DIRECTIONS IN AUSTRALIAN GENERAL AVIATION: CONTEMPORARY ISSUES IN PLANNING AND POLICY

A Thesis submitted by

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For the award of

Doctor of Philosophy

2021

ABSTRACT

Australia is a vast geography with an unequal distribution of population across the continent and a concentration of wealth and infrastructure around its capital cities. The subtext of economic and political debate around the merits of federalism have done little to galvanise the case for regional and remote communities forming a powerful negotiating block in the area of public policy formation.

Key to the success of mobilising the economic participation and exchange of goods and services across these disparate locales is the transport network, with aviation playing a major part in missions as important as aeromedical relief through to the banal functions of newspaper and cash delivery. Added to this is the aviation community's support to tourism operators, with charter and general aviation often the lynchpin in connecting the city to the outback when regional airline routes are deemed unprofitable or of thin return.

Extant strategies to promote the growth and development of the general aviation sector in Australia have been inadequate, with the constituency identifying more impediments than motivators in the current environment. A major reason for the lack of strategic efficacy is the absence of detailed knowledge available to policymakers about the nature of stakeholder objectives, acumen and concerns.

In addressing this, I have undertaken a body of research that has sought to document the planning and infrastructure issues the general aviation sector faces, along with more macro themes that demonstrate unresolved historic issues or emerging and seemingly intractable problems. The intention has been to distil the findings from my investigation into areas of clear focus to contribute to national public policy planning.

During my candidacy, the industry met with a sudden and far-reaching moment of dislocation in the shape of the global COVID-19 pandemic. The circumstances materially impacted my capacity to engage in person with stakeholders across state borders. However, they also presented an excellent opportunity to determine the level of resilience and to catalogue the sector's response to stress and dysfunction relative to prior learnings and future planning imperatives.

Together both phases yielded results that contribute to the body of knowledge in an under-researched sector of the aviation industry, affording the opportunity to

present peer-reviewed findings and stimulate focused discussion for the benefit of a sector that has much to give in the national interest.

CERTIFICATION OF THESIS

This thesis is the work of Lucas Tisdall except where otherwise acknowledged, with the majority of the authorship of the papers presented as a Thesis by Publication undertaken by the student. The work is original and has not previously been submitted for any other award, except where acknowledged.

Principal Supervisor: Associate Professor Shane Zhang
Associate Supervisor: Professor Paul Bates

Student and supervisor signatures of endorsement are held at the University of Southern Queensland (USQ).

ACKNOWLEDGEMENTS

I would like to express genuine thanks to my indefatigable supervisor, Associate Professor Yahua (Shane) Zhang, for his work on my behalf. Through COVID lockdowns, sabbatical and international family obligations, he has stood by to motivate, coach, critique and guide my PhD studies with focused professionalism.

Additionally, I offer thanks to Professor Paul Bates for his early influence on the direction of my research, ensuring that what I developed remained a practical contribution to the world of aviation, for which we both share a passion.

Professor Anming Zhang has likewise lent his considerable acumen to my endeavours from afar at the University of British Columbia. His international perspective and experience have been much appreciated, and it has been a pleasure to collaborate with him on our published works.

Naturally, my patient family has been a part of this journey, and I thank each one of them for the sanctuary they have provided during my studies as I juggled life's many dimensions. To my Creator, I express thanks for the energy and balance that underpinned my endeavour, and to Lin-Manuel Miranda, I offer my appreciation for the creative score that perpetually inspired me not to throw away my shot.

I gratefully acknowledge the support granted by the Australian Government through the Research Training Program, under which this doctoral program was undertaken, along with the administrative and technical assistance of the USQ Research Office, Ethics Committee, the School of Business and the journal editors and reviewers who facilitated my publishing experience.

Capstone Editing provided copyediting and proofreading services, according to the guidelines laid out in the university-endorsed national 'Guidelines for Editing Research Theses'.

STATEMENT OF CONTRIBUTION

Tisdall, L. J., Zhang, Y. & Zhang, A. (2020). Development challenges facing general aviation airports: A case study of Archerfield Airport, Queensland, Australia. *Case Studies in Transport Policy*, *8*, 1458–1467.

The overall contribution of Lucas Tisdall was 75 per cent to the concept development, analysis, drafting and revising of the final submission. Yahua Zhang and Anming Zhang contributed the other 25 per cent to analysis, editing and providing important technical inputs.

Tisdall, L. J., Zhang, Y. & Zhang, A. (2021). Seeking wicked problems, finding opportunities: Advancing Australian general aviation policy planning beyond COVID-19. *Tranportmetrica B: Transport Dynamics.* Under review.

The overall contribution of Lucas Tisdall was 80 per cent to the concept development, analysis, drafting and revising of the final submission. Yahua Zhang and Anming Zhang contributed the other 20 per cent to analysis, editing and providing important technical inputs.

Tisdall, L. J., Zhang, Y. & Zhang, A. (2021). COVID-19 impacts on general aviation – Comparative experiences, governmental responses and policy imperatives. *Transport Policy*, *110*, 273–280.

The overall contribution of Lucas Tisdall was 75 per cent to the concept development, analysis, drafting and revising of the final submission. Yahua Zhang and Anming Zhang contributed the other 25 per cent to analysis, editing and providing important technical inputs.

Tisdall, L. J. & Zhang, Y. (2020). Preparing for ‘COVID-27’: Lessons in management focus – An Australian general aviation perspective. *Journal of Air Transport Management*, *89*, 101922.

The overall contribution of Lucas Tisdall was 80 per cent to the concept development, analysis, drafting and revising of the final submission. Yahua Zhang contributed the other 20 per cent to analysis, editing and providing important technical inputs.

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LIST OF ABBREVIATIONS

AAAA	Aerial Application Association of Australia
AAC	Archerfield Airport Corporation
AMROBA	Aviation Maintenance Repair & Overhaul Association Inc.
ASQA	Australian Skills Quality Authority
Avgas	Aviation gasoline
BCC	Brisbane City Council
BITRE	Bureau of Infrastructure, Transport and Regional Economics
CASA	Civil Aviation Safety Authority
CASR	Civil Aviation Safety Regulations
DANS	Domestic Aviation Network Support
EASA	European Union Aviation Safety Agency
FAA	Federal Aviation Administration
FIFO	Fly-in fly-out
GA	General Aviation
GDP	Gross domestic product
ICAO	International Civil Aviation Organization
MRO	Maintenance repair organisation
NSW	New South Wales
QLD	Queensland
QRIDA	Queensland Rural & Industry Development Authority
RPT	Regular passenger transport
SA	South Australia
SARS	Severe Acute Respiratory Syndrome
UK	United Kingdom
US	United States
USQ	University of Southern Queensland
VET	Vocational Education and Training
WA	Western Australia

CHAPTER 1: AN INTRODUCTION TO THE GENERAL AVIATION SECTOR

1.1 Background

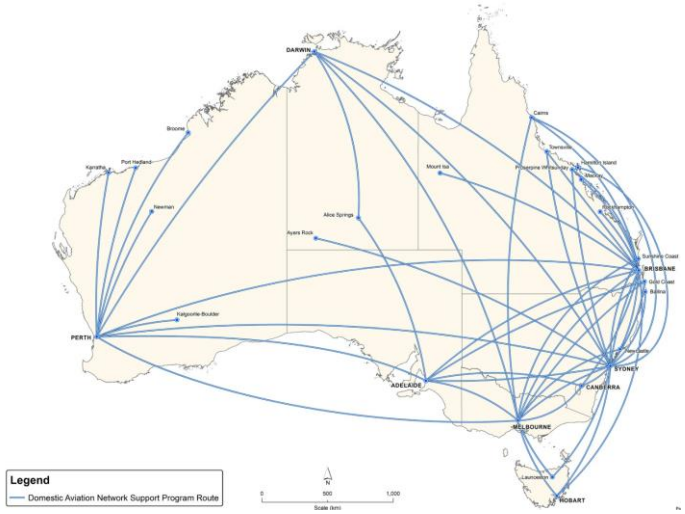
With a geographic footprint basically equating to that of the mainland 48 states of the United States (US), Australia's status as the world's largest island is legitimate. Its location in the southern hemisphere long made it an outpost of empire. Today, a multicultural society operates as comfortably in its Asian sphere as it does the West. That said, recent trade tensions with China in an era of globalisation are stimulating community uncertainty about the economic and regional security of Australia's modest population.

With such macro-political issues at play, it is perhaps easy to overlook that extant supply chains within Australia already carry dimensions that jeopardise continuity. Large distances, reliance on overseas fuel supplies, evolving state border controls and an underdeveloped model of intermodal connectivity are among these dimensions. Against this backdrop, air transport carries some 20 per cent of trade value (Adrian et al., 2019).

Researchers acknowledge the vital role of airline operators in the carriage of vital supplies of food and freight, whether in dedicated fleets or as an adjunct income associated with their regular passenger transport (RPT) activities (Hong & Zhang, 2010). However, these operators are restricted to larger airports which, before the onset of COVID-19, were becoming quite congested and facing capacity issues. Post COVID-19's emergence, the Domestic Aviation Network Support (DANS) program has assisted commercial airlines in maintaining subsidised operations on the nation's top 50 domestic routes. However, as Figure 1.1 illustrates, such operations overfly vast areas of the continent, making regional participation in the national economy a challenging goal.

Figure 1.1

DANS Network



Source: Department of Infrastructure, Transport, Regional Development and Communications (DITRDC) (2021).

Smaller operators have been required to operate to regional and remote communities on typically thin-margin routes utilising older utility aircraft. Such providers typically identify more with the general aviation (GA) community than their airline counterparts. The associated issues of operating safety, reliability, pilot availability and environmental sustainability that accompany these operations represent some of the dimensions of the supply chain considered in the publications that form the backbone of this thesis.

Recent statistics indicate the quantum of activity undertaken by this sector of the Australian aviation industry. In May of this year, the Bureau of Infrastructure, Transport and Regional Economics (BITRE) (2021) reported the following statistical contributions:

- Fixed-wing charter (non-RPT) operators carried some 288,000 passengers, representing a 37 per cent increase over the COVID-savaged May 2020 load.
- For the year ended May 2021, a total of 3.42 m domestic charter passengers were carried on 68,460 trips.
- Helicopter, joy flight and sightseeing charter flights were in addition to these numbers.

The value-add activities of aerial survey, flight training, firefighting, search and rescue and private flying are not typically recorded but should not be understated

in their quantum. More than 800 Air Operator Certificate holders conduct daily operations in the nation's approximately 14,000-strong GA fleet.

Despite the important function that non-RPT aviation stakeholders play in the movement of goods and services as a catalyst for economic activity, there has been an observed gap in the suite of federal policy to stimulate its renewal and growth. The Civil Aviation Safety Authority (CASA) has been an active regulator and has sought to address matters such as the ageing aircraft fleet and international licensing harmonisation. Still, a documented underlying distrust of its motives and performance make it a non-starter as an advocate for stakeholder engagement. The responsibility nominally falls to the Federal Minister for Infrastructure, with the portfolio in recent years typically residing with the Deputy Prime Minister. This role has been the subject of ongoing discontinuity. Thus the periodic efforts to stimulate change have been compromised by a lack of sustained stewardship, creating an observed vacuum in progressive policy setting for the GA community.

1.2 Motivation for the Study

The genesis for this study was the disconnect experienced when transitioning from a senior management role in the well-ordered and rational world of commercial banking to an entrepreneurial opportunity in the GA space. Whereas corporate finance revolved around risk assessment informed by industry benchmarks and norms, the GA sector presented as a thinly capitalised, acumen-light environment populated by passionate practitioners rather than a cohesive group of like-minded businesspeople.

Operating in Brisbane, one looked to the larger centres around Australia to gauge whether these observations were ubiquitous. In doing so, it became clear that passion and self-interest (or indeed self-preservation) were substituted for a national policy framework that would otherwise act to guide, incentivise, or direct the constituency towards national economic objectives.

Brookfield's (1998) 'four lens' theory asks a critically reflective professional to review their perspectives and practice through the eyes of themselves, those they teach or lead, their peers and literature. As a newcomer to the industry, I did not have a working frame of reference with which to engage. As a potential competitor, I found other stakeholders guarded in what they were prepared to share on a peer-to-

peer basis. As a leader, I encountered talented people operating with a kind of bounded rationality. When seeking to be informed by the literature, I found an under-researched, little-documented area of inquiry that demanded attention.

As a PhD student and industry researcher, I obtained access to a platform that facilitated inquiry as an observer and neutral agent, which has permitted a genuine engagement with the grassroots membership of the national GA community and a measure of credibility with the officialdom that is charged with its undertakings. This privileged role has been leveraged, through peer-reviewed contributions, to create an awareness of the sector's needs and its challenges as it struggles to find a voice in the national policy landscape during one of the most challenging periods of its century-long existence.

1.3 Research Aim and Objectives

The goal of this study rests on two pillars. First, an investigation of the existing dimensions of GA practice in Australia, focusing on the structures, competencies and environment that shape it. Subsequently, a determination of what issues universally influence decision making and intent among the leadership of the GA community.

Throughout its compilation, the research project has sought to provide new insights into several overarching questions. Firstly, what do contemporary industry stakeholders in Australia believe would best enable the growth and development of their GA business and the sector more broadly? Chapter 2, through the use of case study analysis, identifies some significant impediments and opportunities open to the industry under the right policy conditions.

Secondly, how closely are these stakeholder considerations aligned to current and proposed government policy settings? Chapter 3 seeks to document policy issues that reflect the complex nature of contemporary public policymaking based on the commentary of experienced GA sector stakeholders.

Finally, do the observable behavioural drivers of industry participants reflect any correlation to current academically accepted managerial decision-making paradigms? If not, what does this mean for policymakers? Chapters 5 and 6 seek to address these questions through the period of pandemic disruption in 2020–21 and

look to promote discussion about the sectors capacity to learn from it in the face of inevitable future sector upheaval.

The product of the research required to answer these questions was envisaged as a vital input into shaping more coherent and progressive federal policy for the sector. However, the onset of the COVID-19 pandemic in early 2020 afforded an unforeseen opportunity to observe how the sector would respond to sudden stress and dislocation, giving insights into its areas of resilience and weakness that might not otherwise have been documented.

The resulting body of work assembled during this period and presented for peer review through a series of Q1 publications reflects the pivot in focus required to track the sector during this critical time. It is hoped that the conclusions reached still represent satisfying answers to the original research question focus, but with perhaps a dimension of raw honesty that comes with observing a genuinely invested population act to preserve their investments and participate in a national recovery.

1.4 Contribution of Research

As highlighted above, there is little evidence of sustained research into the activities, decision making, strengths and opportunities in evidence for the Australian GA community. The literature reviews completed at each step of inquiry do not uncover a focused body of work that has a direct value to policymakers seeking insights into the constituency. The federal government's research arm attests to the lack of data supporting any genuine analysis of the contribution GA makes to the national economy (BITRE, 2017).

This study seeks to address this gap in knowledge. The enquires launched within utilise an array of research methodologies to support an analysis of the contemporary issues that keep GA stakeholders 'up at night'. The outcomes contribute a starting point for further research into such matters as the nature of regulatory oversight, resilience, acumen and sustainability. It is hoped that the dimensions explored within the body of research might be used to stimulate dialogue and bridge the observable and now measurable disconnect between policymaker and practitioner.

It has been gratifying to experience early engagement with the federal regulator as the assembled works have reached publication, indicating their respect

for new sources of intelligence to form a view of what they can do to support industry. Particularly pleasing has been the inquiry focused on the mental health and wellbeing of stakeholders after the publication of peer-reviewed findings encapsulated in Chapter 5. Further, the publications arising from this endeavour have been cited in multiple papers internationally by fellow researchers who have likewise identified an opportunity to explore the dimensions of global GA performance during the pandemic.

1.5 Thesis Structure

This thesis follows the 'Sandwich model A' pattern outlined by Mason and Merga (2018) whereby, after the commentary above on the genesis of the research is addressed, a series of contextualised published works are included to present a storyline showcasing the research resulting from academic inquiry. The concluding chapter draws together the findings and conclusions for future discussion.

Specifically, the thesis commences with a sharply focused analysis of the current operating environment typically experienced by the GA community. Chapter 2 provides a published case study of Archerfield Airport in Brisbane, Queensland (QLD), as a benchmark for comparing the commercial and physical environment of privatised secondary airports nationally. From this work, it was clear that while the utility of GA was relatively easy to identify, the capacity to unlock its potential was impacted by myriad planning and policy hurdles that have retarded its growth. Taking the key findings of the Archerfield case study and reviewing both peer and smaller regional centres, it became clear that such obstacles to progress are shared by many aviation hubs nationally and that no clear policy framework has been promulgated to address them or provide direction to industry.

To explore the validity of these findings, the research focus shifted to a more macroeconomic analysis of key issues in policy planning for the GA sector. Chapter 3, which presents a paper currently under review, seeks to itemise a range of policy constraints identified by stakeholders and practitioners in a broader operating environment. Participants engaged in accordance with a Research Ethics application approved and periodically validated by the USQ Human Ethics Committee. Based on their codified responses, a series of findings emerged that warrant inspection by policymakers. They have a direct bearing on identifying potentially new and

engaging policy levers that would garner stakeholder support and overcome historical cynicism held by the community, who have long associated policymaking with the contentious regulatory activity of the CASA.

During periods of stress and uncertainty, the law of primacy and the tendency to self-preservation typically emerge. The arrival of the global pandemic introduced significant dislocation to the aviation community at all levels. The proceeding chapters documented issues in decision-making during normal operating conditions. Through a peer-reviewed journal article, Chapter 4 tracked the response of a cross-section of operators in a new and stressful phase of unparalleled experience. The findings illuminated a heretofore little measured lack of acumen in the GA community, which had a deleterious effect on the supply chain and genuinely tested the resilience of operator capacity and the depth of their financial capacity.

In Chapter 5, a final journal contribution probes the ability of both sector participants and federal policy makers to learn from the pandemic dislocation and cooperate in formulating a response plan to insulate the sector from future sudden negative occurrences. Given that research scientists across the planet are warning of cyclical pandemics against a backdrop of climate politics, the paper provides evidence that there are several imperatives already identifiable and actionable.

In Chapter 6, a concluding discussion of the main findings, limitations and future recommendations for investigation is presented to promote discussion. It may perhaps provide a springboard from which other more worthy researchers might find solutions to promote the growth and development of an Australian GA sector that is, to date, under-researched and in the shadow of its larger civil and military aviation brethren.

