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Insights from a mixed-methods Delphi study into the global airline industry

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Abstract

This paper looks at the key methodological and design insights gained from a five stage mixed-methods Delphi study investigating the global airline industry's likely future strategic trajectory. The exploratory study sequentially unfolded across a workshop, test/pilot survey, main survey 1, main survey 2, and finally in-depth interviews. The study revealed the important roles each stage played in gathering a wide array of salient data and informing subsequent stages and analysis. This research journey demonstrated the versatility available when mixing quantitative and qualitative methods in a Delphi study covering air transport, and how each can reinforce and complement the other. This is particularly relevant when investigating emerging air markets, where existing data is either limited or non-existent. Although a geographically dispersed multidisciplinary cohort of participants contributed to this study, more expert voices from under-researched emerging regions and air markets are evidently required for future research into this still expanding global industry.

Keywords

Delphi study; emerging air markets; global airline industry; mixed-methods; strategic forecasting; industry level analysis; liberalisation; protectionism

1 Introduction

This paper explores and discusses the key methodological and design insights surrounding a five stage mixed-methods Delphi study conducted mostly in 2014 to investigate the global airline industry's future prospects and strategic trajectory over the following ten years or so. This paper was written at the midpoint into that decade long view; a vantage point well positioned for assessment and reflection on the study. Enough time has passed for greater objectivity, while not too much time has elapsed to reduce the veracity of insights generated. The paper is primarily aimed at those students and academics considering the Delphi method in their studies and research, particularly those in air transport management. In this context, the paper is intended to be a practical guide built on insights gained and lessons learned. More detailed coverage of

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several of the key findings from this study can be found in the following publications by the author; Ellis (2018), Ellis (2019) and Ellis (2020b).

The Delphi method, also known as the Delphi technique or Delphi study, was developed in the 1950s in the US by the RAND Corporation. It is a structured and iterative communication technique that essentially involves several brainstorming rounds (Mason and Alamdari, 2007; Melander, 2018). It is a well-regarded technique to primarily forecast the future using expert contributions, both from a qualitative and quantitative perspective context over the past six decades or so, including more recently in mixed-methods research (Tapio, Paloniemi, Varho and Vinnari, 2011). Delphi is like historical analogy "where the future is forecasted based on historical events" (Vasigh, Fleming and Tacker 2018, p. 288). Although, different to historical analogy which employs a small number of experts to generate forecasts, the Delphi technique utilises multiple independent experts to typically create consensus forecasts (Vasigh et al., 2018).

The Delphi method remains popular across different disciplines, and continues to be used widely in air transportation studies (Melander, 2018). The Delphi method typically works well "in judgement and forecasting situations in which pure model-based statistical methods are not practical or possible" (Rowe and Wright, 1999, p. 354). More traditional approaches to forecasting typically rely on how much "historical data" is available; data not necessarily obtainable, and on some occasions non-existent (Doganis, 2010, p. 224). For instance, in emerging air markets, such as in the Arabian/Persian Gulf, Asia and Africa, publicly available and reliable data can be challenging to locate. Meanwhile, fast growing emerging air markets make using traditional predictive approaches and models very challenging (Fan and Lingblad, 2016).

The global airline industry is large, dynamic and on a continued growth trajectory that has generally remained consistently robust for decades (the COVID-19 pandemic aside). The potential and possibilities of aviation development to foster social, cultural and economic links and growth, especially in emerging air markets, remains substantial (Ogunbodede and Odetunde, 2016). This impressive global growth and latent potential have in part been achieved by technological developments that have seen ticket prices fall, passenger numbers increase, travel times reduce and non-stop flight distances stretched. Commercial aircraft have become quieter, more fuel efficient, safer and more reliable as well over this period (Lumbroso, 2019; Cox, 2018). Yet, despite these laudable achievements the global industry has struggled to substantially break free of its bilateral architecture based as it is on national airspace sovereignty and the associated factors of airline citizenship, home base requirements, and ownership and control restrictions (Havel and Sanchez, 2014). Airlines are in effect "nation-bound" (Mifsud, 2011, p. 128).

2 Background to study

This industry context, particularly as it relates to under researched emerging air markets, led to the development of a doctoral study which aimed to discover the most pertinent themes likely to shape and influence the trajectory of the global airline industry in future. The research conducted a strategic industry level analysis, with the main data generated being sourced from self-rated aviation industry experts via mostly online surveys and in-depth interviews. At its heart, the research aimed to provide a holistic response to the question: What key forces or factors will likely determine the global industry's future trajectory, notably the underlying strategic contributors to an individual airline's global reach? This overarching question was eventually distilled into four research questions (RQs) that covered participant conceptualisations of industry liberalisation and protectionism (RQ1); the prospects for industry multilateralism as viewed via the North Atlantic and Europe (RQ2); the industry impact of the big three Middle

Eastern carriers – Emirates Airline, Qatar Airways and Etihad Airways (RQ3); and finally, liberalisation trends and issues in Asia (RQ4).

