



# *Prospects for Working from Home*

## Assessing the evidence

Tulipwood Economics

Report prepared for iMOVE CRC  
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31 March 2022

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## Abbreviations

ABS	Australian Bureau of Statistics
ANZSCO	Australian and New Zealand Standard Classification of Occupations
ANZSIC	Australian and New Zealand Standard Industrial Classification
BITRE	Bureau of Infrastructure Transport and Research Economics
CBD	Central Business District
CRC	Cooperative Research Centre
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DCE	Discrete Choice Experiment
DITRDC (Federal)	Department of Infrastructure, Transport, Regional Development and Communications
DoTWA	Department of Transport Western Australia
DWL	Deadweight Loss
EIA	Economic Impact Assessment
GCCSA	Greater Capital City Statistical Area
GSMA	Greater Sydney Metro Area
HILDA	Household Income Labour Dynamics Australia
iMOVE	iMOVE Cooperative Research Centre
IO	Input-output
ITLS	Institute of Transport and Logistics Studies (USYD)
MBPS	Megabits per second
MPL	Marginal Product of Labour
MRWA	Main Roads Western Australia
MTWP	Method of Travel to Work
NPV	Net present value
OD	Origin-Destination
OECD	Organisation for Economic Cooperation and Development

OH&S	Occupational Health & Safety
PATREC	Planning and Transport Research Centre (UWA, Curtin Uni, ECU)
PC	Productivity Commission
PT	Public Transport
R&D	Research and development
ROA	Rest of Australia
SEQ	Southeast Queensland
SfH	Studying from Home
SIP	Statutory Infrastructure Provider
TfNSW	Transport for New South Wales
TMR	Transport and Main Roads (Queensland Department of)
UniSA	University of South Australia
VoT	Value of Time
WCTH	Working Close to Home
WfH	Working from Home
WiO	Working in Office
WGEA	Workplace Gender Equality Agency
WTA	Willingness to Accept
WTP	Willingness to Pay

# Executive summary

## Background

iMOVE CRC (iMOVE) has partnered with a number of Australia's leading transport, planning, business and social policy research centres to assess the impact of the increased prevalence of working from home (WfH).

WfH is defined as the proportion of one's working time that is undertaken at home as opposed to at their usual place of work (e.g. the office). For example, if someone normally works five days per week and completes two of those five days at home, then they've worked 40% of their week WfH. A broader classification of WfH would include 'working close to home' such as at a local café or library.

The broad objective of the program of work is to understand the economic and social impacts of the COVID-19 shock on the Australian economy and, specifically, to assess the evidence in relation to:

- changing work practices; and the consequential impacts on:
- productivity and wellbeing;
- travel demand;
- use of, and investment in, transport infrastructure; and
- use of transport services.<sup>1</sup>

The program of work is organised into four separate, but interconnected, projects:

1. Working from Home (WfH) and Implications for Revision of Metropolitan Strategic Transport Models (1) -
  - a) Project partners: Queensland Department of Transport and Main Roads (TMR) and the Institute of Transport and Logistics Studies (ITLS) based at the University of Sydney.
2. Working from Home (WfH) and Implications for Revision of Metropolitan Strategic Transport Models (2) -
  - b) Project partners: Transport for NSW, Department of Transport WA, ITLS.
3. Encouraging the continuation of WfH practices in a post pandemic world.
  - c) Project partners: The Department of Infrastructure, Transport, Regional Development and Communications (via BITRE) and the University of South Australia (UniSA).
4. Working from Home – Changes in transport demand.
  - d) Project partners: Department of Transport WA, Main Roads WA and the University of Western Australia (via PATREC).

iMOVE engaged Tulipwood Economics to prepare a single overarching report that integrates the evidence to date and highlights the main findings of the four research projects. iMOVE also requested that Tulipwood Economics provide policy recommendations based on the evidence identified in the program of work as well as the broader public policy context in Australia. As part of this remit, Tulipwood Economics developed a conceptual framework to guide the interpretation of the evidence and consideration of policy recommendations.