CHAPTER 2: DEVELOPMENT CHALLENGES FACING GENERAL AVIATION AIRPORTS: A CASE STUDY OF ARCHERFIELD AIRPORT, QUEENSLAND, AUSTRALIA

Preface

As the introductory comments to this dissertation have stressed, there is a lack of depth in the published research surrounding public policy development for GA. A major element in the nexus of issues involved is 'place'. While internationally, airport planning and the development of synergistic economies are well documented, there is comparatively little documented about the state of infrastructure occupied by the non-airline fraternity and Australia's secondary airports. Even less is documented on the limitations the current state of that infrastructure places on operators and their ability to contribute to the national economy.

This chapter seeks to make a novel contribution to the extant literature by exploring Archerfield Airport in Brisbane as an illustrative case of regionally important infrastructure that faces significant planning obstacles. The objective, aligned to the overall research direction of this study, is to identify the range of specific dimensions being experienced in that precinct to subsequently test whether they exist in the wider GA community. If so, the research will represent a step forward in identifying specific areas of policy formation worth focusing on in a wider national context.

2.1 Introduction

There are over 2,000 airports and airfields in Australia, about 155 of which receive RPT services (BITRE, 2017). Major capital airports have been leased to private operators under the *Airports Act 1996* (Cth). The vast majority of regional airports are owned and operated by state movements and local councils. Much of the existing research studying Australian airports focus on the major airports in capital cities (e.g., Jiang & Zhang, 2016) or regional airports receiving RPT services (e.g., Zhang et al., 2017; Zhu et al., 2019). The group of federally leased secondary and

metro airports is largely ignored. This group of airports include Archerfield in QLD, Jandakot in Western Australia (WA), Moorabbin and Essendon in Victoria (Vic.), Bankstown in New South Wales (NSW) and a host of others. These airports mainly cater for various GA activities.

In the last 30 years, notable major airports around the world have embraced the concept of an 'airport city' through the development of both aviation and non-aviation related businesses (e.g., Appold & Kasarda, 2013; for recent literature surveys, see Zhang & Czerny, 2012; D'Alfonso & Bracaglia, 2017). However, little research has discussed if this experience is replicable for a city's secondary airport. This paper considers several particular issues confronting Archerfield Airport, one of Australia's key capital city secondary airports privatised in the 1990s. It seeks to build on studies of other Australian ports, including the thriving Essendon precinct (Freestone & Wiesel, 2014), to understand how contemporary stakeholders globally might proceed to identify and address local barriers to growth and development for underperforming aviation assets.

Freestone, Williams and Bowden (2006) have correctly identified that 'in the global "space of flows", airports are critical nodes and have latterly assumed major economic significance extending beyond core aviation functions' (p. 491). This is certainly the case for major commercial ports handling domestic and international passenger and freight logistics. But it is also reflected in the categorisation of the aged Archerfield airport in Brisbane's west as a key strategic asset for south-east QLD (Brisbane City Council [BCC], 2011). This major secondary airport is experiencing operating and modernisation challenges not dissimilar to many increasingly urbanised landscapes worldwide.

Like many second-tier airports that cater for non-airline-centric GA activity, the story of Archerfield has not specifically been the subject of intense scholarly or political scrutiny since its privatisation. Mills (1995) highlighted in the early days of the privatisation debate that the Australian aviation industry was remarkably self-interested, demanding of taxpayer support and fractious. That this characterisation still has merit is borne out by a recent federal government report stating, 'there are currently no robust economic datasets compiled for the GA sector, restricting analysis of the impact of the various cost pressures facing GA or the contribution GA makes to the economy' (BITRE, 2017, p. 1).

Contemporary economic and geographical theory holds that the airport, as a construct, is a nexus of networks, alliances, markets and infrastructure that supports commercial endeavour (e.g., Walker & Stevens, 2008; Morrison, 2009; Kidokoro et al., 2016; D'Alfonso et al., 2017). Yun (2015) holds that the speed to market implied by air transport support is the single most relevant factor in determining the competitiveness of a specific operating location in an increasingly globalised marketplace.

While Walker and Stevens (2008) suggest there is very little empirical research into this changing role of the modern airport, the presence of the 'airport city' concept in contemporary literature is widespread. Arthur (2018) provides evidence of its global application, exploring the evolution of Ghana's Accra airport. His work notes that, while still emergent in Africa, the paradigm tends to act as an accelerant for economic growth. Taiwan has experienced measurable growth attributable to developing the airport city as a 'planning objective' rather than a simple physical manifestation (Wang et al., 2013). Nevertheless, the 'aerotropolis' (Kasarda, 2005) projects a significant geographical presence in an increasingly urbanised environment, and design firms worldwide vie for the opportunity to develop signature projects (Asia Today International, 2012).

Chandu (2017) suggests that such airport precincts are now ubiquitous, resulting from factors as diverse as privatisation, airline deregulation and 'revenue pressures to make airports economically self-sufficient' (p. 373). Wang et al. (2013) have contributed a set of criteria for evaluating the service quality of individual locales, allowing a graduated scaling for the success and sustainability of different facilities across the globe.

Interestingly, Kimelberg and Nicoll (2012) have found that the specific appeal of airports for firms is not clearly understood. They reason that prestige metrics are at play, enhancing the perception of an airport located business as well-connected, highly mobile and on-the-move. Appold and Kasarda (2013) have opined that airports serve as 'functional urban anchors and as symbolic points of orientation' as traditional cities grow to subsume airports surrounds (p. 1243). Their efforts to correlate economic activity by reference to post code–level data in the US have generated three as-yet unresearched hypotheses suggesting there is still some way to determine an absolute relationship between airport city functioning and general economic performance.

Many studies have examined the regulation and privatisation of Australian airports and the associated challenges (e.g., Forsyth, 2002, 2008; Freestone & Baker, 2010; Donehue & Baker, 2012; Lohmann & Trischler, 2017; Zhang et al., 2017). Freestone and Wiesel (2014) have noted that today's Australian capital city airports are increasingly typified by land uses that 'conspicuously juxtapose' traditional aviation activities with non-aeronautical enterprises. This progressive clustering of disparate interests can either be seen as a contact zone for developing new economic synergies (Archerfield Airport Corporation [AAC], 2017) or a battleground for those who believe that it is the vanguard of GA's demise (Archerfield Airport Chamber of Commerce Inc., 2011).

Freestone and Wiesel (2014) documented the journey of Melbourne's Essendon airport as it evolved into Essendon Fields. These authors examined the conflict and progressive resolution of an underperforming aerodrome into a vibrant metropolitan airport and retail destination. Is the experience of creating such an economic hub transposable? This chapter seeks to consider the trajectory of Brisbane's equivalent airport, Archerfield, and its unique issues from an economic and public utility perspective. This implies that we look at the issues facing Archerfield Airport not just from the perspective of the airport itself or a small number of stakeholders. Rather, we investigate the issues from the perspective of the whole GA sector. At the same time, the airport and surrounding facilities bear the nature of a public utility. Thus, the interests of the general public and the role of the government are also considered.

Contemporary scholastic endeavour encourages investigators to consider links to First Nation peoples (Kirkness & Barnhardt, 1991). Therefore, the next section provides the historical context of Archerfield as a realm of contact and conflict and its current status. The methodology is briefly mentioned in Section 2.3, followed by a discussion of a series of challenges that need to be resolved if Archerfield's highest and best use as an airport is to be fully realised. The last section details some interim conclusions.

2.2 Background—A Short History of Archerfield

The traditional owners of the land known as Meanjin, on which Archerfield airport stands, are the Jagara (or Yuggera or Yagarabul) people. This indigenous

group oversaw tribal lands that reached from bayside Cleveland towards the west into the Brisbane Valley. The Maiwar, known today as the Brisbane River, watered the region, which, until the arrival of white settlers, was well timbered although pocketed with swamps and boglands (Steele, 1972). The Jagara people enjoyed a high degree of mobility, as testified by the fact that many of the paths that connected Dreamtime sites became the foundations of road infrastructure for later White settlement (Petrie, 1904). These pathways also connected the Jagara with neighbouring tribes, like the Wakka to the west. Such connectivity facilitated trade, cultural exchange and diplomatic engagements like the triennial Bunya feast, reinforcing familial connections across traditional borders (Queensland Museum, 2019).

By the 1850s, land to Brisbane's west had been opened to settlement, and publican Thomas Grenier purchased some 650 acres of lightly timbered prime grazing land for the handsome sum of £1,920. Within 10 years, the property had been divided into three farms shared by the Grenier family, including Franklin Grenier. Subsequently, the Beatty family acquired the property from the family and ownership of the other properties changed hands into the early 1900s (Grenier, 2009). These family names live on in the streets and roads that criss-cross the Archerfield precinct or lie upon the headstones of these settlers in the God's Acre cemetery maintained within the airport boundary (Friends of God's Acre, 2019).

When Qantas chief instructor Lester Brain landed his de Haviland Giant Moth aircraft on Franklin's farm in 1927 to test its suitability as an airfield he started a cycle of activity that gained rapid motion. After its federal acquisition in 1929, gravel strips were created and the aerodrome took on the name Archerfield (derived from an earlier property of the same name to the south-west). In the 1930s, Qantas moved from their Eagle Farm facility to the newly constituted airfield, and the property became the main airport in Brisbane (Prangley, 2013).

The Second World War saw a fortress mentality settle over Archerfield in defence of the Brisbane Line (Palazzo, 2006). US and British authorities stationed both army air corps and naval forces at Archerfield, alongside Australian and other Allied troops (Kaeys, 2006). Hangars now occupied by Caterpillar and Hastings Deering to the east of the current airport boundary testify to the scope of airfield operations during these critical war days in the Pacific.

After World War Two ended, major air traffic once again moved to Eagle Farm, where technology, political will and town planning coalesced to overcome the geological issues that had faced the waterlogged area. Archerfield came to be the home of light aviation and continued to play host to a variety of GA through to the heady days of the 1980s when the aerodrome facilitated approximately 320,000 movements a year under the auspices of the Federal Airports Corporation (AAC, 2019).

Archerfield was privatised in 1998, along with some 20 other facilities around the nation,. The leasehold for the field passed to AAC Pty Ltd for USD 1.9m (Hooper et al., 2000). At this stage, Archerfield shared many of the same physical and performance characteristics that Freestone and Wiesel (2014) documented in their exploration of the Essendon experience.

Today's Archerfield, a little over 11 km south-west of the Brisbane central business district (CBD) and some 25 km from Brisbane International Airport, covers approximately 257 hectares of land (see Figure 2.1). It plays host to a much-reduced activity level of around 140,000 movements per annum (AAC, 2017) compared to its pre-privatisation era. Nearby Ipswich Road and the South-East Freeway provide convenient, although often heavily trafficked access to the city and larger Brisbane airport through toll road and tunnel options. The facility is serviced by BCC's bus routes, which have stops within walking distance of the airport entries proper. Coopers Plains, QLD Rail station, is the closest commuter rail link at 3 km away, approximately a 38-minute walk.

Figure 2.1

Archerfield Airport

Source: Google Earth (2019).

The airport is divided into eight specific precincts under the AAC (2017) master plan. These precincts are located within five land use zones for planning purposes, including special purpose (airport), general industry, low impact industry, community facilities and conservation (AAC, 2017). Some 75 hectares of the site remain available for development, presenting an attractive opportunity for value building in Brisbane's second-fastest-growing gross domestic product (GDP) area after the TradeCoast Region (BCC, 2017).

The functional heart of the airport business is the 10/28 runway complex, consisting of twinned directional sealed runways running east–west. The 28R/10L is 1,481 metres in length, sealed and rated PCN6 with pilot-activated lighting. Its neighbour, 28L/10R, is 1,100 metres long and only 18 metres wide through its midsections. Twinned grass runways running 22/04 are also available for use, subject to prevailing winds and ground conditions.

The sealed 28R/10L major runway is currently subject to the major development works program, named Airside Infrastructure Modernisation (Project AIM), with some AUD 17.5m to be spent in lengthening and strengthening the runway and associated taxiways and upgrading the area's lighting to meet International Civil Aviation Organization (ICAO) requirements and enhance operational safety (AAC, 2018; Muir, 2019). The airport managers purport that the upgrades will enhance the operational capability of existing airport users and encourage greater use of the infrastructure as an alternative for some users of the busy Brisbane airport (Gaynor, 2018).

2.3 Problem Statement and Methodology

Research analysing airport decision-making efficiency in terms of inputs and outputs has been compiled over several years, using benchmarking tools like data envelopment analysis and other quantitative measures (Adler et al., 2013).

Experienced airport consultants have recognised several key qualitative metrics in managing risk for smaller airports. These dimensions include operational management, stakeholder and community safety, future planning and community expectation (Aviation Projects, 2020) alongside easier-to-measure functions like financial performance. Still, others highlight the need for forward-thinking airports to

plan for speedy adaption to changing regulations and market conditions as part of their cyclical planning agendas (Chant, 2015).

The status quo at Archerfield is shared by a number of privatised airports in Australia in terms of the challenges represented in managing these planning dimensions, and many of the barriers to growth are experienced internationally where urbanisation and infrastructure tensions exhibit themselves (for substantive US and Indian examples, see Joiner (2014) and Rana (2017)).

Yin (2009) suggests that a single case design is rational if the case is a representative or typical case from which the lessons learned are assumed to be informative about the experiences of the average situation. It is particularly useful and appropriate in exploratory research or the early phase of a research program. The case study method is preferred when researchers have little or no control over the events or when there is little background. Given that there is little research into secondary airports for mainly GA activities and charter flight services, this research uses a typical case approach to examine the issues associated with Archerfield Airport, which will shed light on the operation of similar airports.

In case studies, six sources of evidence are mostly used: documentation, archival records, interviews, direct observations, participant observation and physical artefacts (Yin, 2009). Our case study considers a range of documents, including archival records, newspaper and magazine articles, government and enterprise websites, industry reports, academic studies and so on. The results of our inquiry surveying the experience of flight training (fixed-wing and helicopter) providers, transiting charter operators, embedded engineering and avionics contractors and aviation aligned service providers are discussed in the next section.

In focusing attention on Archerfield, this paper seeks to contribute to the relative vacuum of research into the trajectory of secondary airports as part of the contemporary urban planning discussion. It is noted that Archerfield principals have made a considerable investment in the Transition Archerfield Logistics Estate to realise the highest and best use of land in the airport precinct. The Transition site is on the north-western side of the airport. It is promoted as allowing flexibility to provide solutions for aeronautical and non-aeronautical business needs up to 80,000 m^2 (Transition, 2019). With intermodal rail access only 1.5 km away and the ability to operate 24/7 away from the more southerly residential ones, the estate is well placed to facilitate the operational needs of the South-West Industrial Gateway

Major Industrial Area (or SWIG MIA) (BCC, 2019). To date, this area remains largely untenanted by the sorts of businesses sought after in the design concept.

Where some sizeable new tenancies have been consummated, they have been primarily sourced from the public sector and corporate charities. Lifeflight, a major rescue service, has located its heavy helicopter maintenance facility at Archerfield. The government-funded Police Air Wing (PolAir) and Rescue 500 (QLD Government Air Wing, or QGAir) helicopter bases are found on the field after significant dollars were invested in their accommodation. For the most part, however, the eclectic mix of ageing buildings continues to house businesses both aeronautical and non-aviation-focused that the airport has not directly engaged in the facilitation of its re-emergence. While some progressive thinkers in the tenancy base are keen to grow their footprint, they are cognisant of several issues that limit their propensity to invest. This research will use Archerfield Airport as a case study to identify these issues and challenges facing airport users, noting that similar planning pressures appear to be an emerging theme worldwide.

Kalakou and Macário (2013) developed airport business models based on Osterwalder and Pigneur's (2010) business model canvas concept that include nine interrelated components: customer segments, value proposition, channels, customer relationships, revenue streams, key resources, key activities, key partners and cost structure. The issues discussed in this paper are within the elements of the Kalakou and Macário (2013) model and in a more specific Australian GA context.

2.4 Contemporary Challenges and the Future

2.4.1 Zoning

When Archerfield aerodrome was created, it was set among farmland on the city's outskirts where the tallest building until 1970 was Brisbane Town Hall at 95.7 metres, nearly 12 kilometres away (Atfield, 2017). Today, the airport is encased in a light industrial planning zone and low-density residential areas characterised by affordable housing and postwar housing commission style properties.

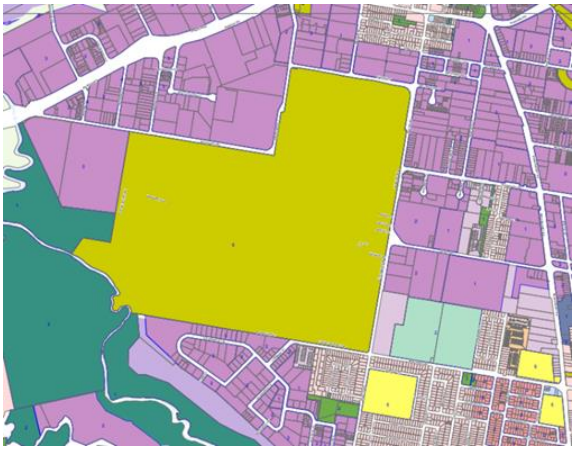
The three nautical mile operational zone of the airfield incorporates much more suburban space, where residential concerns for aircraft operating at the 1,000-foot circuit height mark (including emergency services flights) are reflected in noise

complaints of 53 separate suburbs through the Airservices Australia reporting channel (Airservices Australia, 2019b).

Figure 2.2 graphically demonstrates two key issues previously identified by Baker and Freestone (2012), specifically, 'the clashing of public and private values with respect to the vision and role of airports, and the challenge of integrating intergovernmental planning responsibilities within a federal system' (p. 329).

Figure 2.2

Brisbane Zoning Map



Source: BCC (2019b).

As a federally owned but privately operated airfield, Archerfield remains subject to Commonwealth planning protocols under the auspices of the responsible minister and the *Airports Act 1996* (DITRDC, 2019a). The surrounding infrastructure is owned by state and local government, and each of the three tiers reflects different planning priorities.

An instructive example of the planning tensions between the tiers was evidenced in the Archerfield Airport Community Consultation Group forum conducted on 21 February 2019. One of the authors attended the forum as part of the community outreach required in consultation for the major development works associated with the runway upgrades. The local Councillor for the Moorooka Ward expressed frustration that federal departments, namely Airservices Australia and CASA, should be mandating the height of light poles and trees in the public safety area at the end of the runways, currently occupied by a community sporting club in a parkland. The ensuing discussion about public utility versus aviation safety highlighted the lack of communication and coordination about local area planning,

flora and fauna management and economic value, let alone any consensus on such recondite concepts as quality of life and free-market activity.