In many ways, the wider research journey in this Delphi study mirrored the flexible study design where each stage evolved as the focus became progressively clearer, and the data generated became more substantive and richer. Likewise, the research questions emerged and were honed over time. Added to this, expert participants were only known once the parameters of expert were finalised and willing participants identified and engaged. This design provided the unfolding process an increased likelihood of tracking the emerging data stream, rather than prematurely restricting the scope and potentially overlooking or missing salient data. This exploratory approach was not without risk as time consuming tangents, lower than hoped for response rates and changing priorities all had the potential to disrupt the process (Hsu and Sandford, 2007). However, it did allow modifications to be made as the research unfolded, reflecting a key strength of the Delphi method (Cooper, Gallegos and Granof, 1995). It also provided key insights that can now be assessed with the benefit of hindsight.

Given the exploratory approach of this study, the Delphi method was settled on as the chosen research methodology as it was deemed well suited to dynamic contexts such as the global airline industry (Rowe and Wright, 2011; Linz, 2012). Creswell and Plano Clark (2011, p. 87) argue that research predicated on an exploratory approach, a sequential design and using mixed-methods, as in this study, frequently "value multiple perspectives and deeper understanding", and also tend to transition from constructivism at the beginning (as qualitative data collection predominates here), to post positivism across subsequent stages where quantitative data collection is most common.

Furthermore, Delphi provides a robust and established way for exploratory research questions such as here in this study to be addressed, along with data to be generated where there are currently little or none to be found (Rowe and Wright, 1999). Furthermore, a mixed-methods approach was selected as the data sought were to be collected and analysed across a range of instruments and tools to better capture likely future scenarios (Tapio et al., 2011; Melander, 2018). In addition, the Delphi method was judged to be the most defensible research approach here as it works well with emerging air markets where data are thin or absent (Linz, 2012; Itani, O'Connell and Mason, 2014).

3 The worldview of the researcher

The paradigm (or worldview) which underpinned this research was pragmatism. Mixed-methods approaches remain especially popular for pragmatists (Robson, 2011). Pragmatism encourages freedom for a researcher to select the preferred methodological approaches and practices that best suit their "needs and purposes"; with this freedom extending to selecting multiple means "of collecting and analysing data" (Creswell, 2013, p. 28). Pragmatism acknowledges that research occurs within "social, historical, political, and other contexts" (Creswell, 2013, p. 28). Global air transport certainly reflects a broad array of social, demographic, economic, political, geographical, historical and technological forces that continue to impact and shape the industry's ongoing development (Regan, 2017; Melander, 2018; Itani, et al., 2014).

This less rigid mentality toward research has caused some to label pragmatism as a philosophy with little to no formal structure or guiding rules (Brierley, 2017). In reality, pragmatists adopt a centrally inclined agenda that aims to avoid the philosophical opposites of dogmatism on the one hand, and immovable scepticism on the other (Robson, 2011). Research into international aviation should not be relegated to a single paradigm, theory, ideology or approach (Budd, 2014;

Heracleous, Wirtz and Pangarkar, 2009). If a research study is designed well, has an unambiguous aim and feasible research questions, together with other core aspects, then "a convincing methodological rationale can be established" for it to be founded on pragmatism (Robson, 2011, p. 171).

When there are evident divisions in air the transport research literature between those who support an industry outlook with a more realist stance versus those with more liberalist perspectives (Nayar, 1995; Richards, 1999); or support protectionism over liberalisation and vice versa (Dobruszkes and Graham, 2016); or defend the bilateral system, or in contrast, push for and support multilateralism (Fox, 2014; Havel and Sanchez, 2011); then the industry's size and complex architecture requires a pragmatic research approach best able to navigate these parameters and key industry debates. Pragmatism provided this Delphi study with the philosophical underpinnings to extract meaningful industry insights.

4 Conceptual frameworks

Pragmatism also informed decisions around which conceptual frameworks to use in this study; often referred to interchangeably as theoretical frameworks, and sometimes strategic frameworks as well. These essentially help to organise research ideas and data (Smyth, 2004). Conceptual frameworks assist in detailing and mapping "the key concepts and factors to be investigated", and facilitate and encourage the capture of "emerging, fragmented or broad themes" (Lohmann and Vianna, 2016, p. 200). This study leveraged two well established strategic conceptual frameworks to help guide and scaffold the research process, including question and forecast development. These were Harvard University academic Michael Porter's model covering the 'five forces of competition', along with the Political, Economic, Social, Technological and Environmental (PESTE) framework (Shaw, 2016).

Each of these strategic frameworks has been used with other Delphi studies covering air transport (Nowack, Endrikat and Guenther, 2011; Linz, 2012). The decision to use two strategic frameworks was premised on the notion that no single framework would be able to effectively dissect the complexity, unique characteristics and sheer size of the global airline industry. Nor would a single framework be able to identify key forces and factors (or drivers) impacting the industry as readily, now and in the foreseeable future (Ellis, 2020a). Likewise, use of an onion-style model which merged core elements from several individual frameworks might also downplay or ignore forces and factors that are not at first apparent (Grundy, 2006). Both selected frameworks helped to guide the discussion during the first stage workshop, assisted in the design and structure of the surveys, and provided scaffolds to develop the interview questions.

