ability to adapt airport structure and the BMs according to the situation will be a key to the recovery regardless of the airport size or capacity, although the ability to afford these investments and risks might impact the business decisions.

“... What do you do if the system goes wrong? Does the investment save you any money as a regional airport? You have to know your market and passenger...” (Regional Airport Managing Director, P9)

Fourth is the sustainability-focused business approach. Sustainability and ecological concerns were commonly mentioned points by every participant interviewed when asked about the future challenges after the COVID-19 pandemic. It has been suggested that sustainability must be the focus in the future for airports, with constant investment and redesign needed to apply the required measures for greener air transport. New sustainable airport business model development with technological enhancement might be another important approach as a result of the previous capacity constraints combined with the suspension of large investments.

“... the airspace modernisation program, decarbonisation and helping the UK to get to net-zero by 2050... the introduction of sustainable air transport fuels, hybrid and electric flight or hydrogen flights, and modernisation/better engine technology. These will still be a challenge in the next 5 to 10 years, same as they were last year and today.” (Large Airport Director, P11)

“Recovery also includes creating a sustainable environment, introducing green recovery and green risks as part of aviation. You need to have a healthy organization, green, and safe for everyone. It is a risk and the organisation, processes, and purpose have to be adapted.” (Regulatory Organisation Senior Manager, P26)

While showcasing how the narrative of the research participants could coalesce into four main alternatives for the airport sector, there could be more approaches in the future. As mentioned before, airports are a broad area, and the adaptation of existing business models depends on core business components. Moreover, the influence of macro and microenvironments might also lead to varying possibilities in the future. For example, a medium or small airport might have a large land area that could be used to develop a business park, residential area, or office rentals while a large airport might be limited from this type of development if they are restricted by external factors.

“Airports can develop their landmarks more effectively to not depend on aviation traffic... however, it is going to be very difficult for airports to diversify because the planning law stops these expansions.” (Trade Representative, Department Head, P5)

To conclude, airports can take elements from each of the four approaches to produce a bespoke BM that suits their specific circumstances. Thus, these expected to be instructive to airports as opposed to prescriptive treatments that need to be implemented in their entirety. It is important to point out that business models are not fixed structures. While the common ideas and interpretations have shaped these approaches, they could be intersected, combined or other new opinions could be added to future necessities.

4. Conclusions

The air transport industry had been shaped in the past by external crises such as global terrorism, volcanic activity, and pandemics. This was due to the industry’s vulnerability to external and macro-environmental factors (Itani et al., 2014). Many studies included these external environmental factors as significant drivers for BMs in the air transport industry (Charles et al., 2007; Kalakou and Macário, 2013; Vatankhah et al., 2019). In this research, we aimed to explore how airports reacted to the COVID-19 pandemic and how their business dynamics have changed, and how their strategies evolved to help future resilience.

While the lack of passengers was the main driver of challenges faced,
there were other factors which impacted airport business components significantly and reflected the need to analyse these changes. This research explored some of the core changes in airport businesses throughout the pandemic while first highlighting key forces such as passenger dynamics (i.e., passenger confidence, behaviour change), government decisions, pandemic and infection-related issues, financial situation, stakeholders, and economic environment. For instance, government decisions and epidemiological factors led airports to have a highly volatile market which impacted business components such as operational design, customer relationships and financial structure. As presented in the results section these factors motivated airports to change their strategic decisions and return to core BMs while shaping differentiated future measures in the changing market.

BM not only helped to reveal the main components and relationships within commercial strategies but also explored the cause and effect alongside the ever-shifting environment which places constraints on what BMs were feasible in the sector (Teece, 2010; Baden-Fuller and Mangematin, 2013). Therefore, a conceptual model had been produced to visualise the changes in key BM components (see Figs. 6 and 7). As mentioned previously, it had been expected to have long-lasting impacts after this type of shock such as improved financial structures, key operations, and stakeholder communications. Therefore, it had been important to understand the main components in and around the airports, and how they might adapt to this kind of sudden and prolonged shock for business continuity.

While airports were facing similar situations to other economic sectors, there were unique features of the aviation sector’s response. For instance, pre-pandemic, airports were used to fluctuations in demand that occurred due to seasonality in air travel. The pandemic put these fluctuations into stark relief and forced airports to develop and implement hibernation measures that allowed them to scale back operations to a skeleton service but have a strategy through which to scale up when conditions allowed. To allow for this, airports had to borrow approaches from other sectors on how to immediately respond to the pandemic while altering their longer-term business continuity plans so that they were more adaptable to large swings in travel demand in the future.

The UK market had been especially interesting for the observation as there was significant number of diversities in terms of airport BMs; therefore, results from the study outlined interesting observations. While the main challenges were common, the impacts and recovery predictions were diverse. These differences observed to be related to factors such as size, catchment area, ownership, location, or traffic type. The airport business literature also pointed out the possibility of these types of divergences between specific category airports. For instance, commercial investment opportunities (Fasone, Kofler and Scuder, 2016), the levels of competition on efficiency (Merkert and Mangia, 2014) or ecologic impact (Harley, Timmis and Budd, 2020) had shown variations for small and remote airports. During the pandemic, it could be observed that the small and medium-sized airports with strong domestic markets were seen as having more advantages in the short term compared to hub airports that depended on connectivity, especially if they had government ownership. This was due to domestic travel continuing while international traffic was heavily restricted. However, this could not be observed for remote airports and small or medium-sized airports with private ownerships. It was also predicted that large airports to have stronger recovery in long term; however, this could also change according to individual airport characteristics. Due to that, the assessment of the future BM approaches expected to be diverse accordingly (see Fig. 8).