The unfortunate incident involving the impact of a Beechcraft King Air turboprop aircraft at the Essendon Field's factory outlet shopping precinct in February 2017 was seized upon by many parties, both internal and external to aviation, to seek a redress of planning and development activity at Archerfield (Hamilton-Smith & Withey, 2017). However, such calls overlook that the airport is gazetted as a cornerstone piece of infrastructure for Brisbane, which must be retained as an airport in terms of its 50-year lease with a 49-year option from the Commonwealth (Administrative Appeals Tribunal, 2015). Further, the capacity to maintain the facility mirrors the almost universal requirement for any airport to generate both aeronautical charges and revenue from commercial activities (Freathy & Connell, 1999).

The dilemma of ameliorating land-use conflicts, noise, residential concerns and commercial mandates reflects the Essendon Fields trajectory and reflects documented international experiences (Lassen & Galland, 2014). As the population of Brisbane grows and the drive for affordable housing and higher-density living increases, it is clear that the socio-spatial and environmental challenges facing Archerfield will intensify. So too will the associated challenge of balancing the on-airfield allocation of resources between commercial and aviation interests in the search for ongoing sustainability.

2.4.2 Historic Preservation

Getting the balance right between progress and preservation is often a difficult task. Archerfield Airport principal, Gavin Bird, is quoted as saying:

> Archerfield is a significant place in the history of international aviation. It is a significant place also in the soul of our nation through its multifaceted role during World War II. Above all it remains the heart of our community. (AAC, 2017)

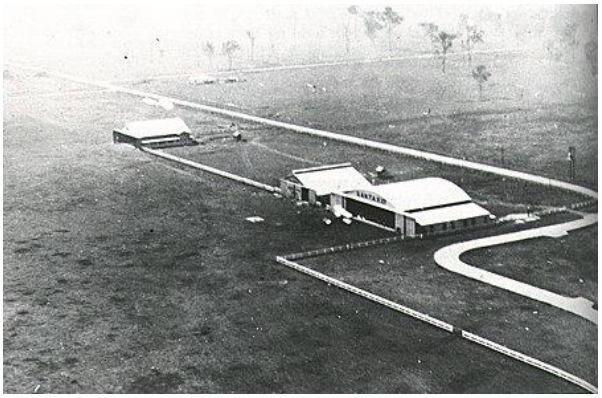
The capacity to preserve elements of the past is complicated when a sense of place is defined by activities rather than any particular piece of infrastructure fabric as an artefact of culture (Kaufman, 2009). The airport's master plan specifically notes that 'there is no evidence of archaeological sites or features that require specific management at this time' (AAC, 2017). However, given the emotional

attachment that many aviators have with the precinct, they are sensitive to preserving the heritage of the aerodrome for future generations.

Arguably, there are three buildings that feature significantly in the photographic record of Archerfield. Its art deco–styled terminal building was erected in 1941 and originally housed the control tower atop its roof. Hangars 4 and 5 are often pictured bedecked in their original Qantas signage (see Figure 2.3). Several other empty buildings of yesteryear are dotted about, and, of course, there are remnants of the settler history on the property. Some of these presented themselves as recently as 2015 when a sinkhole opened at the end of one of the grassed runways revealing a nineteenth-century windmill from one of the original Grenier family homesteads (Lim, 2015).

Figure 2.3

Hangar 4 (centre) in 1931



Source: Ozatwar (2020).

While the premises above call to mind the heady days of activity and associated nostalgia, it is impossible to discount functionality issues for the twenty-first-century business.

Enhanced need for electrical and data services, increased compliance requirements under workplace safety legislation, the security demands of the Office of Transport Safety, paying customer expectations and comfort, larger aircraft handling requirements, general accessibility and freedom of movement are all competing demands on the ageing fabric of a facility that proactively bills itself as Brisbane’s Metropolitan Airport (see Figure 2.4).

Figure 2.4

Hangar 4 Challenged to Suit Modern Aircraft Requirements

Source: L.Tisdall, personal photograph, July 21, 2018.

Preserving space and place is possible, as evidenced by Essendon Fields's approach to refurbishing the Area Approach Control Centre and rebirthing its Beaufort Building into appealing contemporary office space (Essendon Fields, 2019). Archerfield, however, demonstrates a paralysis of purpose in the execution of its vision. With perhaps the exception of Boeing subsidiary Aviall, it has failed to attract aviation-aligned corporatised support that could act as a catalyst group to attract business interests to the airport proper. The will to attract new investment and enhance the property's visual appeal has not been widely promoted, nor have incentives been publicly offered to private interests to participate in the renewal. A kind of preservation by default is in evidence, which does not telegraph the progressive emergence of an airport city-style mentality where the leaseholder is the primary driver of value creation on the property (Schaafsma, 2010).

2.4.3 Affordable Rent

The aviation industry tends to be highly capital intensive and operates on very modest margins (Jorge-Calderon, 2013). This axiom holds true across the GA sector. The sorts of activity volumes and / or profits that enable the larger multinationals to afford modern, purpose-built facilities are not typically enjoyed by the approximately 820 Air Operator Certificate holders across the country, many of whom are small family businesses. This perpetuates a lack of demand for the renewal of ageing infrastructure at many airports, with Archerfield being a case in point. Thus, of the 72 hangars on the airport, the vast majority bear the hallmarks of advanced age or are no longer fit for purpose. The airport's wartime legacy endures

with hangars designed for tailwheel aircraft and lacking the tail clearance to accommodate or service larger tricycle gear aircraft. As a case in point, the ubiquitous workhorse of QLD, the Beechcraft King Air, can only be accommodated in one hangar anywhere along the eastern Qantas Ave frontage of the airport.

From a development perspective, the AAC and its parent company desire to design and build new infrastructure rather than encourage external capital placement from tenants. In doing so, they seek to earn revenue from the ground rent and a return on their investment, an appropriate strategy for a for-profit family business. In a recent offering by the corporation, a facility with a gross lettable area in the order of 1.840 m^2 costing AUD 960 per m^2 to build commands approximately AUD 250,000 per annum plus GST and outgoings (L. Bird, personal communication, 21 February 2019). These sorts of figures are not out of keeping with current commercial expectations in industrial developments in the Brisbane market (BMT, 2019).

Unfortunately, aircraft do not necessarily earn revenue directly proportional to their size (Wei & Hansen, 2003). A larger lettable area is required to protect an expensive charterable aircraft from the elements, but the leased space is not a function of what the aircraft earns. As a result, many operators are forced to house their aircraft in the open, on limited hardstand or grassed areas, making wet weather operations hazardous. In the catastrophic Brisbane storm of 2014 (Donoughue, 2014), many operators experienced the complete destruction or long-term grounding of their aircraft, with repairs and loss of income proving significant. Insurance claim managers estimate that across three major storms to affect the airfield between November 2014 and February 2015, some 400 aircraft were damaged with settlement costs in the order of AUD 9m (D. Tait, personal communication, 28 March 2019).

The 2017 BITRE GA Study reported that, of the sample collected, GA businesses factored 8 per cent of their expenses as ‘rent including airport lease costs’ (2007, p. 31). Using the above example of a meaningful hangar of 1,840 m^2 capable of housing a fleet of 10 mixed-size machines, a business would be carrying an expense budget in the order of AUD 3.125m, well above the gross turnover of most operators on the airfield. Realistically, rent consumes a much higher proportion of expenses even for those in postwar accommodations, let alone anything more contemporary.

The costs of maintaining a fleet where the average age of aircraft is approaching 40 years (CASA, 2017), and the cost of regulatory compliance in operating and piloting them, leave few dollars for expenditure on rents for new developments with price tags reflective of industrial estates where the same structural pricing limitations do not apply. Add to this the finance costs for the airframes that are often not scaled to their utilisation, and operators' confidence to push their operational presence in facilities they will never own is considerably diluted. Overcoming the disproportionate cost-to-income ratio for tenants will remain a significant impediment to discretionary airside development. It tends to support the need for a genuine ramp-up in non-aviation incomes to provide cross-subsidy capacity if the overall precinct is to experience renewal.

2.4.4 Commercial Imperatives

In an attempt to more fully realise the forecast of up to 260,000 aircraft movements per year by 2037, the AAC has sought to encourage the re-establishment of RPT services at the airport. The current master plan points to a handling capacity of 400,000–500,000 passengers per annum across some 9,000 movements in aircraft equivalent to Dash 9 – Q400 or Embraer 170 capacity (AAC, 2017, p. 66). Passenger throughput charges, aeronautical and landing fees and revenues from terminal business activities would further stimulate the AAC's cash flows. Such supplements are a natural expression of the airport city paradigm if executed to encourage consumer engagement at the airport rather than a simple drop and run regional airport experience.

Freight handling is also considered a prime driver of activity if such could be integrated with the Transition Logistics park. Formerly, experienced operators like Jetcraft operated Metroliners and Cessna C441 aircraft from Archerfield. Unfortunately, low margins and a structural change within the air freight industry served to force them out of business in early 2008, and there has not since been a credible logistics handling presence on the field. With the increasing cost of operations at Brisbane Airport and the restriction on movements there, there is surely an opportunity to address the vacuum in freight handling services from Archerfield. New aircraft like the Cessna C408 Sky Courier due to launch in 2020, for which FedEx is a launch customer in the US, would be well placed to operate from Archerfield in the overnight intercity express air freight business.

Aeromedical activity features in the basket of opportunities for Archerfield to evolve into an airport city with a fully integrated offering. With the secondary QEII Jubilee Hospital approximately four kilometres away and the Princess Alexandra and Mater hospitals having helicopter retrieval facilities and major trunk road access, it would seem natural to provide for Royal Flying Doctor Service and Angel Flight Australia activities. However, recent overtures to the Royal Flying Doctor Service faltered on commercial and operational grounds, and CASA's tightening of volunteer medical support aviation requirements is likely to have a limiting effect on this activity (Cripps, 2019).

Flight training has provided the backbone of movement activity at Archerfield for some time. When the oldest aero club in the southern hemisphere, the Royal Queensland Aero Club, floundered financially in 2016, the airport lost significant momentum with tertiary institutions and international student training. A similar experience was felt in 2009 with the failure of Flight Training Australia. Since these failures, Basair Aviation College and Flight One have grown to be the principal providers of flight training on the field, with several other smaller operators also present in the GA and recreational aviation spheres. Many operators in the industry have developed a reliance on the Vocational Education and Training (VET) Student Loan funding model orchestrated by the federal Department of Education Skills and Employment and the Australian Skills Quality Authority (ASQA), and sudden changes in funding models (as was experienced in 2017) can test their financial resilience, particularly where there is little depth to their source of revenue. The high cost of operating a CASA regimen in an Airservices Australia–managed control tower environment compared to the low-cost self-regulated Recreational Aviation Australia operations and cheaper non-towered council operated airports will continue to impede attracting larger cohorts of domestic and international students. The latter is an underexplored market for the Archerfield precinct even before the impact of COVID-19 in 2020.

2.4.5 Airspace

Airports operate in a three-dimensional framework. While the intensity of zoning previously addressed can be addressed in two dimensions, it is important to recognise that the airspace above and surrounding an airfield is equally contested. This is manifestly in evidence in the case of Archerfield Airport. The airspace

controlled by Airservices Australia staff at Archerfield is relatively small. It is juxtaposed between Brisbane Class C airspace, military control zones and restricted areas, including Amberley airbase and the Department of Defence–managed Greenbank Training Area (Airservices Australia, 2019a) (see Figure 2.5). Further to the south, the Gold Coast Airport represents another concentration of active airspace.

Figure 2.5

Archerfield Control Zone

Source: Airservices Australia (2019a).

Two recent demands on airspace availability have been the growth in Amberley as a Royal Australian Air Force superbase, accommodating Super Hornets and C17 heavy-lift aircraft operations and Brisbane Airport's AUD 1.3b second runway development.

The creation of 'Little Amberley' and 'Big Amberley' has meant that the Defence Force can massively increase the size of its military control zone with as little as 30 minutes' notice. The implication of this for commercial operations into and from Archerfield is not insignificant. Western departure procedures are altered and navigation exercises to the west can be materially curtailed, impacting student bookings and planned activities for flight training organisations, with a potential loss of revenue. Inbound flights can be redirected, adding increased track miles and costs to the operator, eroding any margins earned on fixed price charter activities (C. Dudman, personal communication, 28 March 2019). There is then an impact on customer satisfaction levels for the GA passenger, who may have chosen to travel in a chartered capacity because of time-critical engagements elsewhere. Often such occurrences cannot be planned for as the military control zone will become active

during flights already in progress and without previous promulgation by published Notices to Airmen.

Currently, Archerfield sits directly under the instrument approach for Brisbane's runway 01R (right) and the departures for 19L (left). The airspace separation between aircraft is only 1,000 feet. Brisbane currently provides a gateway for a little over 23 million passengers each year. This is set to increase significantly, with the second runway generating an additional AUD 5b in economic benefit from 2020 (Brisbane Airport Corporation, 2019). As the flight paths to support the new dual runway operation come on stream, it is expected that increased holding requirements may be experienced by aircraft operating under the Instrument Flight Rules looking to avail of the Archerfield runway 10L (left) Area Navigation satellite-assisted arrival. Naturally, the cost and time delays associated with this will be borne by aircraft operators, and there may well be an increase in noise complaints from the broader community in the holding areas. The follow-on issues to flight trainers who will have even less access to instrument approaches will include escalated training costs for students who must travel further afield to access the necessary navigation aids.

With the growth of south-east QLD and the planned increase in federal aviation infrastructure utilisation in the Brisbane catchment, the protection of airspace will certainly be a priority for the Archerfield management to engage with if it is to preserve its utility as a viable transport hub for GA.

2.4.6 Social Utility

When all of the above is considered, there remains the hard-to-fathom quantum of social utility. What is the inherent value of having an active airport city precinct in the community? Does that value, if measurable, warrant support from community coffers to offset the cost of the evolution? Mills (1995) commented that in the case of supporting privatised airfields, 'it is much more difficult to find a political rationalisation for subsidy, especially since the beneficiaries of such subsidy are not among the poorest sections of society' (p. 81). While this does not necessarily hold true for many operators who appear to compete in a very tight margin environment simply to provide a living, or for GA pilots who are among the lowest-paid professionals in the market, there is some merit in understanding there are significantly competing social priorities in contemporary Australia.

With a lack of coordinated development planning across government tiers and the inability of policymakers to access robust economic data on the GA sector, a platform does not exist to leverage an integrative value proposition of appeal to the broader population (Baker & Freestone, 2012; Dooms, 2010). The message that airports are generators of economic value and investment catalysts (Conventz & Thierstein, 2014) is not being broadcast effectively in the Archerfield journey. The often-contentious results to date of ad hoc interactions between stakeholders tend to bear out Winn's (2001) research that more focus on case-based communication and demonstration of codependence is needed to improve stakeholder management and buy-in.

2.5 Conclusion

Without doubt, Archerfield airport is experiencing the ripples of stones cast within the wider GA pond. Australian GA is grappling with maintaining an ageing aircraft fleet, high operational costs, currency pressures that drive up new aircraft acquisition costs, a very active (some would say overactive) regulator in CASA (Morgan, 2019) with performance challenges of its own (Professionals Australia, 2019; Hatch, 2019), a sluggish economy, three tiers of government, a small population and relatively unsophisticated corporate culture within the fraternity. In the comparatively small south-east QLD aviation community, these issues are serving to constrain Archerfield's growth.

Despite a widely promulgated master plan and opportunities to connect and explore, there remain divergent but equally intransigent world views held by parts of the airport management, many of its tenants and the local community about the precinct's direction and its importance to the domestic and local economy. While such fractures exist, it is hard to envision that the beneficial synergies of a cohesive economic hub can be achieved, including airport renewal, the promotion of new technologies, growth in the education sector, improvement in industrial job prospects and the attainment of safer skies for all. All this means that early privatised adopters of the airport city concept and progressive planning policy, like Essendon Fields, will have stolen a long march on their QLD counterpart. The relevance of the Archerfield experience to national and international planning bodies is clear. An expectation that an extant secondary airport will remain of commercial relevance and economic value

is misplaced if it is underpinned by a lack of buy-in from the local constituency, poor communication of vision and purpose, overzealous regulation and lack of political will. Time invested in integrating secondary airports into a multimodal transport system and community value proposition that recognises employment, mobility and economic momentum would do much to reinvigorate GA both domestically and internationally. Finally, it should be pointed out that this case study does not intend to present a silver bullet to solve all the issues discussed above but rather to categorise the extant issues facing the GA industry that policymakers are unaware of. Part of the contribution is to start a national discussion about the state of national infrastructure so that emergent themes can be dealt with effectively in the national interest.

Postscript

The themes identified in the preceding case are of value in understanding the nature of issues confronting GA/non-airline transport operators at similarly scaled facilities around the country, whether they be privatised or in the hands-on non-federal statutory entities. Whether or not the issues are of sufficient gravity to warrant specific policy responses is the topic of the following chapter, which looks to address the second research focus of alignment between operator needs and current policy settings.

CHAPTER 3: SEEKING WICKED PROBLEMS, FINDING OPPORTUNITIES: AN EXPLORATION OF AUSTRALIAN GENERAL AVIATION POLICY

Preface

Whereas the preceding chapter presented the dimensions of activity at Brisbane's Archerfield Airport as a specific example of issues confronting the GA community, this chapter seeks to step back and determine whether the issues identified in that case study have national resonance. Inductive reasoning suggests that specific observations, when supported by an accumulation of evidence, can permit a generalised conclusion (Heit, 2000). The paper presented herein has sought to generate data through engagement with GA sector stakeholders. As a novel contribution to the extant literature, it uses the economic concept of 'wicked problems' to frame its inquiry.

3.1 Introduction

Internationally, the issue of expanding aviation capacity to cater to an increasingly mobile global community creates planning tension. Recent studies have found that for the GA sector, the impacts are often even more keenly felt (Freestone & Weiesel, 2014; Tisdall et al., 2020). Experience during the COVID-19 global pandemic has further exposed a lack of planning efficacy for what is often considered the incubator of civil aviation capability (Tisdall & Zhang, 2020).

The ICAO categorises the GA sector as 'all civil aviation operations other than scheduled air services and non-scheduled air transport operations for remuneration or hire' (SKYbrary, 2020). In Australia, many operators characterised by this definition also conduct non-scheduled air transport operations through non-scheduled (charter) services as adjunct income sources from capital invested in aircraft.