Employing these two conceptual frameworks then allowed geographical location to emerge as a key factor shaping the airline industry's future; a central consideration less likely to emerge in either a single framework context, or if only a quantitative or qualitative approach had been selected. Neither generic framework explicitly highlights geography, although Porter has detailed the importance of "geographic scope" (e.g. national or global) in discussions about applying his competition framework (Magretta, 2012, pp. 56-57). Brainstorming core ideas with participants, together with surveying and interviewing them, allowed for a richer repository of data to be developed. In turn, this unfolding process and research journey was underpinned by adopting a flexible approach to employing conceptual frameworks at the outset, so that the research was guided, but not directed or too narrowly focused. In this manner, each stage provided feedback and valuable data that were used to shape and refine the subsequent stage, with the final stage in-depth interviews then creating a feedback loop able to inform the data analysis to follow. Exploratory research such as this study is best anchored to a scaffold to reduce

the likelihood of time-consuming tangents from developing, and the two strategic frameworks above were well suited to achieve this goal.

5 Mixed-methods Delphi study

The Delphi method does not have a set series of standards or definitive requirements, but is best viewed as a plethora of ideas, norms and recommended practices built around the development of future scenarios (Melander, 2018). In this context, several types of Delphi study provided inspiration for this research, with the overall approach adopted predicated on a ten-year window into the foreseeable future (Linz, 2012; Mason and Alamdari, 2007; Tapio, et al., 2011).

5.1 Selecting a Delphi method

Core elements and practices from the classical Delphi, the hybrid Delphi and the eDelphi were selected for this study (Melander, 2018; Hasson and Keeney, 2011). Each reflects a range of different key considerations that were adopted. Chiefly, the classical Delphi is built around consensus, multiple rounds and mixed-methods, typically moving from qualitative (more open) to quantitative (closed) rounds (Hasson and Keeney, 2011). Meanwhile, a hybrid Delphi employs a focus group at the beginning to brainstorm ideas on a chosen topic area, and this study's first stage workshop likewise did so by meeting "in time and place" for just over an hour (Landeta, Barrutia and Lertxundi, 2011, p. 1632). Lastly, the three surveys employed in this research comfortably align with an eDelphi. Online Delphi research which uses digital surveys is increasingly in academia (Hasson and Keeney, 2011, p. 1697).

This smorgasbord tactic, whereby the most suitable and applicable elements from specific Delphi approaches were applied, fits comfortably with the pragmatic world view underpinning the study.

It also fits well with the flexible use of two respected and widely employed strategic/conceptual frameworks. Rowe and Wright (2011, p. 1488) argue that Delphi can be employed as "part of a wider process (with qualitative and quantitative components)"; where the plural methods along with the order of data collection, are decisions of higher importance than choosing the most suitable Delphi method singularly speaking. Added to this, the sheer diversity evident with most contemporary applications of the Delphi method, means that a blurring and overlapping of approaches is to be expected and is often unavoidable (Melander, 2018; Hasson and Keeney, 2011).

5.2 Sampling strategy

This research used both purposeful sampling (also known as purposive sampling) along with snowball sampling. A number of other Delphi studies focussed on the airline industry have done so as well (Delbari, Ng, Aziz and Ho, 2016; Mason and Alamdari, 2007). Purposeful sampling seeks to define and find participants with adequate levels of knowledge of the topic being investigated, and then to directly engage them. Meanwhile, snowball sampling encourages directly contacted participants to pass on research information and links to people who might also be willing and qualified to participate (de Vaus, 2014). Professional emailing lists, university alumni lists, journal authors, air transport conference attendees, organisational websites and media outlets were all utilised to disseminate the online surveys for this study.

Strictly speaking the three surveys employed in this study were designed with an initial series of background questions that essentially meant all could participate, if they chose to, including people with very low levels of industry knowledge. Even so, a person with zero industry knowledge have been very unlikely as all background questions were required to be completed, before the core survey questions and forecasts could be completed. This approach was designed

to maximise the snowball effect. Several emails to the researcher verified that snowball sampling indeed did occur. Several defined experts also contacted the researcher to say that they too had sent the survey link on to a professional acquaintance.

The costs involved in trying to achieve a random sample of global airline industry experts would be substantial (Mason and Alamdari, 2007). The Delphi method is particularly relevant in situations such as this study where expert participants "are geographically dispersed" and challenging to reach through more traditional means (Melander, 2018, p. 69). Also, a random sample was not required in order to address the research questions well. In addition, the exact definition of expert only became possible once the main survey 1 closed, meaning that developing an exhaustive record of all those viewed as expert, or likewise creating a quota or cluster sample, was simply not practically possible. As de Vaus (2014) puts it, sampling that is non-probability (or non-random) based is "much cheaper" and typically more pragmatic than sampling based on probability (or random) techniques, particularly when "the population is widely dispersed" (p. 88).

5.3 Defining expert

It was necessary to define the parameters of expert for this study because clear strictures encourage data quality. Added to this, a wide range of experts help to provide more meaningful key industry insights (Linz, 2012; Minichiello, Aroni, and Hays, 2008). In this context, a "Delphi study is only as good as the experts" involved in the research (Yousuf, 2007, p. 6). The surveys were designed to promote inclusivity with this seen as important to generate ideas than a more prescriptive approach at the outset. A multidisciplinary cohort was also sought, as were a geographic diversity of opinions. Added to these, the exact definition of expert was deliberately

left open to begin with, this allowed for a decision to be made before launching the main survey 2 as to what actually constituted a non-expert and an expert.