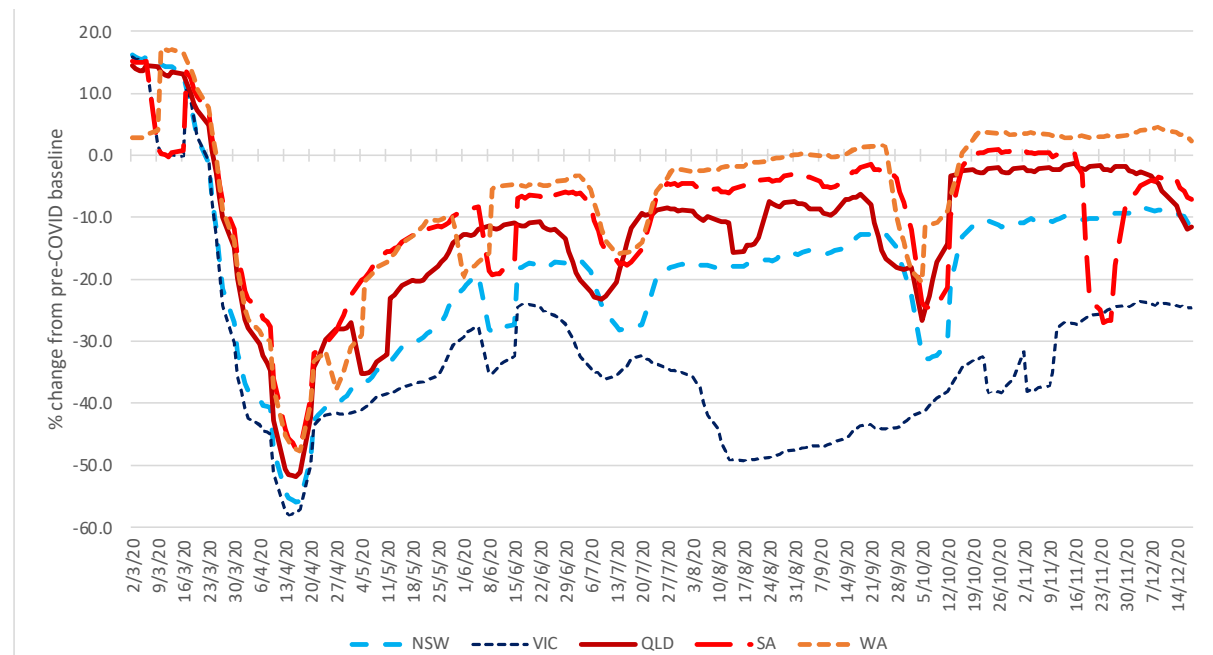
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<sup>1</sup> Hereafter, 'COVID' will refer to the coronavirus disease (COVID-19) caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The 'COVID period' will, generally, refer to the three (calendar) year period 2020-2022.

## The great policy challenge

The Australian Federation’s public policy response to COVID, which included establishing a National Cabinet, suspending ‘non-essential’ office-based work – especially in March and April 2020, created a unique national policy challenge. Millions of Australian workers abruptly switched from their twice-daily capital city commute to an office setup of some form in their home (Figure E- 1). Mandatory social distancing policies dramatically increased the prevalence of working from home, from a rare occurrence for most workers to being the norm for almost all ‘non-essential’ workers (whether desired by employers and employees or not).

**Figure E- 1 Google Workplace Mobility Data, 2020**



Source: Tulipwood Economics based on the Google Mobility Database.

Australia was not alone in navigating its way through the great COVID policy challenge. Every country in the world, whether an advanced OECD economy or a developing nation, faced the same challenges. How to maintain national economic output and full employment – and at a very basic level to complete the hundreds of millions of individual job tasks daily that comprise national output – while being physically separated became a global preoccupation.