CASA is the principal regulatory body for Australian aviation, charged with the administration of legislation in the interests of public safety. CASA's Stakeholder Satisfaction Survey for 2020 found that 46 per cent of respondents were not satisfied with the regulator's performance across a range of measures (CASA, 2021).

Evidence suggests that this body often experiences an adversarial relationship with its constituency (Carter Newell, 2014) despite periodic efforts to overhaul its culture and appeal (Thomas, 1997; Hurst, 2016). The federal government has previously acknowledged that industry efforts to comply with a perceived pariah regulator have compromised operators' capacity and desire to participate in broader policy engagement with the responsible minister and their department (Kirk, 2002). Ongoing Senate inquiries (Australian Flying, 2019) and new appointments at CASA's apex are among recent efforts to improve the outlook for Australian aviation (Creedy, 2021).

This article explores the historical difficulty of setting a cogent policy agenda for Australian GA, arguing that a more engaging model for consultation between stakeholders is necessary to maximise GA's planning outcomes and economic utility. The discussion focuses on Australia as an example of an ICAO member state with significant policymaking power, a geographic imperative for a functioning aviation industry and a diverse set of issues impacting its GA constituency.

This research presents findings drawn from a qualitative sector inquiry to contribute to efforts to align the experiences and focus of operators with the capability and intent of policymakers more closely. After initially surveying extant literature relating to the concept of 'wicked problems' and their possible presence impeding GA policy planning, the paper introduces contemporary sector commentary to highlight difficulties for GA operators seeking to build enterprise value in a nebulous policy environment. Posing two overarching questions about the future of GA and its value as a tool for economic growth, this research utilises results from 21 in-depth semi-structured interviews to draw out issues that represent focus topics to galvanise stakeholder engagement in the near term.

The two guiding questions that frame this inquiry include:

1. Is evidence of wicked problems for policy planners currently observable?
2. What do the industry's stakeholders see as significant impediments to business success?

Focusing on the insights gained in this exploration may help develop more robust and engaging policy objectives, with possible international implications for GA constituencies.

3.2 Literature Review

This paper uses ‘wicked problems’ as a lens to initially consider the degree of industrial complexity the body of GA policy needs to address. Historically, Rittel and Webber (1973) conceptualised ‘wicked problems’ as issues that confound simple resolution due to their ill-defined nature, involvement of multitudinous interest groups, propensity for rapid change and lack of forecastable resolution. Briggs (2007) explored as ‘wicked’ a set of public policy issues that were ‘highly resistant to resolution’ (p. 3). Other researchers like Conklin (2006) have suggested they are an inevitable part of life in contemporary society. Some issues like global warming have been escalated to the status of ‘super wicked’ problems by policy observers (Levin et al., 2007). The dislocation of international consensus on this headline issue and the subsequent community angst and political expediency in evidence around the world arguably bear out Churchman’s (1967) observation that well-intentioned solutions to wicked problems are often worse than the symptoms they seek to cure.

Head and Alford (2013) argue for ‘degrees’ of wickedness, suggesting that it is possible to ‘frame partial, provisional courses of action against wicked problems’ (p. 711). Partial solutions are the best hoped for because a total solution cannot generally be obtained by addressing the contributing elements in a piecemeal fashion (Ackoff, 1974). The risk of such an approach is amplified by the departmental nature of modern bureaucracies where specialised functions create silos (Wilson, 1989) and result in an ambivalent ‘muddling through’ mentality that often fails to provide long term resolutions (Lindblom, 1979).

Schon and Rein (1994) insightfully posited that wicked problems are best addressed, not by endless resource allocation but by understanding the value perspectives that shape the problem. Such an appreciation requires involving the protagonists (and antagonists) in constructing a mutually acceptable pathway to resolution. Head and Alford (2013) also point to Chapman (2004), Seddon (2008) and others who support systems thinking as a way to deconstruct a linear or top-down policy process and engage in an evaluation of the inputs and outputs that reflect processes that can be finetuned to generate better results.

Wicked problems are featured with three dimensions: complexity, uncertainty and divergence (Head, 2008). No single dimension warrants characterisation as a wicked problem. Climate change has been labelled as a wicked problem due to its

complex and uncertain nature and lack of a clear definition of the problem (Ho & Kuah, 2014). This global issue cannot be handled by any single government or institution alone, and there is a lack of incentives and agreements for all countries to act immediately (Lepore, 2018). This contrasts with those 'tame problems' or 'well-defined problems', which usually have a definitive objective. There are established approaches and practices to guide the search for solutions for tame problems. COVID-19 is another classic wicked problem due to its associated complexity and uncertainty. There is no predetermined method to deal with it.

With this lens available, the authors turned to an examination of the Australian aviation community. A survey of extant literature revealed only a modest focus on public policy specific to the GA sector. Of note within that body of work is the emphasis on airport planning and the historical impact of privatisation. Freestone and Baker (2010) highlighted the tensions between the planning goals of privatised airports and their neighbouring constituencies. Validation of these quality-of-life issues was found internationally by Sadr et al. (2014). Graham (2008) highlighted the necessity of developing non-aeronautical income streams for the privatised Australian airports generally used by GA operators once public monies were no longer available to support their operations.

Forsyth (2001) recorded the lack of data available for measuring total factor productivity for Australian airlines that have stymied top-down policy planning. Nearly 15 years later, Kivits and Charles (2015) innovatively utilised Q-methodology to form frames of reference for aviation policy-setting more broadly in the continuing absence of useful data. Tomová (2015) sought to explain the need for new directions in what she called 'airspace economics' in the era after establishing the Chicago Convention, of which Australia is a signatory. Hooper and Findlay (1998) had earlier mapped some of these particular issues insofar as the ability for Australia to complete in the Asia-Pacific. Still, they stopped short of identifying any trickle-down effect for the internal GA community.

In more recent times, the responsible federal minister welcomed a think tank report that prioritised the need to 'maintain and enhance General Aviation industry capability, through workforce development and access to airspace and infrastructure' (McCormack, 2018). As yet, no documentary evidence appears to track progress in this space. Nonetheless, the theme has been taken up in a recently released Issues Paper by the DITRDC (2020a). It points to the planned 2021 release of a new 'Five-

Year Plan for Aviation' that the GA sector will no doubt keenly scrutinise for relevance to its particular needs.

Insofar as examining the issue of wicked problems, policy-setting and objective of this investigation, the GA literature, particularly for Australia, is largely silent. References are somewhat tangential, considering broader context issues like the environment and planning (Griggs & Howarth, 2018; Mootien et al., 2013) without addressing any of the underpinning industry drivers that bear directly on the operating cycles of the GA sector.

This may indicate GA's planning issues are not viewed as facing particularly insurmountable issues or that the issues it faces are not of sufficient scale to warrant a 'wicked' label. Equally, it might suggest that more inquiry is appropriate to explore the presence of wicked problems and catalogue them for further empirical research.

Prompted by a dearth of commentary around policy direction for the GA sector, this chapter seeks to explore and document the underlying issues that industry stakeholders grapple with as a lever to encourage further investigation and more granular analysis.

3.3 Research Framework

Often used by policymakers, management research suggests a preference for quantitative and statistically driven output (Bazeley, 2009). However, where incomplete data meets unstructured decision-making, a qualitative investigation permits informed views about the nature of stakeholder activity and behavioural biases in the target group, highlighting possible areas for policymaking focus (Molina-Azorin & Cameron, 2015).

That an 'unmeasured', or incomplete information platform is a feature of the Australian GA landscape is borne out by the federal government's statistical authority, which has found 'there are currently no robust economic datasets compiled for the GA sector, restricting analysis of the impact of the various cost pressures facing GA or the contribution GA makes to the economy' (BITRE, 2017, p. 1). While information like movement, census dynamics and fleet age data is readily available, there is little to hand to assist policymakers in addressing the dynamic nature of stakeholder decision-making or sentiment in the sector.

To explore the real-time presence of wicked problems (or, at the very least, multidimensional problems) and how sector participants might manage through them, the authors employed a general inductive approach, as described by Thomas (2006). This methodology was applied to responses gained from a web-based survey and follow-up semi-structured interviews with active participants in the Australian GA sector.

The opportunity to participate was initially opened to a national respondent base of 160. The selection was framed on a non-probability purposive sampling basis for the category of operations and geographic representation, with participation being entirely voluntary. Guarte and Barrios (2004) argue for this strategy to elicit data from a segment of the total population most likely to yield data on characteristics of interest to the researcher. Participants were drawn from passenger-carrying operators, flight training providers, maintenance organisations and GA technical support service businesses holding operating certification or authority from CASA. Ultimately, the principals of 21 organisations (see Table 3.1) made themselves available from the respondent base from November 2020 – February 2021.

Except for one, the cohort all had over a decade of experience in the industry, with the majority holding 20 years of experience in ownership or senior executive roles.

Table 3.1

Interview Participant Distribution

Principal business	Number	Location by state
Charter only	3	QLD, NSW, Tasmania
Airwork only	1	Vic.
Charter and airwork	7	WA, QLD, Northern Territory, Vic., NSW
Maintenance repair organisation (MRO)	1	South Australia (SA)
Management services	2	Vic., SA
Supply chain	2	QLD
Participating in all of the above on a vertically integrated basis	5	WA, QLD, Northern Territory, Vic., NSW, SA
Total	21	

Creswell (2002) determined that inductive analysis is an appropriate methodology for identifying, describing and recording themes derived from a variform pool of research results. We would argue that, despite the relatively modest sample, in the spirit of Lincoln and Guba (1985), the resultant insights are trustworthy in that industry practitioners will ‘recognise’ their contribution and position in a credible way. Further, findings are valuable for policymakers in framing industry engagements as they think about national applicability. Notably, the emergent topics reflect focus group discussions and conference forums observed by the authors around the country during the period leading up to the COVID-19 dislocation.

Two key focus areas shaped the information search with participants, complementary to the research questions posed earlier:

- Focus 1: levels of satisfaction that federal aviation policy supports their business objectives
- Focus 2: determination of mechanisms that would provide operators with the best channel for future policy input and industry support.

This methodological framework seeks to do more than ‘give voice’ (Fine, 2002) to a marginalised constituency. While it does not purport to be a fully structured grounded theory approach to codifying the data collected, the structural conditions in industry and the practitioners’ experiences are explored so that the emergent themes can collectively focus attention on areas of policymaking imperative or opportunity.

3.4 Findings in an Australian Context

This section presents the findings produced from a modest sample of business reflecting the GA commercial sector in Australia. From the available data, it was clear there is a desire to participate in constructive engagement with federal policy regulators, but opportunities to do so are perceived to be limited.

When asked about the extent to which the responsible federal department should be engaged in industry planning for growth and development, 15 respondents suggested it should be either ‘a lot’ or ‘a great deal’. Approximately the same proportion rated the current effectiveness of setting a clear industry vision as either ‘not so helpful’ or ‘not helpful at all’.

Importantly, our survey explicitly asked respondents to exclude any consideration of their relationship with CASA, the federal regulator, which is often considered adversarial. Rather, they were encouraged to think about the relationship held with actual policymakers. Again, more than two-thirds of responses were neutral or dissatisfied. The same response rate resulted when probed for evidence of participation in any federal policymaking forums or initiatives in the last three years. This suggests a broadly experienced lack of engagement with the department's policy apparatus.

One regional/non-urban charter and airwork operator with over 20 years' experience, employing up to 20 staff with a turnover of greater than AUD 1m, stated *(sic)*:

> *We need more contact with Federal Minister so he can get our views and requirements directly to head of Casa. The government need an internal inquiry into Casa its far too big. The left hand doesn't know what the right hand is doing. It's flat out running its own organization and not the industry that it's supposed to be working with*. (Participant 2)

Another with similar experience and a business generating more than AUD 5m in turnover and employing up to 50 staff noted:

> *I think the best way to gain insight into the industry is to sit with the owners in their office for a period of time and actually see and experience how the industry actually works, both good and bad. I have offered this for many years … I don't think you can address something that you do not have a great understanding of. I would get the regulator into the industry offices. Not to regulate or surveil, but to see how it works and find the roadblocks that then can be evaluated and addressed*. (Participant 5)

When asked about the first thing they would change if they had policymaking authority, most respondents noted 'red tape' and over-regulation as a key issue. This reflects well-documented media coverage and press release sentiments by industry groups. Outside of this, however, some note proactive policy levers that could be brought to bear:

> *Resources for small operators. Government grants for Plant/Machinery/ Building space/airport fee subsidy to help sustain the GA industry which ultimately feeds the larger Aviation is industry.* (Participant 9)

The perceived lack of current policy direction may also be stymying forward-planning by industry participants. None reported a sense of optimism about planning, with 13 of the 21 respondents reporting uncertainty or pessimism about planning for the next three years. With almost the entire industry fighting to recover from COVID-initiated performance regression, it is clear that many GA participants are genuinely concerned about the future viability of their enterprises.

Outside of regulation, chief among their concerns are the costs associated with operating premises and airport infrastructure. The significant issue of a user-pay model to cover airport costs is directly impacting the sustainability of enterprises operating on low volumes without a change in overhead base. Eighteen GA respondents had experienced no support outside of Job Keeper assistance through the first 12 months of the pandemic. Additionally, the cost of new aircraft and availability of qualified staff also rate highly.

Except for one respondent, the cohort expressed either a neutral or dissatisfied position when probed about attitudes towards the federal government's innovation support. The responses strongly indicated that the federal government should form partnerships with GA operators or peak bodies to promote the scientific and technological development of the sector.

Even with two-thirds of respondents having engaged in a formally recognised business decision-making program or schooling, whether through a tertiary or industry body, 17 of the 21 participants reported interest in a program of voluntary and free business health checks and management coaching by the responsible federal government with no risk of adverse CASA actions. This suggests that scope exists for the department to provide stewardship of the sector, with an opportunity to promote acumen, resilience, industrial relations and grassroots engagement in a way that sector stakeholders would welcome.

After gathering responses in a survey format, further qualitative insight was gained through semi-structured interviews. Industry participants were asked to identify what issues of relevance to the GA sector appeared to have the most difficulty in realising a win–win policy position for all stakeholders. The following commentary represents an effort to frame some of the first-round coding labels with what is currently understood by observers and available for policymaker consumption.

Prior to the arrival of COVID-19 on the world stage, sustained growth in upwardly economically mobile and informed travellers was a constant topic of note and evaluation (Choudhury, 2013; Wang et al., 2018). Demand for pilots was at record highs (Garcia, 2018), and GA players internationally were generally benefiting from an uplift in activity. Reputable media reports post-COVID's arrival suggest a resurgence is inevitable (Hemmerdinger, 2020). With such resilience comes a need to continue to manage the industry's trajectory.

In any elementary marketing text, the reader will note 'place' as a vital part of the marketing mix (McCarthy, 1960). Where goods and services are sold and distributed from has evolved in the digital economy, but fixed-wing aircraft still require large open spaces to operate from safely. While the nature of an airstrip has not evolved significantly, the size and capability of aircraft that use them has. Infrastructure constructed during the Second World War and the ensuing industrial era continue to be the backbone of many GA airports worldwide. Many examples are no longer fit for purpose, whether viewed through the lens of modern workplace health and safety standards or their sheer dimensionality compared to the servicing needs of the aircraft that are to inhabit them (Tisdall et al., 2020b). But whether such precincts should be preserved in the interests of heritage and how airport planning should proceed in the face of growing urban encroachment of valuable development land are hotly contested subjects. It is indeed a delicate balancing act for an airport to increase its throughput and economic return while the community maintains its right to quiet enjoyment of its environment (Deloitte Access Economics, 2018).

Price is an equally important part of the typical marketing mix. Whether the operator of an aircraft should be solely responsible for the total cost of its operation, or whether the public should fund a portion in return for the social utility of access to rapid mobility and expedited movement of goods and services is a contemporary issue (Uddin et al., 2013). Maintaining a standard of living across sovereign geographies is often considered a requirement of good governance (Graham et al., 2003). Several complex questions result. How do rural and remote communities afford to contribute to the cost of GA infrastructure and regulation in the face of escalating operating and compliance costs, a phenomenon experienced internationally (Mathisen & Solvoll, 2012)? Can they afford to be without it (Baker et al., 2015)? What expectation should the public have about what constitutes affordable safety?

The arrival of COVID-19 is a classic example of a wicked problem (Cohen & Cromwell, 2020). In many jurisdictions, aircraft use was shut down as part of a widespread public health response. By reducing transmission risk, economies and lives have been significantly impacted in a manner that may take years to reverse. This action suggests to some that aircraft operators hold a potential liability for disease transmission. There may subsequently emerge market or liability reasons for them to require that their passengers be vaccinated (Robertson, 2016), which will impact the personal freedoms of those who support an anti-vaccine lifestyle (Snape, 2020).

The average age of the Australian GA fleet is approaching 40 years (CASA, 2020c). CASA has recognised the safety implications for fare-paying passengers being serviced by an ageing network on maintenance programs not traditionally requiring the rigour of airlines (Kourousis, 2013). However, in implementing new Civil Aviation Safety Regulations (Part 135) to align GA charter and airline operators to a passenger carrying operations standard, little thought has been applied to how thin-margin, often capital-challenged GA operators will be able to sustain a heavier maintenance regime. An inability to carry the cost will ultimately lead to a reduced operator population and therefore reduced services to rural and provincial centres that rely on GA connectivity to participate in wider economic activity.

Suppose government were to intercede, perhaps in the spirit of the *US General Aviation Revitalisation Act (1994)* (GARA), with a legislated structural change to permit the cost of new aircraft to be reduced through such means as accelerated depreciation, import tax waivers or similar. In that case, an argument might be raised for other sectors that equal support is appropriate for them, further straining the public purse. The experience with GARA also showed that a change in the status quo can have unintended consequences more deleterious than the initial problem, with manufacturer liability passed down to pilots, engineers, air traffic controllers and other participants in the customer supply chain (Kuhse, 2000).

This is borne out directly by industry commentary locally. When prompted for comment about what consultation arrangements might be best suited to draw federal policymakers and operators closer together on structural changes, one respondent stated:

> *This is a difficult one. The bulk of the govt interface is through the regulator. Unless an organisation tenders for govt contracts (such as RASS), there is*

> *unlikely to be much interface or really any requirement for an interface. Often when govt gets involved they stuff it up because the people involved have little or no understanding of the sector*. (Participant 11)

Moving operators to acquire newer aircraft or newer classes of aircraft requires a whole new policy and regulatory approach to type training, recurrency training and insurance risk appetite than is likely achievable in a relatively small marketplace. When asked about what would need to happen, one respondent stated:

> *Engaging with insurance underwriters to roadmap better safety recognition of Australian based training for complex types leading to lower overseas training requirements for operators*. (Participant 17)

The example of the Cirrus Vision SF50 single-engine jet with ballistic parachute is a current example where the federal regulator is very slow to accept its capacity in the fee-paying passenger space to which it is ideally suited. Insurers baulk at the capacity for private pilots to operate the aircraft at airline levels and jet speeds with an AUD 4m hull value (Southwick, 2019). Yet its full aircraft parachute system and Garmin 'Safe Return' automated landing system make it an exceptionally safe advanced aviation asset (Garmin, 2020).