Two background questions (BGQs) on levels and years of airline industry knowledge were used to establish the minimum requirements of study expert, and are summarised in Figure 1.

BGQ 2: How would you rate your overall knowledge of the global airline industry?				
Limited	*Average*	*Good*	*Very Good*	*Excellent*

BGQ 3: How many years of knowledge do you have of the global airline industry?					
1 to 2 years	*3 to 5 years*	*6 to 10 years*	*11 to 20 years*	*21 to 30 years*	*30+ years*

Figure 1 Main Survey 1: Background questions used to define expert

This resulted in a good level of knowledge as the minimum (together with very good and excellent), while both poor and average were excluded. Added to this, 6 to 10 years were decided as the minimum years of industry knowledge, with both these minimum requirements needing to be selected for a participant to be considered an expert. This in turn meant that only those experts who had indicated by the closing of the main survey 1 that they were willing to be emailed the next survey link received it. As with other air transport focused Delphi studies this process was detailed at the outset so that all potential participants were cognisant of what to expect as the research progressed (Mason and Alamdari, 2007).

Practitioners suggest a range of expert participant numbers for a successful Delphi study. Linz (2012, p. 30) maintains that participation of between "20-30 industry experts" is ideal, whether collecting quantitative and/or qualitative data. Others maintain that "a group of 5-13 members is" possible for Delphi studies, so long as expertise is high (Johan and Jones, 2007, p. 2). Others suggest a wider range of Delphi participants, with "a minimum of seven and a maximum of 30" suggested (Saizarbitoria, 2006, p. 782). One of the challenges is to articulate "what constitutes a

real expert", particularly early on in a Delphi study (Landeta et al., 2011, p. 1630). This study was predicated on finding as many participants as practical and possible for the main survey 1, resulting in 122 usable responses (n=122) of which 71 were experts (n=71). From this expert cohort 52 (n=52) were willing to be sent the next survey link. The main survey 2 was completed by 34 experts (n=34) only.

5.4 Reliable, anonymous and maverick opinions

Although the use of experts brings a range of positive benefits to a research endeavor such as this Delphi study, their participation is not entirely without risk. On the one hand "self-rated experts" are unlikely drop out, while their opinions tend to be more stable than the views of non-experts (Rowe and Wright, 2011, p. 1489). Even so, being anonymous, a key element of Delphi, can make experts feel safely hidden from view and as such give a feeling of impunity which then potentially captures unreliable views (Landeta, 2006). Nevertheless, anonymity is also positive in many ways such as by reducing "undue social pressures" from dominant and overly opinionated participants, or by alleviating majority opinion pressures, and tends to result in views based for the most part on "merit alone" (Rowe and Wright, 1999, p. 354). A strong argument for anonymity is that it works against the "*Bandwagon effect*", whereby participants mirror group expectations and succumb to group pressures (emphasis in original) (Nowack, et al., 2011, p. 1607). Therefore, the Delphi approach attempts to circumvent "the small-group dynamics that often skew group judgements" (Surowiecki, 2013, p. 275).

This is not to infer that experts should ideally agree with each other. In fact, early on there should be "at least one participant who is willing to challenge the status quo" (Mercer, 1995, p. 34). Such "maverick" views challenge "conventional thinking", and are suggested as part of "the Delphi process whenever possible" (Bolger and Wright, 2011, p. 1510). Together with including

mavericks, many Delphi study practitioners also recommend the use of non-experts or 'lay people' to help generate a diversity of opinion at the outset (Hussler, Muller and Rondé, 2011, p. 1651). As discussed in the workshop section below, the inclusion of a known maverick did enhance this Delphi study during the first stage of data collection, as did including participants who with the benefit of hindsight would not have qualified as a defined expert.

5.5 Predicting, forecasting and agreeing

Predictions and forecasts are often seen as the same. However, in this study, ironclad predictions were avoided and instead a more flexible notion of forecasting was adopted to capture key industry insights. In this sense, this study was an explorative Delphi predicated on unearthing industry trends rather than one with "a predictive focus" (Nowack, et. al., 2011, p. 1609). Although forecasting is derided by some as a weaker attempt at predicting (Vasigh, et. al., 2018), the insights generated by placing less emphasis on prediction accuracy, and more on quality forecast data generation, mean that the findings can be deeper, wider ranging and have greater longevity. In a study such as this, the overarching objective was to generate salient data and findings, and not to simply aim for accuracy. This way, the underlying reasons behind why a forecast generated the data it did becomes more relevant than the fact that it did not ultimately transpire.

Added to this, it is important to remember that there was no practical way of knowing at completion of a research endeavour such as this whether the forecasts made would actually occur or not (Vasigh, et. al., 2013). Only ten years or so after the completion of the data collection in 2014 (that is, around 2025) will the full extent of the accuracy of each forecast be known. Even at this point in time, each forecast's likely highest value remains the key industry insights they provided, and not specifically if they were mostly accurate or inaccurate in the end. The reality

that this study may raise more questions than it actively addresses is a central strength, not a key weakness. Insightful and vigorous debate is more valuable than immovable predictions and inflexible opinions.