The capacity to transfer a sizable proportion of national economic output from the workplace to the ‘home office’, utilising the ‘digital highway’ has been an important indicator of economic and social flexibility and resilience. High income countries such as Australia, with greater digital capacity, flexible regulatory and planning systems, and fiscal and monetary ‘fire power’, are more likely to absorb the economic and social shock and return to pre-COVID economic performance and social wellbeing relatively quickly.

Notwithstanding these successes, new challenges will arise as government-mandated WfH arrangements make way for mandated and voluntary WfH arrangements between employers and employees. In such a scenario, the extent and scope of WfH arrangements, as well as the resulting broader implications for transport systems and the labour market cannot be easily predicted. Identifying and managing the longer-term implications of the shift to WfH will not be easy. The UniSA

research project team observed that the great policy challenge has complex and profound implications:

*“As a consequence of the COVID-19 pandemic, there has been an unprecedented upsurge in the adoption of WfH practices. Employers have had to develop the necessary infrastructure and protocols to support these changes; employees have had to adapt their work practices to manage these changes. Despite these challenges, the pandemic has offered a unique opportunity to test the viability of WfH practices across different jobs and industries, and to assess their economic, social and environmental impacts.” (UniSA 2021).*

## From mandatory enforcement to voluntary negotiation

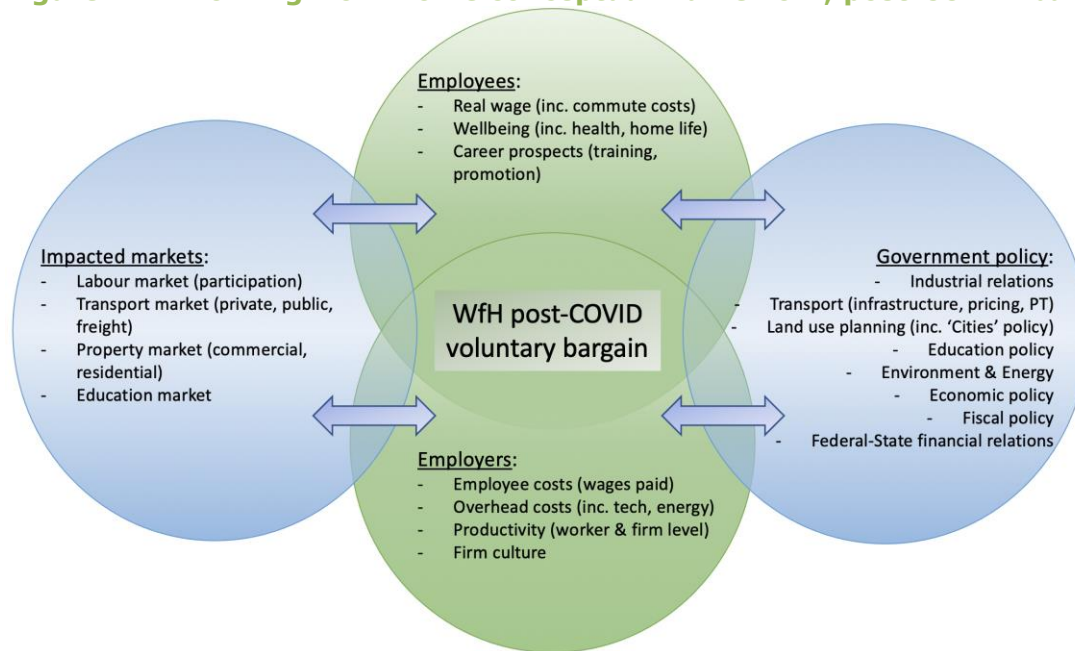
Given the complex interactions and impacts of WfH on many markets and policy areas, the research project groups each established an analytical framework to guide their investigations into different aspects of the issue. The incentives on offer to the two most immediately impacted economic agents – employers and employees - are central to whether WfH continues at the much higher levels seen during the two-year COVID period or returns to its pre-COVID gradual trend rise.