Airspace allocation is an equally complex issue showing wicked characteristics. A case in point has been establishing the second runway at Brisbane's international and domestic airport. This infrastructure, pre-COVID, was much anticipated and looked to satisfy the growth needs of what was arguably the southern hemisphere's busiest single-runway airport. It is used by RPT, freight operators and GA players alike. However, in creating the flight paths necessary to make the dual runway system operative, limitations have been placed on the operating scope of busier GA airports.

Reducing the operating heights of GA operators led to increased airspace violations, the concentration of traffic and reduced manoeuvring scope to avoid poor weather. In the case of Archerfield Airport (Brisbane's secondary airport), this has led to more interactions with Amberley Airforce Base and its control zone, which has already been recently amended to give it priority access for national security operations. Numerous media outlets have further reported the quality-of-life impacts for Brisbane residents due to new overhead activity (Moore, 2020; Thorn, 2020a).

Technological advancement, particularly the growth of automated systems and pilotless aircraft, presents additional wicked challenges to aviation stakeholders.

CASA initially struggled to maintain a regulatory capacity to manage the rapid onset of unmanned aerial vehicles that have become popular in various applications from fire-ant mapping and fauna surveys to real-estate development and recreational photography. The emergence of unmanned aerial vehicles capable of patient and passenger transport in larger formats introduces new risks to the community and travellers where the human element is removed. Is the automation of such transport at the expense of pilot employment and a major reengineering of international safety systems worth the cost of development (Perritt & Sprague, 2016)? This matter ranked lowly in the initial findings of our survey with a deeper concern for the cost of regulation and overheads. Still, upon further inquiry, participants expressed concern over the longevity of their enterprises and ultimate saleability, given that for many, it represented their superannuation fund. While such debate finds its roots in the onset of the industrial revolution, the issue of technological progression takes on new weight when the expertise to override a systemic error or environmental threat is not present many thousands of feet above ground.

Finally, the impact of global aircraft movement and climate change remains of note, with all but one respondent expressing dissatisfaction with the level of support of innovation, including that designed to enhance sustainability. Bows and Anderson (2007) were among many researchers looking to understand how, in the (United Kingdom) UK experience, growth in aviation activity as an economic health indicator could be reconciled against carbon reduction targets. GA aircraft, large consumers of lead-containing aviation gasoline (Avgas), contribute to the statistical record of pollution as a function of operations. Yet, such movements significantly facilitate the trade that funds the national climate response (Macintosh & Downie, 2008). The desire to move to cleaner-burning fuels or sustainable technologies leans into the issue above of affordability and the allocation of scarce sector resources, demonstrating the implacable nature of setting policy mandates in an environment with some wicked dimensionality.

In the initial review of the responses received through the two stages of inquiry, simultaneous coding emerged, highlighting the participants' genuine emotional engagement with their businesses and the sector itself. During the subsequent analysis, pattern and focused coding after the style of Saldana (2013) were used to distil the somewhat emotive responses into three baseline themes. Based on how many participants contributed to the resultant theme on two or more

occasions, the second-round code groups were ranked for further exploration (see Table 3.2).

Table 3.2

Ranking of Coded Themes

Theme	No. of identifying respondents
Regulatory & policy environment	20 of 21
Acumen & capability	19 of 21
Technology & sustainability	18 of 21

3.5 Discussion: Opportunities for Federal Policy-Setting

The topics mentioned above represent examples of policy planning issues that are inherently complex, often fragmented and without simple resolution. Although expanding the respondent group would be valuable in garnering data, several imperatives are suggested by the evidence gathered to date. These are addressed in the following thematically aligned categories:

3.5.1 Reordered Governance

In 2003, the then-responsible minister issued the Australian regulator with a new charter setting out the strategic directions for the entity.

Specifically, he stated:

> CASA must honour its commitment to working cooperatively with the aviation industry to maintain and enhance aviation safety. There is a strong need for CASA to strengthen stakeholder relationships, not just through formal consultative mechanisms, but in the day-to-day dealings with industry participants, particularly in the general aviation sector. (Anderson, 2003)

In the nearly two decades that have followed, the GA sector continues to struggle with its relationship (Aerial Application Association of Australia [AAAA], 2020). A recent move to strip away local, regional office connectivity in preference to a national model of functionalised silos is already creating disruptions in business continuity and the ability to readily access support (C. Dudman, personal communication, 11 January 2021).

Calls for a reformation of CASA's corporate structure have been well documented, including those calling for a stronger voice for GA with appropriate

industry experience embedded in the organisation with control over regulatory reform impact management and ongoing stakeholder engagement (Aviation Maintenance Repair Overhaul Business Association [AMROBA], 2016; Ferrier, 2014; Phelan, 2016; Ingall, 2016).

Taking control of vocational training and funding for industry participants instead of relying on a two-regulator environment is also seen as a necessary step towards a healthier industry that is more responsive to workplace needs and employment outcomes. The current system of flying and engineering schools needing to make regular compromises on standards or expend effort and money on keeping two non-aligned regulators happy to access student funding is unsustainable and results in lip service compliance to one master or another (Innovation & Business Skills Australia, 2018; Hampson, 2017). BITRE (2017) reported a 40 per cent fall in GA flying activity between 2010 and 2015, with the flight training category being predominantly impacted as the inability to meet the regulatory burden of a dual compliance regime or access student funding channels bit hard.

In these two areas and as a starting point, significant scope is present to reduce the wicked dimensions associated with maintaining and promoting safety while building scope for participant self-determination. Further debate about the form and function of such reordered governance is well within the policy mandate of the federal department charged with the responsibility to promote the growth and development of Australia's infrastructure capability.

3.5.2 Management Resilience

Management decision making requires a degree of acumen during normal economic cycles. A period of dislocation like that created by the COVID-19 pandemic requires readily adaptable skills and the mindset of operators predisposed to resilience through prior preparation (Herbane, 2019). Critically, strategic resilience requires the capacity to both learn new skills and 'unlearn' others (Morais-Storz & Nguyen, 2017).

The interviews conducted through this research endeavour have suggested that while quite a number of GA sector operators have undertaken formal management training in one form or another, the majority would also welcome continuing education and guidance. In a recent industry review of the diploma-level training offered in aviation management by ASQA, experienced respondents cited

time management, corporate structuring, dispute resolution, resource management and legal system awareness as key skills lacking in the GA workforce today (L. Parratt, P. Gash, personal communication, March 2021).

The federal regulator requires a potential operating approval holder to be a 'fit and proper person' and to present a business viability plan under Subsection 28(2) of the *Civil Aviation Act 1988* (Cth) (CASA, 2019). However, subsequent to issuing an approval, the performance of a business to its fiscal plan is not part of the regulator's remit during a typical surveillance audit. Operators are inclined to suggest this is appropriate, as the regulator's charter is primarily concerned with safety. However, given that the maintenance of safe operations is inherently connected to the ability to finance them, there is perhaps a missed opportunity that might contribute to safer skies and more robust businesses.

A sector-specific business education program that permits operators to access management skillsets like financial planning, import/export capability, legal and compliance guidance and human resource assistance would not be beyond the scope of the policymakers using existing resources. Examples of this sort of collaboration include the outreach programs of Austrade, so well utilised by Australian companies looking to expand their reach globally. Austrade (2021) itself has found that 'lack of alignment and unity is a hindrance when facing the global marketplace' and is seeking to harmonise the value propositions of the industries it assists. In a sector so fragmented that the federal regulator struggles to quantify its value to GDP, similar assistance in promoting business competence and confidence could prove a key objective for GA policymakers in the near term. Such a program could well be used as a model in supporting the growth of GA enterprises regionally in the Oceania supply chain where Australia holds particular influence and where access to formal management training is not as readily accessible (Scholten et al., 2014).

3.5.3 Technological Progression

Environmental concerns about GA's contribution to the national carbon footprint are legitimate. An ageing fleet utilising decades-old engine technologies and leaded fuels is of material concern when planning how to stimulate the sector to greater activity and create wealth through sector employment. Root cause analysis for why Australia's fleet is ageing so rapidly reveals a lack of incentive for stakeholders to expend limited capital on newer technologies. A similar profile in the

US, where over 150,000 GA aircraft have a greater average age than 35 years (Federal Aviation Administration [FAA], 2006), suggests international similarities may represent an opportunity for collective endeavour.

Several policy levers are available to stimulate fleet renewal without expending limited public monies on a relatively narrow sector of endeavour (despite its role as a catalyst of economic growth).

Accelerated depreciation and tax holidays are among the policy tools available to encourage sector players to actively participate in acquiring new technologies. They can be considered more of an opportunity cost than a direct cost on the public purse, but the benefits can be directly measured. Safety outcomes, maintenance savings, increased skillsets for maintainers and pilots, reduced emissions and a range of other important metrics are interrogatable and inspectable measures of success. The demand, coupled with an implied encouragement for financiers to facilitate credit terms linked to borrower cashflow retention, can likely spawn an influx of new assets and a net contribution to economic growth in the sector. New routes, reduced operating costs and new energies can mirror in the GA sector what has been felt in the RPT space with the retirement of large body jets for smaller, more efficient models.

Emerging nations have utilised special economic zones of development with good effect. The ‘tiger economies’ of south-east Asia consistently built robust business sectors by gazetting certain geographies as the beneficiaries of duty and excise concessions, lower tariffs and similar benefits. Similar scope exists for airport locales to stimulate infrastructure development, new investment and regional development in Australia’s GA network.

The attraction of innovation capital to industries and technologies that promote sustainability and operating efficiency is a key building block for progress. In an increasingly globalised competition for available capital, it is the responsibility of government to foster the environment that allows industries within its economy to compete (Morgan, 2005). Federal partnership with state-based players is critical in promoting the aviation industry as a destination for investment to ensure there is no dilution in the message that Australia’s collective political will and ability to derive value from investment are linked to proactive policy. QLD is one provincial jurisdiction that has long recognised this (Yigitcanlar & Velibeyoglu, 2008). Still,

differences in political ideals and the barriers of federalism may well be stymying an international approach to this messaging.

3.6 Concluding Comments

There are numerous issues to address in the advancement of GA policy planning in Australia. Our initial research question sought evidence of genuinely 'wicked problems' for policy planners. The difficulty in setting a coherent pathway of opportunities is exacerbated by an ongoing lack of data for individual enterprises and the GA sector collectively. It is acknowledged that the insights gained in this paper are drawn from a small sample size, despite the invitation to participate being made broadly available. This is an example of an inherently insular lens prevalent in the sector due to an absence of a unifying policy participation influence. The generalisability of resultant observations will naturally require empirical testing.

While future research will need to more articulately determine whether the presence of wicked problems can be categorically proven, the scope of identified themes shows that any policy planning is subject to complex dimensions. Further research in this area will need to engage stakeholders at a more grassroots level. To this end, the authors remain committed to a longitudinal study of management decision-making and resulting outcomes to further inform policymakers about touchstone behavioural drivers shared by the wider GA community. Scope further exists to expand the application of a more granular grounded theory methodology to codify the semantic intent of operators as they are given the opportunity to expand their input into any progressive policy forum that may arise on an unclear horizon.

The second research question yielded more immediately useful findings. Market failure is traditionally characterised by self-interested decision-making that yields non-optimal collective outcomes. The responses gathered from our inquiry suggest that precursor conditions are visible, with numerous areas where market agents feel that they have to 'go it alone' in the absence of a harmonised policy framework to focus industrial consensus. Governance, acumen and technology emerged as key issues for potential government policy focus or collective industrial action.

From an international perspective, it would be of interest to further explore a similar set of dynamics in the US and New Zealand that are often pointed to as

‘preferred regulatory regimes’ by Australian sector participants, including our industry respondents, to see if those jurisdictions do hold genuinely tighter policy bonds between government and industry. Further, what are the predictions for GA communities developing under command or planned economies where sectional interest groups are often bypassed in the interest of a greater economic agenda? In emerging aviation economies like many in Africa, where many competing sustainability issues exist, will GA feature in any meaningful planning to mobilise resources for economic growth? The answers to these questions would contribute to a broader understanding of whether classically defined wicked problems universally represent an intractable impediment to GA policy-setting or simply identify opportunities for stimulating innovation and new enterprise paradigms.

Postscript

In answer to the second overarching research question for this study, the preceding paper underscored that misalignment between GA sector operators and the current federal policy settings is in evidence. Subsequent to data gathering, the federal government has released its vision statement for the sector (DITRDC, 2020a), which includes a five-year plan for the future of aviation in Australia. Several of the themes in the data have manifested themselves in the vision statement, which is a pleasing validation of the findings and gives reason for confidence that a recalibration in expectations can be achieved.

The next two chapters shift focus to consider elements of management decision-making observed during a period of enhanced discontinuity. They seek to address the third area of exploration involving the nature of acumen evident in the sector and its capacity to participate in long-term planning to promote future resilience.

CHAPTER 4: COVID-19 IMPACTS ON GENERAL AVIATION—COMPARATIVE EXPERIENCES, GOVERNMENTAL RESPONSES AND POLICY IMPERATIVES

Preface

The intended pathway for this research candidacy involved extensive travel around the nation to interview GA stakeholders in their local environments to draw out genuine commentary, observation and understanding the context thereof. However, the arrival of COVID-19 in Australia made this pathway unattainable, at least for the foreseeable future. A new route to facilitate exploration of the GA community was mapped, which involved observing and documenting the activity of the constituency during a period of severe industrial dislocation.

Prior research into largescale industrial disruptions in various market economy sectors (Todd, 1991; Morris, 2008) has suggested that 'private sector adjustments to new economic conditions are often clumsy and costly' (Hollenbeck et al., 1984, p. 45). With a range of structural limitations and a lack of clear national policy direction already identified in earlier chapters, this paper sought to determine if these represented critical functional impediments to a sector managing severe disruption.

4.1 Introduction

COVID-19 has been an unprecedented calamity for the global aviation industry (British Broadcasting Commission, 2020; Jones, 2020; Stokel-Walker, 2020). Many countries have imposed travel bans that immediately resulted in a sharp drop in airline services and air passenger volumes (Parrock & Murray, 2020; US Customs & Border Patrol, 2020). It is no exception for Australia. This country took an elimination strategy in the fight against COVID-19. It shut its international border to other countries in late March 2020. Subsequently, Australia's two major carriers, Qantas and Virgin Australia, cancelled almost all their international flights. Australian states quickly followed the federal government's move and closed their borders to non-essential travellers. Throughout 2020, an Australian state could

reopen its border to another state if no COVID-19 cases were reported in that state for a certain period. However, once a new case was identified in one state, other states would quick close their borders to those who stayed in or had travelled to that state in the last 14 days, causing great disruption for air travel between Australian states. As a result, the number of passengers carried in the domestic market in December 2020 was 54.9 per cent lower than for the same period in 2019. Such 'open and close' dramas continued in early 2021.

The Australian civil aviation experience during the pandemic has been well documented (e.g., Zhang & Zhang, 2020). Tiger Airways redundancies, Qantas and Virgin stand downs and a subsequent need to find parking locations for aircraft fleets with no defined timeline have been reported in almost every news cycle. What is less documented to date is the impact of COVID-19 on the GA sector, either nationally or internationally.

Following a brief review of historical health-related disruptions as a window into past responses, this chapter seeks to address this gap with a preliminary analysis of responses experienced in Australia and the experience of the industry counterparts in the US. In doing so, insight is sought on the following research question:

RQ1: Given past pandemic experiences, what evidence of applied learning has been evident in the GA sector?

Addressing this question is of value because aviation is underpinned by a safety culture that espouses learning to avoid recurrent underperformance. Two subordinate investigations further explore RQ1 to illuminate potential key areas of focus for policymakers and industry players to build industry resilience in a post-COVID-19 world.

RQ1a: What were the immediate challenges to continued operation confronted by the GA sector?

RQ1b: With the current framework of industry oversight, what mechanisms might be deployed to enhance sector resilience?

Utilising a survey of available literature and the response data derived from semi-structured interviews, this paper explores a range of experiences within the GA sector to gain a perspective on a largely unmapped but important contributor to Australia's economy. With a particular focus on the governmental response relative to business activity drivers, the chapter seeks to highlight policy measures that can be leveraged to make the sector more robust in the future.

4.2 Literature Review

4.2.1 Past Pandemic Experience and Current Depth of Policymaker Understanding

Aviation is a multifaceted industry, with manifestations across countless areas of human endeavour. ICAO (2009) classifies GA as non-commercial business aviation, instructional flying and aerial work such as survey, agriculture and search and rescue. Because many training operators utilise aircraft for ad hoc charter to enhance return on assets and provide some career progression as a staff retention aid, there is often a close correlation between those participants and providers of low-capacity non-scheduled passenger transit. A study by Kearns (2018) revealed that the response to any given stimulus was not homogenous across all aviation businesses, meaning that impacts on GA must be considered for their dimensionality rather than a simple subset of the consolidated civil aviation experience.

The aviation industry has experienced significant pandemic-styled disruptions in the past. Such events included the arrival of the severe acute respiratory syndrome (SARS) coronavirus-initiated disease emerging from Asia in early 2003 (Breugelmans et al., 2004). At the time, the World Health Organization (2002) suggested that the roles of health authorities and aviation industry participants should be to protect the public's health without unnecessary disruption of travel and commerce. Significant research was undertaken suggesting that transmission of SARS was low risk for the travelling public (Wilder-Smith et al., 2003) and more closely aligned to the transmission dynamics at the place of embarkations rather than travel activity in isolation (Goubar et al., 2009). This mirrored prior investigations around other respiratory ailments like tuberculosis (Kenyon et al., 1996).

The subsequent H1N1 influenza pandemic of 2009 and a novel coronavirus emergence in 2013, impacting primarily the Middle East (MERS-CoV), had significant repercussions for the travelling public (Brown, 2013). Contradictory research argued that the act of air travel was in and of itself a transmission point for communicable diseases (Clegg, 2010). Naturally, when considering recent movement statistics of 3.3 billion souls across almost 33 million flights utilising 52,000 air routes (Air Transport Action Group, 2016), containment of pandemic spread is of serious concern and warranted academic interest.