In a similar manner, consensus was carefully crafted in this study to avoid sounding like a requirement. Having said this, the spread of agreement across the study meant that it would comfortably fit into the category of an agreement-based Delphi whereby questions and forecasts are generally designed to gauge levels of agreement (Landeta, 2006). Consensus was defined as a convergence of views at or above 75%, mirroring similar air transport studies using the Delphi method (Mason and Alamdari, 2007). However, consensus is not viewed by many contemporary Delphi researchers as a key requirement, but rather "the ability to simply…discuss and refract ideas" are highlighted to arrive at clear and defensible conclusions (Lentz, 2009, p. 54). Many now contend that "a free exchange of conflicting views" is superior to aiming for consensus agreement (Surowiecki, 2013, p. 203). Nonetheless, consensus was incorporated into this study as a valuable reference point, but not in a manner that stifled "innovative ideas" or drowned-out divergent viewpoints (Melander, 2018, p. 77).

5.6 Data analysis

Data analysis in this study centred on descriptive statistics, together with thematic analysis predominantly associated with the workshop and the in-depth interviews, and both parametric and non-parametric statistical tests of association, focused mainly on the survey data collected. In this latter context, a number of t-tests were performed with Likert item data (i.e. forecasts), while chi-square tests were conducted on a range of multiple choice question (MCQ) response data. All statistical tests were performed to a 95% confidence level. Thematic data analysis, sometimes labelled content or cluster analysis, has been employed in other mixed-methods

Delphi studies and aims to "distill out various themes and different views regarding the themes" (Tapio et al., 2011, p. 1618).

Thematic analysis is particularly apt in research such as this where a quest "for insight" is pursued (Boyatzis, 1998, p. vi). In the end, "a pragmatic approach is suggested" strongly influenced by the data that are available along with the affordable tools obtainable (Robson, 2011, p. 452; Cooksey and McDonald, 2011). Ultimately, data analysis decisions reflected the study's overall flexible design, supported and encouraged by a pragmatic outlook unencumbered by rigid research boundaries and made all the more possible with a mixed-methods approach. The overarching scaffold provided by the two chosen strategic frameworks, together with a constant process of distilling out key themes as they emerged, and honing the research questions in response, helped to reduce the creation of significant research tangents and to guide the research within clear parameters. Flexibility is synonymous with an anything goes approach; thus, a search for insight is not an aimless endeavour primarily focused simply on data generation but instead on the unearthing of valuable insights.

6 Findings and key insights

Each standalone stage of data collection provided key methodological and design insights. This next section looks at each stage separately; after this, an overarching view is adopted to better understand the sum of these individual stages and their aggregate contribution to addressing the study's four research questions.

6.1 Stage 1: Workshop

The first stage workshop was essentially a brainstorming session that lasted just over one hour and had five participants (n=5); with one acting in the role of observer to provide key feedback

afterwards. This arrangement was known to all participants prior to the start of the session. The workshop was audio recorded, transcribed and analysed manually in Microsoft Word using thematical analysis. A brainstorming session to start with is important when forecasting with experts because of "the wide range of viewpoints and ideas which result" (Mercer, 1995, p. 35). Participants were chosen based on their known airline industry knowledge, along with their willingness and ability to attend the face-to-face session in Sydney, Australia.

One participant was invited to attend because their previously stated views on the airline industry challenged purely economic assessments popular throughout the literature. This participant preferred to focus on human resources and industrial relations which they viewed as underpinning the ongoing development of the industry. Their inclusion reflected the idea that a participant willing to question assumptions and challenge majority views should be involved to improve the effectiveness of a brainstorming session (Mercer, 1995). As noted earlier, such "maverick" participants play an important role in the Delphi method, and align well with its core contemporary principles and applications (Bolger and Wright, 2011, p. 1510).

Although the parameters of expert were not precisely defined before the workshop, an analysis of each participant's workshop introduction suggests that two at least two participants were experts, and likely a third. As noted earlier, together with the suggested involvement of mavericks, Delphi study practitioners also endorse the use of non-experts (or lay people), to encourage diversity of opinions at the beginning (Hussler, et. al., 2011). As also noted in the sampling section above, the inclusion of non-experts in this study also enhanced the snowball sampling employed by encouraging those with lower levels of expertise to share the survey link with others who might have higher levels of industry knowledge and experience.

Workshop participants were guided by an initial presentation covering the research aim, objectives, research questions (at that time) and global airline industry context, and were then taken through a series of semi-structured questions. The roundtable format followed at the workshop encouraged participation through ease of eye contact amongst attendees, and ensured the researcher/facilitator could readily maintain a flow of ideas and contributions by asking individual participants to address a question and/or to provide their views or clarification on a topic area. This way, a range of views were achieved across each question and topic area, while contributions were more effectively distributed and shared.

One important result of the workshop was that the research thereafter shifted away from a primary focus on the big three global airline alliances, to the international relations and geographical location realities which underpin the global airline industry's strategic architecture. Robust discussion amongst workshop participants, led on many occasions by the willingness of the maverick participant to disagree with other participants, encouraged this shift as the global alliances evidently failed to achieve much traction as a standalone topic. The maverick participant regularly challenged the other workshop participants to question their assumptions and clarify their opinions.