Employers and employees must negotiate (or bargain for) new employment contracts, and establish new systems and processes for the post-COVID world. The common themes identified and explored by the four research groups include:

- the upper limits of WfH, by industry, occupation and job task;
- the impact of mandatory and optional WfH policies on travel demand and commuter preferences for WfH;
- the avoided ‘negative externalities’ (i.e. social costs) associated with traffic congestion, PT crowding and public health, and pollution;
- changing attitudes towards the health risks of using PT;
- land use planning and cities policy;
- worker and firm-level productivity;
- worker health & wellbeing; and
- macroeconomic and fiscal impacts.

Figure E-2 (below) brings together the most common themes from the research. This graphic illustrates the primary economic agents (employees and employers), and markets and policy considerations involved in the WfH ‘post-COVID voluntary bargain’. The schematic clearly shows the complexity of the issue and the direct and indirect impacts the increased prevalence of working from home will have on a number of markets – such as the Australian labour market, transport market, commercial and residential property markets and the education market.

**Figure E- 2 Working from Home conceptual framework, post-COVID bargain**



Source: Tulipwood Economics based on ITLS (2020, 2021), UniSA (2021), PATREC (2021) and Productivity Commission (2021).

Accordingly, all tiers of government need to carefully review the medium- and long-run impacts of working from home and consider whether policy adjustments or major reform is required. This especially relates to industrial relations, transport infrastructure investment, the provision of public transport services, land use planning and cities policy and, more broadly, macroeconomic policy.

## Assessing the evidence

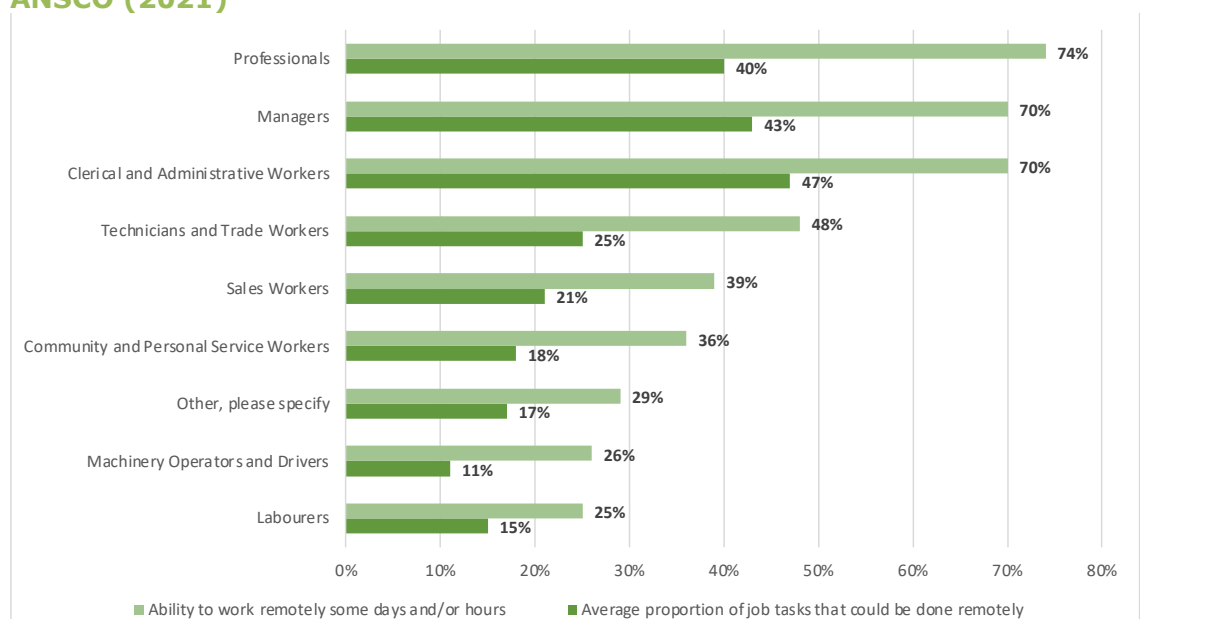
### Capacity to WfH

The capacity to work from home depends on the degree to which individual employees can durably carry out their functions physically isolated from both (a) their colleagues, and (b) consumers or service recipients. The survey evidence from the four research project groups indicates that:

- Between 40-50% of the Australian workforce could feasibly work from home *some days of the work week* to complete *some job tasks*, however capacity varies widely when estimated by industry and occupation;
- The industries with the greatest capacity to transition to WfH are those that largely employ office-based workers with minimal capital requirements beyond a laptop and internet access: Information, Media and Telecommunications; Financial and Insurance Services; Agriculture, Forestry and Fishing; Professional, Scientific and Technical Services; and Electricity, Gas, Water and Waste Services;
- The industries with the least capacity to transition to WfH are those that are characterised by a high degree of customer, client or patient physical contact and are not, therefore, amenable to the transition in general: Accommodation and Food Services, Health Care and Social Assistance, Retail Trade, and Transport, Postal and Warehousing:
  - To some extent, COVID accelerated the shift of a limited number of health care services (e.g. GP consultations) to the telehealth model, but the overall effect has not been significant to date.

- Some industries, such as Construction, involve a large services component (e.g. designers, engineers, draftsman) that can be carried out, to at least some extent, off site, and hence, the shift to WfH has been greater than expected.
- All four research groups concluded that it was more meaningful to assess WfH capacity by occupation. The survey evidence showed that Professionals, Managers, and Clerical and Administrative Workers have the greatest capacity to work from home.
- In contrast, Labourers, Machinery Operators and Drivers, and Community and Personal Service workers had the lowest capacity to work from home (Figure E – 1).

**Figure E – 1 Self-reported ability to WfH and undertake job tasks, by 1-digit ANSCO (2021)**



Source: UniSA (2021, Chapter 7).

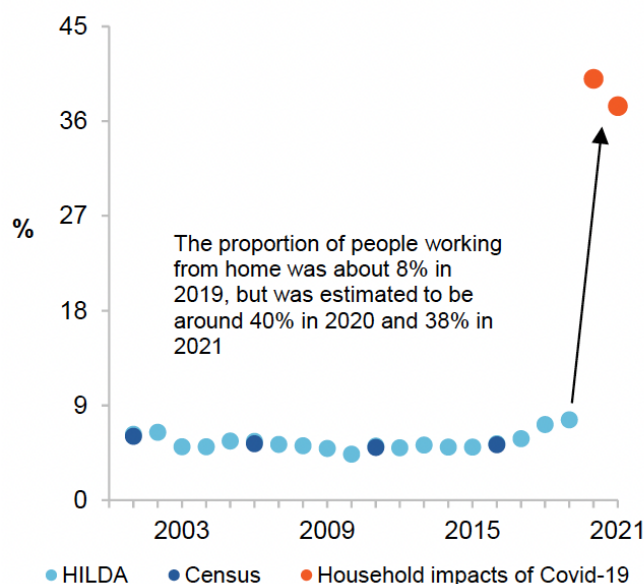
## Prevalence of WfH during COVID

The four research groups deliberately undertook their surveys at different times during 2020 and 2021 to evaluate the effects of the different stages of the pandemic and scale of the policy response (i.e., social distancing measures). Reflecting their relative capacities to switch to WfH arrangements, the prevalence of WfH by industry and occupation during the COVID lockdowns was mixed.

- Essential industries such as emergency services, public transport, hospitals, large supermarkets and takeaway food delivery services remained operating;
- The hospitality and tourism industries (e.g. airlines, hotels, cafés and restaurants) effectively shut down with workplaces going into a ‘deep freeze’ and millions of workers being supported by the \$89 billion JobKeeper scheme;
- Particularly in the eastern states, the education sector largely moved online (apart from day care centres) with teachers continuing to work developing online material and monitoring students’ performance remotely;
- The bulk of non-essential office-based workers, with minimal capital requirements and few or no client facing responsibilities other than those which could be carried out remotely, switched to working from home.

- Overall, the proportion of people working from home, which had increased to about 8% by 2019, increased to around 40% in 2020 before declining slightly to be 38% of the Australian labour force in 2021 (Figure E - 2), (PC, 2021).