Despite the significant fiscal implications and health or industrial policy learning outcomes, little has been written about the impact of these pandemics on the GA and non-RPT aviation sectors in each of the economies impacted by this series of maladies (Tisdall & Zhang, 2020). In the Australian context, this is perhaps not surprising given that, as of 2017, the responsible federal department stated 'there are currently no robust economic datasets compiled for the GA sector, restricting analysis of the impact of the various cost pressures facing GA or the contribution GA makes to the economy' (BITRE, 2017, p. 1).

In December 2016, the Aviation Maintenance Repair and Overhaul Business Association Inc., an advocate for GA in Australia, wrote the following:

> The real reason general aviation, i.e. aviation sectors other than the major airlines, cannot achieve its growth potential and add to the Australian economy is the lack of political support in this country for an industry that could create many jobs and careers, especially for rural Australia. (AMROBA, 2016, p. 1)

Such statements contrast with the FAA and European Union Aviation Safety Agency (EASA) jurisdictions, where a more granular understanding of GA economics is evident. Sobieralski's (2013) study of optimal tax rates for aviation gasoline in the US and Njå and Solberg's (2010) review of policy processes in a European context are illustrative of this position. Despite having little historical commentary around the specific responses to pandemic disruption, these jurisdictions with a broader history of engagement with GA appear likely to have some early-mover advantages in crafting policy responses for their respective GA communities if only from the point of view of 'knowing your constituency'.

4.2.2 Background of the Australian General Aviation Sector

As previously noted, the Australian Bureau of Infrastructure, Transport and Regional Development has specifically documented the absence of comprehensive economic data on the contribution of GA to the national accounts (BITRE, 2017). This observation goes to the heart of concerns held by many GA participants about the level of support to build credible industry growth strategies (Australian Aviation, 2018). However, despite the lack of available financial measurables, some vital statistics help frame the industry. The total number of Australian (VH-registered) GA aircraft stands at a little under 14,000 machines, with an average age approaching 40

years (CASA, 2020c). In 2018, this collective flew 3.41 million hours, almost half of this attributable to non-RPT aircraft activity (BITRE, 2020). The sector employs approximately 11,000 persons as of the 2016 Census (ABS, 2017). In November 2019 alone, this relatively small sector, including charter operations, carried 233,172 passengers on fixed-wing operations (BITRE, 2019). For a relatively small group, GA 'punches above its weight' and its functioning is of genuine importance in the domestic economy given the size of Australia and its modest population (Tisdall, 2018).

In the latter part of 2016, the Commonwealth initiated a review of the GA sector under the stewardship of BITRE. Then-Minister for Infrastructure and Transport, Darren Chester, also established the GA Advisory Group to support consultation with stakeholders and inform the direction of the BITRE inquiry.

The group's Chairperson identified to the Minister three initial areas of focus for the group. Two of these are of interest in determining Australia's readiness to deal with industry dislocation in the GA sector:

1. 'Identify levers to better promote General Aviation in Australia as a contributor to social and economic development [and]
2. Develop a broad long-term strategic perspective for General Aviation' (DITRDC, 2019b), partly in response to completing the department's GA study.

These reviews are yet to deliver meaningful findings to influence policy for GA. The vacuum in direction has typically been filled by the often reactionary and emotive nature of disparate decision-makers in the sector, leaving it little prepared for the complexities arising from the COVID-19 crisis (Australian Flying, 2020).

In sum, our survey of extant literature relating to specific policy initiatives by the Australian government suggests a lack of focus for the GA community. Specifically, there are gaps in the following areas:

- aviation-specific COVID-safe operating protocols for GA businesses (most notably flight training organisations)
- education and support for employers in connection with their circumstantial stand-down of staff
- opportunities to access government funding initiatives for repositioning/adapting GA business models reliant on other heavily impacted sectors (i.e., tourism)

- government intentions to provide input into the regulatory framework required to reactivate staff after stand-downs
- promotion of availability and access to low-cost non-government funding as a fiscal stimulus
- specific ministerial expectations for the conduct of the much-vaunted regulator, CASA, during the pandemic disruption.

The authors have sought to directly engage with stakeholders to explore their primary concerns and decision-making tendencies to determine how the GA community has operated in this nominal vacuum.

4.3 Methodology

The impact of COVID-19 has been sudden and is resulting in a discontinuity in unanticipated forms. Having surveyed the minimal extant literature involving past pandemic experiences as an indicator of potential impact areas and likely regulatory responses across three specific GA arenas, it is clear this is an under-researched area of inquiry.[1] Thus, observations drawn from semi-structured ethnographic interviews conducted during the real-time response to COVID-19 are captured to reveal the issues being faced by contemporary operators in the GA community and inform findings for RQ1a and b.[2]

Qualitative methods tend to rapidly identify issues stimulating behavioural responses at times of uncertainty (Grosvenor, 2000; Tisdall et al., 2020). Seeking input from industry participants through ‘coalface’ interviews provides valuable insights into what is of paramount or immediate concern to them at this critical moment of industry dislocation (Qu & Dumay, 2011). The sample of respondents

[1] A number of studies have investigated the role of air transport in the spread of the COVID-19 pandemic (e.g., Zhang et al., 2020; Christidis & Christodoulou, 2020). Researchers have also examined the impact of COVID-19 on air transport, or the two-way interaction between air transport and COVID-19 (e.g., Sun et al., 2021). All these studies focus on commercial aviation rather than GA.

[2] The survey method has also been used in the impact of COVID-19 on commercial aviation. For example, Suau-Sanchez et al., (2020) estimated the medium- and long-term impacts of COVID-19 on commercial aviation. Their sample consists of 16 senior airline industry executives from European organisations.

was drawn from a cross-section of business forms typically represented at secondary/GA airports.

A total of 12 semi-structured interviews, usually lasting between 30 and 45 minutes, was conducted during social distancing and essential-travel restrictions with senior members of the GA community who had at least 10 years of experience in the sector. Table 4.1 provides a summary of participation. Ten of these were Australian, and two from the US to seek examples of broader industrial themes across jurisdictions. Of those interviewed, four were enterprise owners, four were chief executives or equivalent employed officeholders, and four were senior managers with client service responsibility. Three maintenance organisations were included, holding either Part 145 or CAR 30 CASA approvals. Three flight training organisations were represented, with a mix of domestic and international students on the Commonwealth Register of Institutions and Courses for Overseas Students. Four charter operators (including two in the US) were addressed, and two major refuelling groups representing international brands. The reasons for this sample of industry participants were not only their professional experience but also the breadth of their geographic and customer operating bases.

Based on an evident concentration of capital investment and employment carriage, four enterprise groups were defined as the targets for investigation in the interviews:

1. maintenance organisations that rely on GA activities as their key source of revenue
2. flight training and aligned organisations that rely on international and domestic students freely
3. charter operators likely to experience a surge in demand due to the rapid demise of airline options
4. refuellers whose businesses rely on volume sales and an intricate pricing model.

Table 4.1

Summary of Interviewees

ID	Type	Role	Typical clients	Country (State)
1	Charter	Owner	Fly-in fly-out (FIFO) mine services	Australia (SA)
2	Charter	CEO	On-demand charter	Australia (QLD)
3	Charter	CEO	Intercity business travellers	US (CA)
4	Charter	Senior Manager	On-demand charter	US (CA)
5	Training	Owner	Domestic and international students	Australia (QLD)
6	Training	CEO	Domestic students only	Australia (NSW)
7	Training	Senior Manager	GA, airline check and training	Australia (Vic.)
8	Maintenance	Owner	Turbine, regional charter	Australia (SA)
9	Maintenance	Owner	GA piston private ownership	Australia (QLD)
10	Maintenance	CEO	GA flight training schools	Australia (NSW)
11	Refuelling	Senior Manager	Airline & GA, national presence	Australia (QLD)
12	Refuelling	Senior Manager	Regional RPT and GA, non-metro	Australia (NSW)

It is acknowledged that the sample size is relatively small considering the size of the aggregated sector, and thus the results should not be overgeneralised. The investigation did not seek to reflect particular individual experiences but rather emergent common themes. However, the preliminary findings presented herein reveal several issues that warrant further investigation. They may inform future policy direction for the post-COVID-19 era in support of recovery and future resilience.

4.4 Emergent Themes

The Australian Airline Financial Relief Package in tandem with the AUD 198m Regional Airlines Network Support and Funding Assistance Programs have provided a small measure of trickle down support to regional and remote area operators who are deemed to be carrying out essential support services for the federal COVID-19 response (McCormack, 2020). Total aviation sector support has been promulgated at AUD 1b (Sullivan, 2020). At face value, this support is impressive. Industry observers have been quick to point out that much of the assistance, like the waiving of airways fees and charges, can only be realised when flights are taking place (Thorn, 2020b). Further, its value to the GA sector is nominal (Nadge, 2020).

4.4.1 Maintenance, Repair and Overhaul

The Regional Aviation Association of Australia (2020), in its letter of 9 April to Deputy Prime Minister McCormack, coherently outlined the need for federal assistance to downstream industry, including MROs, independent simulator training centres and privately owned flying schools. The association noted the difficulties MROs and their upstream suppliers have experienced as operators deferred or cancelled scheduled maintenance and cashflows dried up. One MRO CEO in our interview noted that ‘in several instances along the eastern seaboard, component suppliers have cancelled credit terms to their clients, disturbing the typical spontaneous financing patterns of MROs’. Reliance on the national Job Keeper program (underpinning AUD 1,500 per fortnight for staff) is expected to be widespread. However, one MRO owner stated that ‘simply to keep staff in a period where meeting payroll commitments is uncertain will prove very difficult’.

Unexpected deficiencies in import capabilities have exacerbated issues with MRO workforce planning. A US supplier of new aircraft seeking to have a machine delivered by vessel to Brisbane for an Archerfield-based flight school after first docking in Sydney has been required to route the aircraft to Melbourne for reassembly. The company’s Oceania director has advised that formerly available temporary customs clearing courtesies were no longer on offer by the responsible department due to COVID-19 management protocols. This means that the Gold Coast–based MRO that would normally attend to the reassembly has missed out on an engagement that would have supported five workers for two weeks. Two imports

behind the initial airframe will be similarly redirected. Skills applicable to the task cannot easily be transferred interstate because of border closures or untenable quarantine restrictions.

4.4.2 Flight Training Organisations

Simulator training centre revenues have rapidly waned as operators have stood down crews or have been able to take advantage of exemptions to recurrent training requirements offered by CASA. A senior manager of one of Australia's pre-eminent centres, which operates industry critical training equipment not readily available elsewhere in the country, reported that 'they had lost 90% of its revenue'. Non-Australian pilots, notably from the Pacific region, who do not benefit from the CASA exemptions will be doubly disaffected by a lack of ability to access onshore training facilities and the lapsing of their licence privileges (Morgan, 2020). Similarly, private flight training organisations that often rely on international student revenues are being considered vulnerable to collapse, leaving large investments devoid of earning potential and a gap in the market not easily filled upon a return to normal operating conditions (Marshall, 2020).

To date, CASA has not promulgated specific regulations concerning managing flight training interactions. The CEO of a medium-sized QLD flight training organisation stated that 'industry players have been left to determine their own risk mitigation strategies which has led some to shut down prematurely, others to curtail training engagements and yet others to proceed without change'. An owner also working in the training space noted that 'the fiscal implications relative to leased asset payments, the uncertainty of staff payment protocols and the lack of consistency in COVID-19 exposure management are of immediate concern to flight training operators'. The capacity to access low-cost state government cashflow funding (Queensland Rural & Industry Development Authority [QRIDA], 2020) and generic federal payroll support programs (Australian Taxation Office, 2020) will likely assist many to continue baseline operations. Still, these will have the longer-term effect of leveraging up already thinly capitalised balance sheets for most small operating-margin GA businesses. A natural progression for this sub-sector is a period of aggregation where marginal operations are subsumed by more stable enterprises that have previously diversified and will thus be better placed to weather the pandemic.

4.4.3 Charter Operations

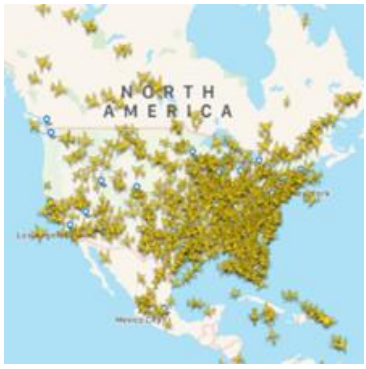
Insofar as charter operators are concerned, there has long existed a limitation on their capacity to sell 'by the seat'—even though their carriers liability insurance (a mandatory policy) provisions for the same strict liability payment coverage as a major airline. An enterprise owner with large exposure to the FIFO market expressed that 'CASA appears amenable to a relaxation of this position to support the reignition of low-capacity regional flying, and long as such flying does not operate on a fixed schedule'. This relaxation essentially makes the cost of mobility far more manageable for isolated families and groups to access regional centres and is sure to be welcomed by operators.

The COVID-19 reductions in interpersonal services have had one observable positive effect for charter operators. The carriage of freight, normally the domain of for-purpose carriers like Toll and FedEx, has escalated with the dilution of RPT services. One charter company CEO expressed that 'operators have had increasing levels of quote activity for the transports of goods as diverse as medical equipment and blood products to kittens and live corals'. However, the current dysfunction in evidence (Australian and International Pilots Association, 2020) around the stalled introduction of fatigue management rules into industry (CASA, 2020b) 'has left a number of operators without the necessary flexibility to redeploy assets speedily enough to take advantage of revenue flight opportunities', according to one senior charter manager.

The experiences of US participants present an interesting counterpoint. In that jurisdiction, significant effort has been directed at continuing 'business as usual'. Prima face evidence of this includes the continuance of aircraft movements within the continental US. While acknowledging differences in population and industry scale, Figures 4.1 and 4.2 (Flight Radar 24, 2020) indicate the volume of activity in the continental US on 1 April as standing in stark contrast with the much-reduced level of activity in Australia at the same time. Of note in the US response is the range of classified essential travel, which includes persons engaged in lawful cross-border trade, individuals travelling to work in the US and those travelling to attend an educational institution (Universal Weather & Aviation Inc, 2020). In Australia, these classifications have been curtailed by interstate border closures, enforced self-isolation protocols and other restraints on free movement.

Figure 4.1

Aircraft Activity US, 1 April 2020



Source: Flight Radar 24 (2020).

Figure 4.2

Aircraft Activity Australia, 1 April 2020

Source: Flight Radar 24 (2020).

The 14 April announcement by the US Transportation Secretary of a USD 10 billion relief package for airports, including GA airports, gives credence to an ongoing commitment to keep aviation moving in the US. Unlike Australian initiatives, pitched at operating cashflow support alone, the US funds are available for 'for airport capital expenditures, airport operating expenses including payroll and utilities, and airport debt payments' (US Department of Transport, 2020). Such broad permission of allowable funding use helps to maintain focus on the operability of the people and infrastructure necessary to revert to full-scale operations in the post-COVID-19 period.

This support has been appreciated by industry. A moderately sized jet charter operator in California responded:

> *As I am sure you know, the government has earmarked a tremendous amount of money for airlines big and small. Full disclosure: we are a very small*

> *'airline' and have yet to receive any funds. That said, I am fully expecting government aid in the form of grants and low-interest loans which will provide tremendous relief for us. Aviation is a business with notoriously high fixed costs, and in a near-zero revenue environment, this aid will be life-or-death for some. I commend our government for taking quick action here, and I'm hopeful that cash will be in the bank soon.*

In an experience similar to Australia, the FAA has sought to reduce regulatory impost for operators. One charter operator from Van Nuys, California, commented:

> *On a regulatory level, they've released guidance for pilots who have training requirements coming up in the next 90 days. Pilots can overfly previous limitations on their training since recurrent training is not viable in the near future. This is a very practical move, and I applaud the FAA for taking quick action. They are not known for moving fast on really anything in their history. Who doesn't like pleasant surprises, though?*

Responses like the above speak to a level of cynicism about why support is in evidence only at a critical juncture when some pragmatic, outcomes-based decision making would be of value to industry under normal conditions. However, the constituency duly acknowledges the fact that an unheralded baseline level of support is available to supply at least a living wage. Like those being metered out 'until funding is exhausted' (QRIDA, 2020), they do little to address the structural operating conditions being specifically experienced during the pandemic. In the observation of one interviewed MRO operator, such funding might be structured to 'cover the cost of reconfiguring aircraft to carry freight or provide for personal protective equipment requirements that are at least useful to diversify missions and future-proof operators'.

4.5 Fuel Suppliers

As of 17 April 2020, one major fuel supplier's stocks of Jet A1 stood at 95 per cent of storage capacity. This has significant implications for GA in that it still has a heavy Avgas reliance, which is a downstream product of the refinery. With the demand for Jet A1 (equating to 33 per cent of refining stock offtake) reducing due to grounding vast fleets of RPT aircraft (Morrison, 2020), the refining equilibrium is

upset. The margins produced at this level that subsidise the production of lower-grade offtakes (including Avgas required by piston-powered aircraft) are reduced, leading to decisions to place refineries in care and maintenance mode rather than operate them at a loss. This places further stress on an already short supply line. Australia only holds 23 days of jet fuel on a normal operating footing against a target of 90 days of self-sufficiency (Hepburn, 2020).

Lower stock turnover in the GA space due to restrictions in non-essential travel, including recreational aviation, has a knock-on effect for fuel retailers. A senior manager with a regional distribution focus noted that ‘reduced capacity to hold staff and the added cost of maintaining compliance with storage and use-by requirements mandated under the JIG (Joint Inspection Group) global aviation fuel standards rank among these effects’.

4.6 Interim Policy Considerations

Notwithstanding the discussion items to follow on a more macro perspective, several issues of note to policymakers emerged for the GA sector that represent opportunities to enhance industry responsiveness and compliance with health directions.

Firstly, a major selling point of on-demand charter is that the rigour of major airport and airline processes can be dispensed with, avoiding wait times as a significant factor in user preference when travelling (Forsyth & Dwyer, 2010). Yet, there was no published direction for intrastate GA travellers, many of whom were deemed ‘essential workers’ having to travel to such national economic infrastructure generators as FIFO resources camps. Individual operators were left to determine protocols that saw them superficially compliant with health directions but without the benefit of professional guidance. Given that studies like Budd et al.’s (2009), which have already documented the ‘epidemiological vulnerability of a closely inter-connected and highly aeromobile twenty-first century world’ (p. 426), it would seem appropriate that a set of readily implementable health screening protocols be generated and easily facilitated by GA operators and airline entities alike.