Immediately after the workshop, a conundrum of sorts surfaced whereby a decision had to be made about whether to re-conduct it with this new focus area as the prime topic. The decision was made to press ahead as time and resource constraints, along with likely negative impacts on participant motivation levels, were deemed potentially higher costs than any benefits to be gained from repeating the workshop. The data gained from the workshop were seen as sufficient to develop the second stage pilot survey as much of the workshop had adopted a bigger picture strategic view of the global airline industry anyway.

6.2 Stage 2: Pilot Survey

This study conducted a pilot survey (n=12) after the workshop, and both it and the subsequent main surveys were developed in Google Docs, a reliable, stable and freely available survey platform. Pre-testing remains crucial to creating "good survey questions" (Dolnicar, 2013, p. 560). The respondents were selected based on previous interactions with the researcher, along with recommendations from other participants (i.e. snowball sampling). The pilot survey ultimately revealed that the long multi-part open ended paragraph-style questions which dominated its structure were mostly unpopular; an observation mirrored in the literature as they are seen as time consuming and challenging to fully address (Dolnicar, 2013). Researcher inexperience, together with a desire to capture as much data as possible, drove development of the pilot survey. Shorter surveys have been shown to improve the quality of collected data by decreasing "fatigue effects among respondents" (Dolnicar, 2013, p. 565). Sentiments for study respondents here can be summarised by several direct quotes based on feedback left on the pilot survey, including: "I think the questions are too long and make the respondent reluctant to take the time to give the detailed answers that are required". Other comments included: "A lengthy questionnaire for the open-ended type. Perhaps in-depth interviews may work better?"

One participant recommended: "Keep questions shorter and more focused", echoing another participant who thought that questions tended to have "very long sentences [and too] many things". Another suggested: "In order to get [a] high response rate, I suggest you should modify all the questions with optional answers for anybody to choose". Several other participants also recommended a multiple-choice format and this was subsequently followed for the main survey 1. The pilot survey clearly demonstrated how vitally important pre-testing is in academic research, including air transportation studies (Schnell, 2004). There is little doubt that this

research endeavour would have seriously floundered – due in large part to low response rates – had it not been for the feedback acquired and implemented from the pilot survey.

Like deliberations surrounding the workshop before it, the pilot survey could have been repeated once the revised format was finalised. However, the same issues and concerns around time and resource constraints, together with participant motivation considerations, along with the fact that the open ended questions were able to be readily modified into closed multiple choice questions (MCQs), meant that this did not occur. Instead, the main survey 1 (detailed next) went ahead, with a staggered and targeted release to begin with, in case any major issues surfaced; none did.

6.3 Stage 3: Main Survey 1

The main survey 1 contained 18 MCQs, along with areas at the end of each main survey section for participants to leave longer responses and/or clarifying comments. A total of 122 usable responses were obtained; a further two partially completed survey responses did not contain enough data to be of practical use. Of these 122 responses, 71 were classified as expert, once those parameters were subsequently decided and applied.

Key industry issues raised in the study's literature review, combined with workshop data on the industry and core themes from the pilot survey, were all utilised to arrive at a final list of 18 MCQs. Decisions were then made around the style of each MCQ, essentially a choice between multiple response (tick box) or single response format. Most MCQs of both format included the response option 'other' to capture additional data, and to act as a quality control check in case a question had evidently missed a widely supported response option. The option 'other' was rarely used, and on the few occasions that it was selected by several or more respondents, it mostly provided an avenue for clarifying comments on a clearly preferred option. This included

expanding on evidently strongly held views around topical areas such as the industry and climate change. The key insight gained in this regard on the main survey 1 was that participants on the whole prefer MCQs, but also need to be given the opportunity to add more details and comments if and when inclined to do so (Cooper et al., 1995).

A significant decision to be made after the main survey 1 was completed and closed for new responses was the cut-off point for expert. Self-selection played both a formal role and an informal role here. For instance, a majority of participants with limited and average stated levels of industry knowledge did not leave an email contact for further participation; 75% and 55% respectively. In contrast, a majority of good (56%), very good (87%) and excellent (69%) level participants did leave an email address for the subsequent survey link. It should be noted that those who rated their industry expertise as excellent were likely very busy individuals less able to commit to further participation compared to many other expert study participants.

When defined expert was arrived at (as detailed in the *Defining expert* section earlier), data analysis across a wide range of MCQs from the main survey 1 revealed that response patterns were fairly stable amongst this cohort, and less so amongst non-experts. This reality has also been highlighted in the Delphi literature (Hussler et al., 2011). Added to this, selecting a more conservative and restrictive cut-off point for defining expert would have considerably reduced the available expert pool to then send the main survey 2 link to. Costs and benefits must always be considered in research, and multi-stage Delphi studies constantly involve trade-offs, including the need to consider what is coming next. The key insight gained in this respect was that expertise should not be viewed as being based on an immovable set of parameters. Rather, expertise is best seen as reflecting a diverse cohort with knowledge of the field or area and able to contribute

informed ideas and opinions, while retaining sufficient divergent opinions to encourage innovative findings and challenge orthodoxy (Melander, 2018).