**Figure E - 2 Scale of the increase in WfH, pre-COVID and COVID**



Source: Productivity Commission (2021).

The UniSA research group monitored the prevalence of WfH during the pandemic across 17 of the largest Australian cities via an online weekly survey of roughly 150 employees and 50 managers over the period mid-January to early May 2020:

- During this period, the average employee was doing just under one-third (31%) of their job tasks and activities remotely; while
- About 57% of employees were doing less than 10% of their job tasks and activities remotely, while 17% were doing more than 90% of their job tasks and activities remotely (UniSA, 2021).

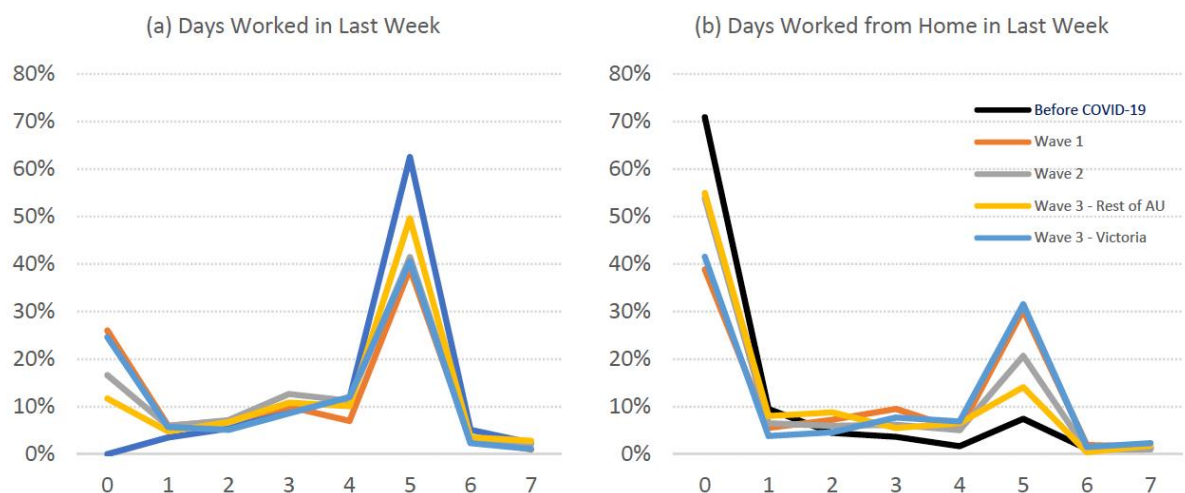
The ITLS research group conducted an Australia-wide survey over four ‘waves’ through 2020 and 2021 and found the proportion of workers working from home increased significantly compared to a pre-COVID baseline, as follows:

- While 71% of respondents did not work from home at all before COVID, that proportion declined to 39% during the Wave 1 survey period.
- The number of workers working 5 days per week from home almost quadrupled from 7 to 30% at Wave 1. However, this rate had eased slightly in the Wave 2 data collection period in early June 2020.
- The average number of days worked at home per week during the pre-COVID baseline was 0.86 days, during Wave 1 this increased to 2.4 days, and by Wave 2 it had dropped back to 1.7 days per week.
- In Wave 1, almost half of the respondents (47%) indicated they *could* WfH, a result more prevalent among those on higher incomes and/or those middle-aged. This trend, including the differences by age and income, held through to Wave 3 (September 2020).
- The ITLS research group found broad geospatial differences, with regional respondents less willing or able to WfH (46%) than those in metropolitan areas (32%). The ITLS found that this

difference was, in part, linked to the lower perceived risks of COVID in less densely populated regional areas (Figure E- 1, Figure E- 3).