Secondly, a matter of liability arises. Naboush and Alnimer (2020) have presented several dimensions to potential airline liability in the event their activities contributed to passenger acquisition of COVID-19. Depending on the interpretation

of prevailing conventions, vicarious liability is a serious issue for airline participants. Should such an issue be proven by law, the typical GA operator is unlikely to have the resources to weather a claim or the insurance arrangements in place to underpin the ability to pay damages. Policymakers would do well to consider an equitable sharing of responsibility and some legislative safeguards for providers when deeming some travel essential, especially where such can only be reasonably facilitated by a non-airline smaller player.

A third area that may warrant a stated national policy in the interests of clarity and pathogen management is aircraft boarding. Sun et al. (2021) have highlighted a range of extant studies at the airline level around the simple matter of boarding passengers during a pandemic. A multitude of options is trialled, with varying impacts on either transmissibility or efficiency. Yet for charter operators, likely due to the smaller nature of both aircraft and travelling cohort, no direction has been mandated. Out of the abundance of caution, our survey participants reported that some FIFO employers mandated their travelling groups be reduced by half to obtain onboard social distancing. The veracity of this strategy has not been measured, but the issue remains without firm guidance to work-hungry operators.

Fourthly, an unanticipated side effect of such efforts to reduce onboard crowding was increased flight requirements for some contracted charter providers. Half capacity flights departing twice as often results in an essential workforce being delivered to rural and remote resource communities and welcome cashflows to operators who sell ‘by the plane’ rather than ‘by the seat’, but also escalates the matter of carbon emissions from an already significant contributor. The aged nature of a fuel-inefficient fleet remains an issue for industry engagement (Akça, 2018), even outside of a pandemic inspired escalation of movement in various economy sub-sectors. Compromising hard-earned national policy progress at building sustainability into the non-airline sector is not an ideal outcome of the pandemic.

Finally, an observed area of coalface policy coordination that bears review is the cooperation between oversight agencies in the movement of GA traffic. Typically, state authorities within Australia have been tasked with policing their borders and intercepting cross-border chartered and private flights. During the height of the border closures, highly proactive states like QLD and SA deployed officers to GA airports, with such frontline pandemic control personnel from suburban stations observed to be totally reliant on using such commercial mobile apps as Flight Radar

24 and Flight Aware to look out for inbound aircraft with no formal alerts from Airservices Australia or another federal surveillance capability. Whether or not such disconnects have implications for national security or law enforcement at other times merits consideration in the broader context of the federalism debate (Productivity Commission, 2017).

4.7 International General Aviation Experiences

To contextualise the Australian experience, it is perhaps of value to briefly consider GA's journey relative to some international jurisdictions where policymakers and regulators have been visible in their constituencies. The UK's Department of Transport has regularly updated its COVID-19 guidance for the GA community. Plain English directions about what GA participants can do have taken the guesswork out of what is a permitted activity (UK Department of Transport, 2020). EASA has proactively sought to educate and inform its GA constituency and appears to have garnered enthusiastic cross-border support for its recommendations on matters even as simple as disinfecting an aircraft effectively (EASA, 2020c). New Zealand's Civil Aviation Authority proactively considered the issue of mental health for its aircrews while regularly updating guidance information for transport operators and non-reward GA participants alike (Civil Aviation Authority, 2021). In the US, the world's largest economy, COVID-19 perpetuated low-interest rates that have stimulated demand for GA aircraft upgrades in the second half of 2020 (Bertorelli, 2020). Still, little market direction has allowed insurance costs to markedly increase during the same period (Anglisano, 2020). Interestingly, thoughts in the US market have turned to the impact on airport facilities and the cost of FAA design standards to accommodate an increased level of aircraft ownership post-pandemic (Keidel-Adams, 2021).

In contrast, China has been actively engaged in policy initiatives for its GA constituency, going so far as setting up subsidiaries and special funds for GA companies that actively look to engage in the national response to COVID-19 (Asianskymedia, 2020). Some African policymakers have sought to address travel-inducing sectors like tourism in a triage effort to stave off the total collapse of GA operators reliant on guest movement to supplement the operating cost of connecting remote area communities with essential services like healthcare (Muragu et al.,

2021). Certainly, there has not been a ‘one-size-fits-all’ response around the globe, and the lapse of time will likely reveal varied stories in under-reported GA markets like South America and Oceania.

4.8 Discussion and Conclusion

In Australia, the federal response to issues confronting GA has initially been overshadowed by the direction of resources to national and regional passenger carriers, including Qantas, Virgin Australia and REX. These major enterprises have been dramatically impacted by the almost overnight suspension of first international and then domestic routes when the nation closed its borders, followed by the states closing theirs (Young, 2020; Thorn, 2020c; Zhang & Zhang, 2021).

The qualitative survey, conducted in the early weeks of the COVID-19 pandemic, has illuminated several shared conditions and experiences among GA participants in four sector subsets, notably concern around the nature of structural fiscal support, a desire for clear policy direction and considerable exposure to community dislocation. While the sample size was small, these conditions appear to be generally held across the geographies and activity areas surveyed, lending weight to the validity of focusing on these areas for future policymaking by the authorities.

Given the evolving nature of the pandemic and the indication of a closed national border into 2022, a future study would do well to explore what policies ultimately develop in Australia and how they compare with the priorities expressed in the interview findings nearer to the outset of the outbreak where unaccounted-for emotional influencers were likely in play. To that end, the authors are working towards a longitudinal study of the sector participants, the results of which will be progressively released to peer review.

In responding to RQ1 on adopting behaviours as a result of prior industrial and policy experience, the current study’s key findings include the understanding that a nationally structured industrial response that specifically addresses GA needs has not been in evidence during past pandemics and is not currently enacted in the surveyed environments. Clegg (2010) noted in evaluating the impacts of the H1N1 virus on international travel and trade that ‘after this pandemic is over, both international and national bodies will most definitely need to meet to determine what they can do to prevent and contain future pandemics’ (p. 467). A decade on, such

planning has not been immediately evident, which has left even peak representative bodies at a loss for direction, essentially stating ‘somehow or other, we need to cooperate to find a way out of this’ (AMROBA, 2020).

Industry participants across the two of the four sector subsets have expressed appreciation for the rapid relaxation of pilots’ currency requirements. To date, little commentary has been expressed about a) how such currency will be rapidly reattained, b) the cost pressures on providers with scarce resources under peak demand after such low trade, or c) whether federal regulators will demonstrate such quickness of will on cooperating with industry after the COVID-19 crisis abates. Such cooperation should include genuine dialogue about the capacity for operators and organisations to self-assess risk and replace prescriptive regulations with performance-based alternatives if they have been entrusted to do so under periods of high duress and remote/socially distant oversight with safe outcomes.

In addressing RQ1a, the interview data suggest that the fiscal business support packages provided by national authorities have not, for the most part, addressed the specific structural nature of the GA sector. Research suggests that policy benefits are best realised when they are targeted (Anable, 2005). Formulating support that aids in the diversification of operations, reduces compliance costs or reduces taxes and excises on an ongoing basis appears to have more long-term merit than short term cashflow support that simply leverages already stressed balance sheets.

Freestone et al., (2006) identified that ‘in the global “space of flows”, airports are critical nodes and have latterly assumed major economic significance extending beyond core aviation functions’ (p. 491). In a modified domestic form, the concept of developing airport cities (Chandu, 2017) as special economic zones bears investigation. Modified taxation, scaled excises, accelerated depreciation, innovation sponsorship and international investment incentivisation are among the policy levers available under the ‘dual legal order’ regime (Likosky, 2005). To date, these have never been fully explored in a GA context (Walker & Stevens, 2008) and may do much to encourage the progressive replacement of ageing infrastructure evident in many GA airports and to develop capacity for diversified activity within individual enterprises.

Finally, the GA sector across the surveyed sub-sectors is exposed to many of the same vagaries as the broader RPT/civil aviation sector. Among these exposures is

quality and stable fuel supply, a low-margin operating environment, dependency on key infrastructures where tenancy costs are a significant portion of revenue and a significantly skilled workforce that takes time and resources to develop. Feedback received through the interview sample in answering RQ1b suggests that one strategy policymakers could adopt is to more fully integrate the entire aviation sector in a scaffolded manner that insulates the economy from the 'sudden death' of an airline player and harmonises the competitive framework in which scale of operations can be recognised and leveraged. This includes the equalising rules for passenger-carrying operations, the maintenance regimes applicable to such operations and the more aggressive management of anti-competitive practice by national corporate regulators.

COVID-19 has been a game-changer globally. Aviation practitioners must now address the robustness of their risk management protocols, supply chains, gearing, workplace health and safety policies and staffing relations. If public policy is to assist in rebuilding the deeply bruised aviation sector, it must address all of its constituent parts and reflect an ethic of adaption rather than rely on the survival of the fittest.

CHAPTER 5: PREPARING FOR ‘COVID-27’: LESSONS IN MANAGEMENT FOCUS—AN AUSTRALIAN GENERAL AVIATION PERSPECTIVE

Preface

Building a body of research upon which to base future decision-making is arguably the cornerstone of scientific endeavour. The preceding chapters have utilised case study methodology and inductive research techniques to document heretofore unmapped dimensions of the Australian GA experience. Specifically, Chapter 4 identified short-term, more immediate dimensions of the COVID experience and its interaction with the external policy environment.

By contrast, this chapter seeks to contribute a crystalised view of the most critical findings relative to the internal experience of operators and how that experience modified the nature of management decision-making observed in the sector and the financial impacts of such choices. This chapter highlights a lack of financial acumen in the Australian GA community, which is likely to inhibit resilience in the sector and limit its ability to learn from the economic shock COVID-19 represents. In addressing a longer-term view than that explored in Chapter 4, this chapter argues that both industry and government have an excellent opportunity to recalibrate mutual expectations, address key sustainability issues and promote resilience in the GA sector.

Further, in contrast with the proceeding works that mapped some of the more macro dimensions of industry, this chapter proposes several specific initiatives to improve the quality of management decision making in the sector’s leadership, with a view to improving its financial outlook and visibility to policy makers.

5.1 Introduction

On 25 January 2020, the first case of what is now termed COVID-19 was reported in Australia (Hunt, 2020). The rapid escalation of the COVID-19 response levels by government agencies across the country aimed to reduce the spread of an aggressive virus in the majority of the population. To achieve this, a primary target of containment was the free movement of people using air transport. On 10 March,

Qantas announced capacity cuts on international transport by 23 per cent before this rose to 90 per cent and flowed over to domestic travel (Druce, 2020). As early as 18 March, extensive media reporting highlighted that an AUD 715m airline rescue package was to be launched (Karp, 2020). Some 10 days later, this was followed by an AUD 300m fund for regional aviation operators (Sullivan, 2020). Such support was unheralded and welcomed by many airline players despite lobbying positions adopted to support individual corporate agendas.

By contrast, the GA sector was not the beneficiary of specific discussion or fiscal resolve of the same calibre. The federal regulator encouraged aviation operators to reach out to them on 17 March to discuss their need for regulatory support. On March 24, a series of exemptions were put in place to deal with the practicalities of pilot currency, medical certification and organisational registration (CASA, 2020d). While these measures have been accepted by industry, the communication of broader management support and strategic direction has been noticeably muted compared to similar agencies such as the EASA that has adopted a role of stewardship for their respective constituencies (EASA, 2020a, 2020d).

This chapter aims to document the impact of COVID-19 on Australia's GA sector, focusing on the issues affecting the formulation of government policies, business decisions and mental health. The next section will give the background of Australia's GA industry, followed by the research methods used for this study. Section 5.4 presents the problems that need improving and solving. Recommendations are provided in the last section.

5.2 Background

The Australian GA sector and its aligned on-demand charter services have long been acknowledged as a disparate subset of the civil aviation industry (Bureau of Transport and Communications Economics, 1996). The responsible federal department itself states that 'there are currently no robust economic datasets compiled for the GA sector, restricting analysis of the impact of the various cost pressures facing GA or the contribution GA makes to the economy' (BITRE, 2017, p. 1). The issue is exacerbated by a lack of understanding of the key decision-making drivers of the actors within the sector (Kivits & Charles, 2015).

The commercial element of the GA community has been grappling with structural limitations for many years (Mills, 1989; Laird, 2001). Among their shared concerns have been the capacity to raise capital, access finance, adapt to rapid regulatory change and contain costs in training and operations (Aircraft Owners and Pilots Association of Australia, 2011). The sector, including approximately 840 authorisation holders, has been heavily populated by privately held, thinly capitalised operators who depend on asset utilisation rates to keep ahead of their costs curves with varying degrees of success. Representation of the sector has been fragmented, with a heavy policy emphasis on the airline community tending to take away the bandwidth of the smaller players in the aviation industry.

The impact of COVID-19 has rapidly exposed the fragility of the GA sector, and the relative immaturity of the business continuity plans nominally held by operators. It has also highlighted the lack of insight that federal policymakers have into the constituency, and the challenge of communicating to operators with varying degrees of commercial acumen across flight training, recreational hire and on-demand charter alongside maintenance organisations and other supporting businesses.

5.3 Research Methods

This chapter considers the Australian experience observed across a range of GA operators in the flight training, maintenance, repair and overhaul (MRO) and associated on-demand charter spaces in the early months of the COVID-19 pandemic. Information gathering for this study involves reviewing existing literature produced by academic journals, government organisations, magazines, GA firm websites, consulting firms and industry bodies. Informal conversational interviews were carried out with the management of GA operators to understand their concerns, operational and financial decisions amid the pandemic crisis and future plans. The operators hold either CAR30 or Part 145 maintenance approvals, Part 141 or 142 training approvals and charter or low-capacity RPT certificates. The 10 businesses observed (refer *Appendix B* for characteristics) were located in Cairns, Archerfield, Bankstown and Adelaide and are typical in size and scope to the general constituency resident at many GA airports across Australia (DITRDC, 2019a).

5.4 Observations

5.4.1 Changes in Decision-Making Paradigms

The rational choice paradigm of decision-making suggests that managers will choose alternatives that carry the highest subjective expected value to them, based on logic and data (McShane et al., 2013). However, the rapid onset of COVID-19 and the endless news cycle introduced levels of tension and negative sentiment into the community that excited emotional responses. Both information overload and emotion compromise rationality (Li et al., 2014).

Numerous operators defaulted to a form of bounded rationality (Simon, 1990), practising satisficing rather than maximising potential outcomes and future-proofing their businesses. Our interviews reveal that very few businesses had engaged in scenario planning for exogenous business interruption in the early weeks of the pandemic, despite having had ample examples in SARS and MERS-CoV about the potential for industrial disruption due to global health crises. Operators expressed uncertainty about the nature of stand down provisions in minimum wages and conditions, given that many had never had to consider them. Further, the operator principals were concerned about their balance sheet capacity to sustain mass drawings on accrued leave balances. In contrast, others found a general lack of financial management data to support claims on available federal support like JobKeeper[3] and the various low-interest state loan schemes or had difficulty interpreting the qualifying criteria for such assistance.

A kind of fight or flight response became amplified across several metropolitan airports. Our interviews suggest that key suppliers in the MRO space pre-empted business failure by their debtor base and moved to a cash on delivery terms base, withdrawing standard 7–30 days terms for parts consumers. The interviewees admitted that this was largely driven by self-preservation rather than creditworthiness, the historical character or capacity of the debtor principals. The rushed changes in decision-marking principles included constricting credit terms by such businesses. The likely result is a shift by clients to those suppliers who kept their doors open and are willing to be pragmatic based on a more in-depth knowledge of end-user consumption rates and ongoing viability.

[3] The JobKeeper scheme is a temporary government subsidy for businesses significantly affected by COVID-19.

Interestingly, it is not all bad news. Movement data suggest that flight training organisations took advantage of the exemption of social distancing rules in school classrooms and Australia's accommodating autumnal weather conditions to press on with their flying activities (Airservices Australia, 2020). Perhaps because of the relatively low levels of initial COVID-19 infection in Australia, managers were biased by a representativeness heuristic that compromised the level of investment in virus suppression in favour of throughput. This is also due to a lack of direction from the responsible department of the regulator about what flight activity might continue, which is in contrast to EASA who had banned most aspects of visual flight rules flights in Europe (EASA, 2020b).

5.4.2 Deferred Investments

Prior to COVID-19, there has been a noticeable uplift in sentiment among the GA fraternity. The US dollar value was starting to appear manageable. An indication of some consolidation in industry (particularly flight training and MRO operations) was in evidence, mirroring international trends (Jacobs & Goebel, 2019). The aircraft broker market had completed higher than expected closures of GA aircraft in the final calendar of calendar 2019, with particular demand in the tourism sector. Social capital appeared with industry participants forming networks to try and counter the influence of RPT players coming into the training and charter space, thereby stymying downstream supply and support players in the GA sector.

However, such confidence rapidly evaporated, with various industry participants withdrawing non-binding offers, cancelling aircraft orders and deferring capital projects like hangar expansions and line training for staff (Wilson, 2020). US manufacturer of advanced private aircraft, Cirrus Aircraft, laid off 85 staff in just one week in March, for a total of 550 inside one trading year, suggesting a global phenomenon of retraction (Johnson, 2020). In Australia, our interviews reveal that one key simulator centre lost 90 per cent of its income stream overnight, with operators taking advantage of relaxations or deferring training for aircraft that will not arrive online in the foreseeable future. Given the private nature of many GA entrepreneurs, the true quantum of foregone investment may never be known.

5.4.3 Mental Health and Potential Safety Cost

During the first six weeks of COVID-19's presence in Australia, the authors surveyed 10 specific businesses representative of typical airport tenancy mixes to determine the impact of the pandemic on staff wellbeing. Research suggests that people have better psychological wellbeing if they have multiple selves—social, professional, personal and so forth—building to a self-concept that acts as a buffer against any one deleterious impact on one's sense of wellbeing (Lester, 2012). Arguably, the novel coronavirus rapidly stripped people of personal interactions, threatened their professional security and pushed people into isolation without necessarily having the support networks in place to support it. Eighty per cent of business owners consulted during the survey process conceded that they had not yet considered this element of their business continuity plan.

Aviation relies on mentally alert, well-adjusted, fatigue-managed personnel conducting their duties within prescribed standard operating procedures (Bendak & Rashid, 2020). A failure to recognise the mental health impacts on the performance of sudden discontinuity may prove costly to capital, compliances and reputation where no organisation defence is erected to limit human factor or liveware failures in aviation activity. Recognition of the need for authentic leadership and emotional intelligence during periods of organisational stress coupled with their often well-homed cognitive and practical intelligence would enhance the manager's ability to role model sound problems solving and provide a frame of reference that can be endorsed by workers who have been suddenly forced outside of their normal operating paradigm. Rather than just reflecting Fiedleresque contingency theory (Fiedler, 1978), genuine engagement with the team in a crisis can enhance employee longevity, reduce stress and promote a sense of unity and purpose that bears long-term fiscal benefits.