6.4 Stage 4: Main Survey 2

The main survey 2 contained 27 forecasts in the form of mostly standalone Likert-style items (i.e. 5 point scales) (Carifio and Perla, 2008). This survey was only emailed to the 52 experts from the main survey 1 who had indicated they were willing to receive it. An initial background question asked if each had completed the previous survey, and all 34 respondents selected 'yes'. The forecasts on the main survey 2 were built on the data and findings from the main survey 1, and had summary feedback and results provided to help guide and inform expert participants.

A major concern with the main survey 2 was the restricted pool of potential respondents available; that is, the 52 experts willing to receive the survey link. Anonymity meant that it was not possible to target reminder emails to only those who had not yet completed the survey. Participants who were willing to be interviewed and left their details on the survey were able to be removed from such email reminders; however, only 17 ultimately did so. Although reminder emails were sparingly used, and apologies given in each for those who had already completed the survey, several did reply via email to say they had already done so. This being the case, a late spike in survey submissions just prior to the stated deadline did result in a 65% response rate in the end (34 out of 52); thus, the planned for minimum of 30 responses was ultimately achieved.

A balancing act has to be achieved in such situations whereby reminders act as motivators and not de-motivators. It is imperative to remain professional, courteous and open – most participants are likely to understand if a researcher is struggling to achieve a high response rate. Likewise,

although five separate stages of data collection have the very real capacity to generate stress and anxiety for a researcher, it must be remembered that the data produced, and the flexible approach required, still present contingency opportunities should all not go to plan. In this sense, data may still be sufficient to gain key insights into an industry or issue, while extending deadlines and offering incentives can help to improve low response rates as well.

6.5 Stage 5: In-Depth Interviews

The final stage in-depth interviews involved 13 experts (n=13) and were designed to encourage the creation of richer and deeper insights into the survey data. Although 17 main survey 2 respondents indicated they were willing to be interviewed, four did not respond to the formal interview invitations sent thereafter. The interviews had an average duration of 31 minutes each, with the median time being 34 minutes. Each interview was audio recorded, transcribed and thematically analysed in Microsoft Word. Cost and training constraints meant that using dedicated software was not feasible for this study, although the literature on qualitative data analysis points out that Microsoft Word is a reliable, easy to use and cost effective way to analyse text, and contains "many features" that are found in "special-purpose software" (La Pelle, 2004, p. 85). Interviews were conducted either face-to-face in Australia (n=4), via video conference using Skype (n=6) or Google Hangouts (n=1), or via telephone (n=2). The interviews were semi-structured and drew on data and key findings from across the earlier four stages of the study.

One practical tip provided to the researcher from a more experienced university researcher was to use two digital recorders, along with a checklist, for each interview; a practice that proved invaluable on at least two occasions as one recorder failed to activate (or may have been incorrectly operated). Time constraints, nerves and memory lapses can all take a toll, especially when an inexperienced researcher is interviewing well-known and respected industry experts

who are understandably time poor. Contingency plans are vital to ensure that there are technological, logistical and other key back-ups available should they be required. In one form or another such contingency plans are typically implemented at some point, especially in a Delphi study such as this where a diverse range of people, time zones and processes are involved across more than 12 months of data collection.

Although it is certainly the case that in-depth interviews alone could have formed the basis of this research (as suggested above by one pilot survey respondent), the fact that they were conducted after an unfolding process across four earlier stages of qualitative and quantitative data collection, helped to inform and structure them in ways simply not possible otherwise. The practice of utilising in-depth interviews in latter or final stages of a Delphi study is becoming increasingly common (Melander, 2018). Even so, it is certainly also true that more participants would have been involved in this final stage if they had not been expected to traverse and complete four previous stages. As highlighted earlier, there is no escaping the fact that Delphi studies are time consuming for everyone involved (Hsu and Sandford, 2007).

The interviews were developed to add surrounding context and greater depth to the data already collected, and not to be the main or sole source of data for the entire study. A relatively small cohort was then able to value-add, rather than be expected to carry or underpin the research overall. There is no real substitute for talking directly to participants and giving them a voice, and in-depth interviews provide one of the best opportunities to do this (Minichiello et al., 2008). By seeking to "give voice" to a diverse range of airline industry experts and insiders, this study pursued a practice that is highlighted as generally lacking in air transport research (Lohmann and Vianna, 2016, p. 203). The flip side is that in-depth interviews alone would not have as effectively and efficiently captured and explored as many relevant industry issues and trends

(and voices) compared with the additional use of a brainstorming session and two subsequent online main surveys.

6.6 Overarching findings and discussion

The key findings in relation to each of the four research questions (RQs) help to also highlight core insights gained. Firstly, the overall findings for RQ1 indicated that participant conceptualisations of the global airline industry are to a significant extent shaped and influenced by the region/s of the industry where their knowledge is highest. Given the airline industry's considerable size and global scope, founded on a diverse array of national air markets, this finding strongly reveals a heterogeneous global industry landscape, rather than a homogenous single entity. In this context, RQ2 revealed that both the North Atlantic and Europe are not likely to lead or significantly influence the global industry's future trajectory, so much as provide a window into how regional air markets might multiply over time as neighbouring countries elect to more closely cooperate on a multilateral level in air transport in different parts of the world in future.