- Utilising its Wave 4 survey from June 2021, ITLS found that time saved from commuting was divided evenly between additional paid or unpaid work and additional time spent on leisure or family activities.
- The ITLS research group developed an improved transport model of the Greater Sydney Metropolitan Area that enables the probability of WfH to be predicted based on socioeconomic and other drivers derived from its Waves 4 survey in June 2021. The revised transport model predicted, for example, a 16% reduction in ‘total motorised modes’ (i.e. car, bus, train) in 2023, and a corresponding reduction in emissions (up to 10%) and in the generalised cost of travel for all motorised modes (13%).
- Using its Wave 4 survey, ITLS examined attitudes about the use of, and return to, public transport in the GSMA and SEQ. In both the GSMA and SEQ, 61% of PT users identified as either “very concerned users” or “extreme concern avoiders”. The proportion of “extreme concern avoiders” was higher in the GSMA. ITLS conclude that the focus of awareness campaigns should be that “public transport is safe”.

**Figure E- 3 Number of days WfH, weekly**



Source: Beck & Hensher (2021b).

The PATREC research group focussed on WfH impacts in Western Australia. Its Wave 1 survey covered the period 14<sup>th</sup> May to 24<sup>th</sup> June 2021, between two short snap lockdowns in WA, but with very few cases and a time of low infection rates across Australia. PATREC found:

- WfH increased and commuting decreased compared to the pre-COVID period, particularly for ‘flexible’ occupations and industries;
- Slightly over two-thirds of Wave 1 survey respondents worked from their workplace most of the time, with one-quarter working in a hybrid model (i.e. ‘Working in Office’ WiO/WfH), and the remainder (about 7%) working ‘almost always’ from home;
- The industries most amenable to WfH included the Electricity, Gas, Water and Waste Services; Information, Media and Telecommunications; Wholesale Trade; Financial and Insurance Services; and Professional, Scientific and Technical Services; and
- Those in the most ‘flexible occupations’ (i.e. Managers; Professionals) had the highest proportion of respondents who worked from home (22.1%) and the lowest commute rate (3.86 commute days per week).

- Those in ‘frontline occupations’ had the highest commute rate (4.11 commute days per week).
- Roughly, 50% of Managers and Professionals transitioned to complete or partial WfH arrangements. Other occupations remained mostly in the workplace.
- Almost half of respondents stated their preference to work in a hybrid working model in 2022, and nearly 10% stated a preference to work only from home. PATREC concluded that this suggests that hybrid working is likely to persist in jobs that permit it in the post-COVID environment.

## Impact on transport demand through COVID

The ITLS and PATREC research groups collected real-time data on traffic demand. Common findings from these surveys included a significant overall reduction in the number of commuting trips made, which consequently reduced traffic congestion and public transport (PT) crowding in the major cities, and a preference for ‘going into work’ mid-week and working from home on Monday and Friday.

The ITLS research group, in their initial three-waves in 2020 covering all Australian states and territories, found that:

- Overall, there were significant reductions (of up to 20%) in public transport trips relative to pre-pandemic levels;
- People were spending more time during the workday in the suburbs;
- There were respectively fewer one-way train and bus trips in May 2020, when the restrictions were at their most severe, than in the corresponding, pre-restriction, period of February 2020;
- As a proportion of overall household trips, public transport fell from around 15% of trips to 7%; and
- There was a 54% reduction in the pre-COVID total time costs because of faster commute times or no commute.

ITLS argues that, with a greater focus on local activity, there will be a need to reprioritise improvements in local public transport, safer pedestrian walkways and precincts, and bicycle lanes, serving short trips throughout the day, with the added benefit of improving first and last mile connectivity to public transport and (hopefully) contributing to improved health outcomes through greater physical activity.