5.5 Recommendations and Conclusion

The difficulty in crafting public policy or financial support instruments is clear where the architects have limited knowledge of the target audience (Berg, 2015). Yet, there are already mechanisms in place that, if reshaped and connected, could alleviate the financial myopia of the GA sector, as evidenced in the preceding observations.

To obtain an operator's certificate, the Australian federal regulator requires the production of a financial viability statement. Once produced and nominally accepted after scant analysis, these rosy projections are unlikely to be revisited as the primary charter of the regulator is deemed to be safety, not fiscal management. Attaining minimum benchmark ratios and liquidity measures aimed to promote solvency, depth of balance sheet and sustainable trading terms are often covenanted by financiers and may prove valuable in maintaining operator focus on key commercial drivers if they were incorporated into the auditable renewal terms of operating approvals. This would conceivably promote sustainable pricing, capacity to reinvest in safety, staff and equipment, and remove the marginal operators from the marketplace, favouring those more capable of withstanding economic discontinuity.

The abovementioned BITRE (2017) report highlighted the dearth of performance data to inform public policy. Again, the deidentified Australian and New Zealand Standard Industrial Classification and business activity data held by the Australian Taxation Office, with some self-reporting elements as part of the annual GA activity survey gathered by BITRE, should be aggregated to present a macro dataset enhanced by movement and occupancy data understandings from public and private airports and the risk underwriting information drawn together by insurers every year. This metadata should be sufficient to generate a fuller understanding of a sector that employs more than 11,000 people (ABS, 2017) and has millions invested in plant, equipment and approvals.

Further to the ongoing viability of enterprises, enhanced scrutiny should be employed when evaluating those deemed to be 'fit and proper' accountable and responsible managers. Currently, the validation of such officeholders is based largely on criminal history checks and subjective assessment of familiarity with operating regulations. There is no requirement to demonstrate financial acumen nor hold any formal or industry-recognised business qualification (CASA, 2019). Perhaps by linking the requirement for demonstrating fiscal competency requirements under the Australian Qualifications Framework (promoted in both the VET and Higher Education sectors) to the scope of necessary skills, the calibre of financial management decision-makers might be made more robust.

Extending access to financial literacy programs for licensed personnel as part of their preparation to enter the industry would also do much for employees' ability to contribute to the financial welfare of the business and perhaps their own fiscal

outcomes. This enhanced source of decision knowledge is likely to improve decision commitment and reduce the risk of conflict in times of external shock. Mandating credible financial literacy tuition into existing structures like work health and safety and non-technical skills training would be a small impost but assist all industry levels in understanding their fiscal resilience strategy options and their power to contribute to their businesses' bottom line. Further, such team members are likely to feel empowered about making decisions in difficult circumstances, thereby reducing mental anguish and associated health stressors.

Finally, in considering targeted financial support for the sector, attention should be given to mechanisms that shore up the long-term viability of participants. At this stage, the bailout packages available to the airline operators have not been extended to the commercial GA operators (apart from some activity fee waivers or refunds) (Nadge, 2020). Relaxation of pilot currency requirements is a short-term relief, but it must ultimately be redressed in the interests of safety and, therefore, is only a deferred cost. Generic federal and state loans are to support payroll and cashflow, not capital expenditure or acquisition. Rather than loan bailouts into already thinly capitalised balance sheets, providing trading line guarantees or rental bonds based on similar low-cost terms to encourage the continuance of credit terms and de-risking of tenancies would encourage industry participants to support each other more during periods of extended duress. Likewise, tailored industry finance packages aimed at coupling equipment profiles, attractive depreciation rates and historically low interest rates could be underpinned by the government for qualifying candidates to galvanise bank engagement with the sector.

Numerous options exist to improve the potential for the GA sector to meet potential challenges presented by 'COVID-27'. As the Canadian, the US and other international jurisdictions example bears out, the unified presentation of will by the local sector is required, and an understanding by policymakers of the value and contribution of a resilient and performing GA community in the broader economy.

CHAPTER 6: CONCLUSIONS AND FUTURE RESEARCH DIRECTIONS

6.1 Promoting General Aviation in Australia

This thesis presents an anthology of connected peer-reviewed works inspired by the desire to escalate GA community awareness in Australia and thereby opportunities for further inquiry and policy development. Policymakers can use the resultant work to make strategic planning decisions in the national interest, having validated through inquiry that the sector is largely unmapped in its ability to contribute to the economy but holds a vast potential to mobilise goods and services. Specifically, the contributions of this thesis to the body of research are:

- It has developed a pattern of inquiry into sector infrastructure that can be replicated to expand the knowledge of national assets and their scope for development.
- It has invited ongoing exploration of established economic theory as it applies to the GA sector to encourage further research and active debate about using various policy tools to stimulate sustained growth and development.
- It has identified a level of resilience within the community that can be leveraged to promote focused engagement, thereby building a nexus of idea exchange between stakeholders, academic observers and policymakers.
- It has shed light on the unknown dimensions of the sector, which should act as a catalyst for future research and encourage awareness of the opportunities and development goals of the sector at a national level.

These contributions have materially met the stated research aim and objectives set out in Chapter 1.3 and stimulated momentum for new policy settings and future research. At the outset, three overarching questions framed the research inquiry.

Firstly, what do contemporary industry stakeholders in Australia believe would best enable the growth and development of their GA business and the sector more broadly? Chapter 2, through case study analysis, highlighted the limitations

experienced by stakeholders operating in an ageing infrastructure environment facing competing planning pressures. The case of Archerfield, reflective in many ways of secondary airports nationwide, demonstrates the need for an affirmative policy to promote renewal and reinvestment, balancing heritage preservation with the need for physical 'place' appropriate for twenty-first-century operations. Recognising the unique contribution that aviation makes to the national economy through the rapid mobilisation of people, goods and services might be augmented by policies aimed at supporting the capital-intensive, low-margin industry with operating incentives that encourage investment in new technologies and physical distribution capability.

Secondly, how closely are these stakeholder considerations aligned to current and proposed government policy settings? Chapter 3 found that there are dimensions of operator experience that have an underdeveloped body of policy and reflect wicked (or at least highly complicated) problems that are hard to address. Whereas the government's principal response has been to promulgate regulation at a significant rate, the constituency is seeking support and guidance to develop resiliency strategies to improve the depth and efficacy of the sector's economic contribution.

Finally, do the observable behavioural drivers of industry participants reflect any correlation to current academically accepted managerial decision-making paradigms? (If not, what does this mean for policymakers?) Chapters 4 and 5 made a significant contribution to answering this question. By identifying behaviours under stressed conditions, the two chapters highlighted the primacy of behaviours built on self-preservation in the absence of any unified policy or industrial response. In early interviews with senior bureaucrats that framed this investigation before the onset of COVID-19, it was made clear that writing policy for a disparate set of interest groups within the GA sector was neither easy nor a strategic priority. This pre-existing perspective did not promote a platform that would galvanise collective decision-making at a time of intense dislocation. That said, scope exists to more fully explore the organisational behaviour dimensions of the sector, and this remains a potential outcome of future longitudinal research for the author.

6.2 Policy Imperatives

The investigation undertaken for this thesis utilised a range of methodologies to extract previously unmapped data. The qualitative approaches adopted sought to tease out reliable and observable themes from an under-researched constituency. The purpose of this endeavour was to better inform future policy initiatives that might be crafted to support the commercial GA sector in Australia. The imperatives distil down to three concentration areas.

Firstly, an effort must be directed at formalising a data-gathering platform that allows policymakers to transparently identify the contribution GA makes to the national economy. It is manifestly inadequate that a large employer base is unrepresented in the national GDP evaluation. By tweaking such existing statistical tooling as the GA Activity Survey and permitting appropriate metadata sharing between government departments, opportunities exist to enhance the sector's visibility without imposing significant reporting regimes on the populous. Without addressing this key deficit, it is unlikely that credible, coherent and targeted policy can be introduced to stimulate sector activity.

Engagement levels with stakeholders by policymakers were a recurrent theme throughout the research endeavours. The reimagination of an interface with government that is not focused on regulation but instead on education, skills promotion and opportunity identification would be welcomed by the constituency. This implies that the responsible department must find innovative ways to reach out to the sector and take ownership of the experience. The current pandemic environment presents an opportunity for such a response, demonstrating stewardship in a time of uncertainty and refocusing energy on recovery rather than ongoing dissatisfaction with the regulator.

Finally, with themes around sustainability, technology and acumen emerging from the stakeholder population, it may be of significant value for policymakers to consider how best to incentivise commercial GA operators to mobilise capital and embark on a program of supported investment. Levers to support such efforts have been identified in the preceding chapters, including those successfully trialled overseas. Scenarios in which accelerated depreciation, asset write-off, favourable financing terms and skills support/development programs are among non- or low-cash contribution responses within the purview of government to support or sponsor.

6.3 Limitations of the Study and Future Research Pathways

This research set out to investigate the underlying decision-making paradigms evident in the Australian GA stakeholder community at a grassroots level. From the outset, it was evident that the lack of transparent data on the sector's contribution to the economy and the minimal amount of documentary evidence or commentary on its role in the economy made establishing a research beachhead difficult. Added to this were COVID-19 limitations on travel and face-to-face engagement with regional and remote Australian operators, which resulted in a modification to the data-gathering approach originally envisaged.

The case study built in Chapter 2 considered the trajectory of Archerfield Airport, mapping its progress against Essendon Fields, which was the only other documented case of planning discussion with any academic rigour attached. Whereas the Archerfield case presented in a novel contribution to the literature, it would benefit from having a full suite of analysis available for major secondary airports nationwide. Such a collection would be invaluable in spotlighting the areas of limitation coalescence shared by the GA sector, promoting more focused policy and planning discussion.

Applying a 'wicked problems' filter to Chapter 3's exploration of first-person commentary was an attempt to introduce some extant economic theory to the sector commentary. Peer review commentary garnered through compiling journal contributions highlighted the perspective gap between pragmatic practitioners and theoreticians, suggesting further work could be done to align practice and analysis into a format more useful to policymakers working with an incomplete picture of the constituency. Naturally, a larger respondent group would have been welcomed during this research phase, but therein lies an opportunity to pursue a longitudinal study of the populace past the anticipated conclusion of the present pandemic.

Chapters 4 and 5 presented findings from a range of stakeholder experiences during the pandemic's dislocation. The conclusions reached are reflective of the Australian experience. Extending this inquiry's scope to capture a broader range of international experiences would contribute to understanding whether Australia's GA policy framework is out of structural alignment with global trends, or whether there is more underpinning the GA community worldwide than has thus far been

documented. Further, as alluded to in Chapter 6.1, a more granular-focused research endeavour around the psychology of stakeholder decision-making through an organisational behaviour framework would be a valuable contribution to the current body of GA research. As academic contributions worldwide come to publication status, a formalised literature review of the materials now being produced would be a valuable springboard for future policy-modelling activity.

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APPENDICES

Appendix A: Interview and Survey Question Bank

Directions in General Aviation: Identifying Contemporary Motivators & Decision-Making Models to Better Inform Industrial Policy *(Original Thesis Title, Approved under Research Ethics application H18REA242)*

PERSONAL INTERVIEW FORMAT

1. For the record, may I have your name and title within your organisation?
2. What is the registration number of your Air Operators Certificate?
3. What is the trading name of your enterprise?
4. How long has this AOC been in operation?
5. What sorts of operations does your enterprise facilitate?
6. How long have you been involved with the AOC personally?
7. When you look back at the history of the enterprise, what do you feel was the most challenging period of operations? What do you put that down to?
8. From your perspective, who is responsible for setting the tone and direction of policy for the General Aviation sector?
9. How would you describe the current national policy setting for the General Aviation sector?
10. What is your opinion about the suitability of the current policy for promoting growth in the General Aviation sector?
11. Where do you obtain your information about the current national policy?
12. Excluding changes in the regulatory environment through the actions of CASA, has your enterprise ever been directly influenced by a particular federal government policy?
    i. If so, how?
13. Did your organisation review the General Aviation Report 2018 prepared by BITRE?
    i. If so, what did you feel was its most compelling finding?
14. Is your enterprise formally affiliated with any industry body? E.g., RAAA.
    i. Why or why not?

15. What word do you feel best describes the federal government's attitude at a department level towards General Aviation?
    i. Why did you choose that word?
16. What challenges or successes do you feel the federal government has experienced in formulating growth-oriented policies for General Aviation?
17. Assume you were asked to participate in a policymaking forum at a federal level. What policy instruments do you think could stimulate the most positive change for the General Aviation sector across the country?
18. Thinking about your own enterprise, what policy instruments do you feel would encourage you to invest in new aircraft, infrastructure and employees?
19. Let's think about acquiring a brand-new aircraft for your fleet. Can you describe how your organisation would go about evaluating the need for such an investment?
20. Consider for a moment that you have been offered the chance to compete for a worthwhile commercial tender. Step me through your approach to winning the tender.
21. Does your enterprise have an independent advisor to assist you with making business decisions or reviewing outcomes?
22. When you think about business planning for this enterprise, what form does it take?
23. What is the single biggest concern you have when thinking about the next five years for your business?
24. Thinking about General Aviation internationally, what overseas market do you feel Australia could best learn from and why?
25. Lastly, I would like to ask some more detailed questions about you.
    i. How long have you been involved in the general aviation sector?
    ii. Have you worked in any other non-aviation related industry?
    iii. Have you completed any tertiary or industry qualifications relevant to your current role? If so, what kind?
    iv. Have you ever participated or been invited to participate in a research project in the General Aviation sector?

v. Are you aware of any other academic studies looking at federal policy for the General Aviation sector?
vi. Do the working relationship you have with the federal department influence your vote at election time?

Interview timing: 45–60 minutes

MODIFIED REMOTE SURVEY FORMAT (COVID ADJUSTMENT)

RQ1 Overall, how satisfied are you that federal aviation policy supports your business objectives?

Excluding your regulatory relationship with CASA, how would you rate your relationship with the federal policymaking body?

1—Highly Satisfied
2—Satisfied
3—Neutral
4—Dissatisfied
5—Highly Dissatisfied

Excluding CASA communications, are you aware, or have you participated in any federal policymaking forums or initiatives in the last three years?

Yes
No

How would you rate the effectiveness of federal policy in providing a clear industry vision for Australian general aviation?

Highly Effective
Effective
No opinion
Dissatisfied
Highly Dissatisfied

To what extent do you feel the responsible federal department should be engaged in industry planning for General Aviation growth and development?

Deeply engaged
Passively Engaged
No opinion
Moderately Engaged
Highly Engaged

Have you ever engaged in any formally recognised business decision-making program or schooling, whether by a tertiary or industry body?

Yes
No

Excluding CASA dispensations and generic JobKeeper-type support, has your business benefited from any specific government support to continue operations during the COVID-19 period?

Yes
No

Would you be interested in a program of voluntary and free business health checks and management coaching by the responsible federal government with no risk of adverse CASA actions?

Yes
No

Which of the following matters most concerns you about the future of your business?

Regulation
Cost of finance
Cost of new aircraft
Availability of qualified staff
Labour costs and liability management
Operating premises and airport infrastructure
Technological obsolescence of manned flight
Continued access to government funding (e.g., VET Student Loan program)

The federal government's current General Aviation policy has made me feel:

Optimistic about planning for the next few years
Uncertain about planning for the next few years
Pessimistic about planning for the next few years
Neither optimistic nor pessimistic about panning for the next few years

RQ2: What mechanisms would provide Operators with the best channel for future policy input and industry support?

Overall, how satisfied are you that the responsible federal department supports innovation in general aviation?

1—Highly Satisfied
2—Satisfied
3—Neutral
4—Dissatisfied
5—Highly Dissatisfied

What consultation arrangements do you feel would be best suited for drawing the federal government and operators closer together?

Free form answer

Overall, how would you rate the value of General Aviation policy settings in assisting you to make decisions about the future of your company?

1—Highly Valuable
2—Valuable
3—Neutral
4—Limited Value
5—Completely Valueless

Do you consider any international models of industry policy support (excluding regulatory settings) to be superior to the current Australian experience?

Yes
No

If yes, which? (Free form answer)

Should the federal government be seeking new ways to proactively engage with the General Aviation sector?

Yes
No

If yes:

Should the federal government be involved because it is a

Very important matter
Somewhat important matter
Not an important matter

Should the federal government be involved because it has a

Large responsibility to address sector issues
Moderate responsibility to address sector issues
Small responsibility to address sector issues

If no:

Why shouldn't the government be involved? (mark as many as you feel apply)

Because is not an important issue
Because it's not the federal government's responsibility
Because past government efforts to address issues have not worked

Should the federal government form partnerships with the General Aviation operators or peak bodies to promote scientific and technological development of the sector?

Yes
No

If you were appointed as a policy advisor to the responsible Minister, what is the first issue you would seek to address? (Freeform answer)

Dimensions

What is your expected business turnover in 2021?
$0–$250k
$250–$1m
$1m–$5m
$5m+

What is your total experience in industry?
1–5 years
5–10 years
10–20 years
20+ years

Where does your business operate?
Capital city
Regional city
Regional non-urban
Nationwide

How many people does your business employ (full-time equivalent)

1–5 employees
5–20 employees
20–50 employees
50+ employees

What is the nature of your business?

Charter only
Airwork Only
Charter & Airwork
Other
All/most of these categories

Appendix B: Chapter 5.3 Participant Characteristics Summary

Participant #	Primary Activity	Location	Turnover AUD	Staff Number	Years of Operation
1	MRO	Cairns Qld	$500,000 - $1.5m	4	7
2	Flight School	Adelaide SA	$1.5m - $5m	7	9
3	Charter	Bankstown NSW	$1.5m - $5m	6	11
4	Flight School	Archerfield Qld	$500,000 - $1.5m	3	4
5	MRO	Archerfield Qld	$1.5m-$5m	11	8
6	MRO	Adelaide SA	$1.5m-5m	21	14
7	Flight School	Bankstown NSW	$5m-$10m	29	12
8	Charter	Cairns Qld	$5m-$10m	20	16
9	Flight School	Bankstown NSW	$1.5m - $5m	9	8
10	Charter	Archerfield Qld	$1.5 - $5m	5	4