Further, one of the important findings was that airport BMs were already changing during the COVID-19 pandemic. However, some of these changes accelerated to help airports survive in this challenging pandemic environment. The need for financial leanness, collaboration and advanced technological adaptations had been some of these components which the pandemic brought forward. For example, even though the UK air transport market was highly deregulated, the macro environment and local decisions continued to significantly impact airport businesses as air transport is obliged to follow international regulations and restrictions. This is because the global air transport market will continue to operate in a highly regulated environment, which had been shaped by individual country decisions increasingly during a pandemic. However, most of the participants strongly suggested that some of the market regulations and structures, such as the issue of air space modernisation, need a change to ease the pressure. Another interesting finding is how heavily airport BMs are intertwined with external factors, much more than with many other industries. For instance, a heavily regulated market environment generates multiple impacts on airports from additional costs to network development or planning policies. Additionally, airports were responsible for the local community around them. Therefore, the external environment should be part of any resilient airport model decisions in the future.

Participants commonly agreed that this might not be the last crisis experienced in the industry, and these crises will have future implications. It is important to point out that the industry will continue to experience disruptive events while some might be smaller or similar to COVID-19. The impact of the COVID-19 crisis has been severe despite numerous measures taken previously around crisis management and business continuity. Moreover, the previous measures, while contributing to business continuity, were not sufficient. Therefore, there has been a consensus to prepare and design systems, and operations for increased resilience. Furthermore, another interesting finding of this paper was the observed future BM approaches. These had been shaped by the participant’s views on the recovery predictions, future implications, and key challenges. It was possible to suggest 4 main approaches that could comprise the forward-looking commercial model of any specific airport. These approaches had been listed as follows: 1) Cost-effectiveness and minimisation, 2) Diversification of revenue streams and intensified commercial activities, 3) Enhanced digitalisation and operational efficiency, and 4) Sustainability focus.

While there are 4 key strategic approaches, airports might adopt more than one according to their business components such as customer characteristics, market, size, location, and value propositions (see Fig. 8). For instance, revenue diversification had been frequently mentioned even pre-pandemic; however, there is a question of how possible to use this after a pandemic for some airports or how to best implement this approach in the changing market. As mentioned previously, every airport had been unique and requires a diverse approach. Large-size airports supported the intensified approach to revenue generation by developing commercial offers while medium-sized airports choose to utilise available sources to create additional revenue. Additionally, some small and medium-sized airports were reluctant to pressure their passengers or airlines with increased charges due to their vulnerability in losing these customers and some airlines might be reluctant to reestablish routes with tight margins. As such, there were new market conditions and altered customer behaviour due to the pandemic that these airports need to be mindful of.

Another point had been the technological enhancements; large airports can afford to focus on operational efficiency through technological enhancements while small-medium-sized airports will be choosing to increase traffic by attracting airlines and optimising their operational efficiency rather than costly investments. This had been because the hub and large airports with high traffic levels will recover in the long term and have the advantage of cash to develop their operational, commercial, and technological infrastructure over other airports. However, small, and medium-sized airports need to balance their cash carefully because of the pandemic and to make investments in operational utilisation for long-term resilience. On the other hand, small, remote, and medium-sized airports also considered technological adaptations in specific operational areas to improve efficiency and cost control in the long term. Therefore, the most appropriate design for the future had been viewed as efficiency and knowledge of the owned business model. In addition to the other evolved factors such as the
importance of cost base, the flexibility of the BM and “mitigating the risks while being reasonably diverse” (P12) due to the impact of COVID-19. To summarise, airports’ strategic decisions and values aimed to survive during the pandemic, recover quickly to pre-pandemic levels, and improve the future after recovery. As a result, airports returned to their core products while limiting their operations and sources to keep the cash to survive in long term. As discussed in the results section, multiple approaches could be shaped to fit new market conditions and for quick and efficient business recovery. It had been suggested that the BMs were useful structures to apply when making future and strategic decisions for business continuity (Niemimaa et al., 2019). Thus, frameworks were designed to visualize the changes in key business components during the pandemic and led to possible approaches after the recovery (see Figs. 6 and 6).

This paper contributed to the existing airport business model literature by exploring the changes during a sudden demand shock and highlighting future business drivers. One of the limitations of this study was not being able to explore the future business model approaches individually and in detail due to the timing of this study. The study aimed to explore the pandemic’s impact, factors that influenced airports during the pandemic as well as the future market and business approach. Also, it was important to point out that the data collection started with the pandemic and ended during the recovery period which did not include the post-crisis stage and the situation globally after therefore. Future studies might explore these BM approaches and possible airport archetypes that might be adopted after the recovery. To provide detailed business model structures and how these could be achieved, studies could conduct further exploration of these models.

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