One unexpected study finding in this respect – which also helped to vindicate the flexible approach adopted overall – was that economic ideologies (essentially free market support versus free market scepticism), did not significantly influence response choices for the most part. On most occasions, pragmatic views trumped ideologically driven opinions. The long running and ongoing industry debate covering freedom versus sovereignty (Rhoades, 2016) led to the development of several MCQs and forecasts thought likely to produce statistically significant results. These rarely did so. However, what was surprisingly uncovered were a series of statistically significant results based on regions of best industry knowledge, as noted above. Other Delphi-based research has concluded that situational context matters for experts, further

strengthening the need to involve "experts from different parts of the world" (Melander, 2018, p. 76). This study's findings would clarify this further by emphasising the need for experts with industry *knowledge* from different areas of the world.

The extent to which airlines are able to grow and extend their global reach is to a large degree determined by geography, and the three major Gulf carriers (RQ3) are a prominent case in point in this regard. These carriers help to demonstrate that geographical location matters in global aviation, and that such a competitive advantage is virtually impossible to replicate for airlines with less advantageous home base locations (Budd and Ison, 2017). The nationally based architecture of the global industry anchors airlines within a country, and this then confers unequal geographical benefits (Havel and Sanchez, 2014). It also means that growth rates and global reach have natural limits which make it challenging for any particular carrier, or regional group of carriers, to dominate the global industry as a whole (Flint, 2006). One key insight gained here from study experts was that marketing and media interest, sometimes bordering on hype, is not the same as considered expert opinion. This certainly appears to be the case when it comes to the three major Gulf carriers where media coverage has sometimes overstated their global impacts (Dresner, Eroglu, Hofer, Mendez and Tan, 2015).

Finally, RQ4 covering Asian region liberalisation and its global ramifications and insights, showed that the nationally based bilateral system is likely to endure for the industry in future, alongside regional pockets of multilateral liberalisation. China was viewed by most experts as the regional (and in many ways global) defender of this system and industry structure well into the foreseeable future. These four research questions and their key associated findings were more readily discoverable across five stages of data collection, including the use of mixed-methods. Any singular stage or approach would have struggled to unearth key industry insights across

such a range of industry regions, major players and contexts. Like a dragnet, the five stages of this study were able to capture a wealth of valuable data, while the data analysis was able to uncover key themes and statistical associations.

7 Conclusion and final considerations

This research journey helped to reveal not only the salient data and findings that can be unearthed on the global airline industry when employing a mixed-methods Delphi study, but also the insights that can likewise be produced for future such endeavours. Although the Delphi method is often time consuming and labour intensive – as indeed this study was – it need not also be financially costly. Online surveys and in-depth interviews (particularly those via videoconferencing), allow Delphi practitioners to reach experts from around the world in a timely and cost effective manner. But with technology, and multiple data collection stages involving many potential and actual participants, comes the risk of things going wrong, and contingency planning is vital to ensure any disruptions are quickly dealt with, and alternate plans activated when required.

Exploratory Delphi studies not only require contingency plans if and indeed when unexpected events occur, but they also need solid planning to ensure unexpected events are minimised to begin with. Scaffolding a Delphi research endeavour with one or two established strategic frameworks is an important way to ensure flexibility does not turn into undirected and unstructured data collection. Added to this, thematic analysis applied across multiple stages encourages a process of progressively locating and distilling key themes and sub-themes. This process in turn encourages an ongoing search for the most relevant insights, helping then to avoid tangents and weaker lines of scholarly enquiry on the whole. However, as participant response rates typically and understandably decrease across stages/rounds in a Delphi study, the

opportunities to explore key emergent themes is often times limited as a result. Delphi research requires considerable trade-offs with mixed-methods well placed to assist in reducing participant time commitments overall, allowing a reliable and defensible cohort of willing expert participants to be found across all stages of a study.

Even so, there is little doubt that more responses to the main survey 1 would have benefited the study overall. For instance, more emerging air market voices could have been located and captured, along with more opportunities to separate respondents into a range of employment categories and roles (i.e. response capacity) beyond the academic and non-academic cohorts used. It is likely that key stakeholders have significantly different views on the industry's future, and these were not readily apparent in this study. While it is true that an expert sample size does not need to be particularly large to generate salient insights, it is also the case that global topics like international air transport management possess the inherent risk of breadth overwhelming depth if not enough viewpoints are considered.

This research did show that a mixed-methods Delphi study is a very effective vehicle for collecting data on emerging air markets, though again with the caveat that emerging markets experts were challenging to locate. The western centric views that continue in many ways to dominate global aviation research must be challenged if the industry's future growth and development are to be better understood (Budd, 2014). After all, this is a global industry that is forecast to grow considerably in future, and much of that growth is going to be in emerging air markets in regions like Asia, South America and Africa (Baroux, 2013). Mixed-methods Delphi studies represent a valuable research approach to assist in uncovering key industry insights from these regions; only more so in a post COVID-19 world and industry.

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Insights from a mixed-methods Delphi study into the global airline industry

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