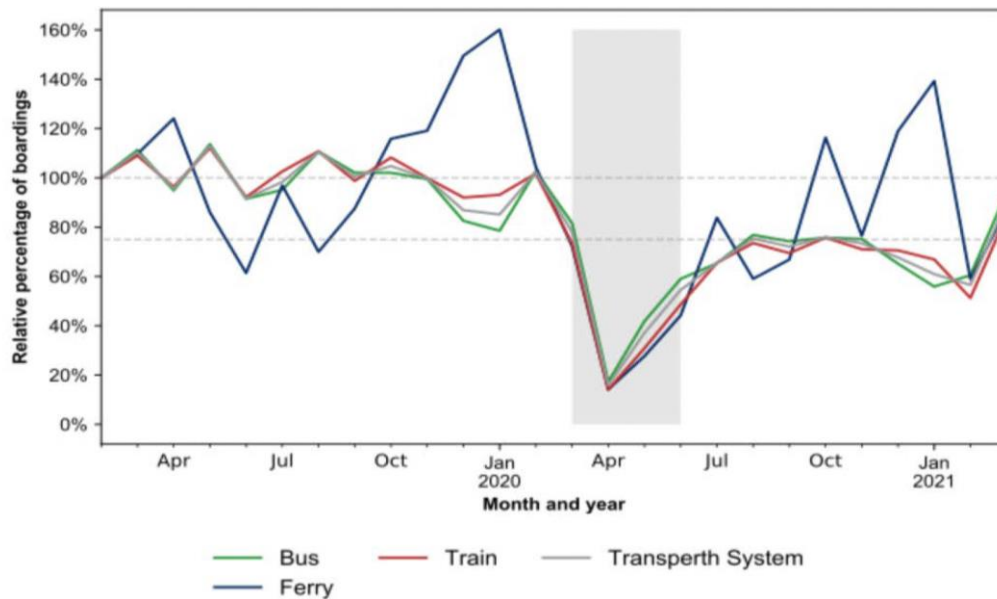
ITLS also estimated the monetary value of the time cost savings from (not) commuting (across private car and PT travel) during COVID (relative to a pre-COVID baseline) in the Greater Sydney Metropolitan Area (GSMA) and found a significant overall cost reduction of \$5.6 billion.

*“The \$5.579 billion of reduction in travel time costs represents a 54.02% reduction in the pre-COVID-19 total time costs of \$10.3 billion, much of which we would suggest can be associated with congestions costs.” (Hensher, Beck & Balbontin, 2021).*

The PATREC research group found for the Greater Perth Area:

- Daily traffic volumes across the Perth CBD cordon dropped by 40% during the first lockdown (March-April 2020) and by 60% during the second lockdown (in late-January-early-February 2021).
- Public transport patronage in Perth dropped by 80% during the first lockdown and by 40% during the shorter second lockdown period (Figure E - 3).

**Figure E - 3 Public transport boarding, by mode, 2020**



Source: PATREC (2021b, p.41).

### Employer and employee preferences and productivity

The surveys revealed that employer and employee preferences were, perhaps surprisingly, reasonably well aligned in terms of attitudes towards working from home. There were mixed views around worker and firm-level productivity, reflecting the fact that the WfH experiment is in its early stages.

In cases where WfH is possible, UniSA found that more than half of employees and managers surveyed agree that WfH will not impact the ability to achieve “job objectives and outputs” due to the increased flexibility afforded by remote working, and the ability to work longer hours if necessary. PATREC found that workers were more adaptive and proactive under a hybrid model of work than working solely at home or in the workplace.

In its study of the Greater Sydney Metro Area (GSMA) in late May 2020, the ITLS research group found that workers indicated little perceived difference in productivity between the office and the home environment:

- For employees, roughly one-third of survey respondents felt productivity had improved, one-third believed productivity hadn’t changed, and one-third believed productivity had declined.
- For employers, about one-third of respondents indicated that productivity had increased a little or a lot while over one-half of respondents indicated no change in productivity (Hensher, Wei, Beck & Balbontin, 2021).

Clearly, it is still early days in terms of assessing the impacts of working from home on productivity. And it would be a mistake to conclude that the productivity impacts of a short-term mandatory system would be identical to those that would emerge under voluntary negotiation. The evidence presented by the four research groups indicates that, in a more flexible system based on voluntary negotiation, there are likely to be trade-offs between hourly productivity and the total number of hours worked that are not possible (or less feasible) in a purely office environment. Additionally, there are clearly some aspects of the employment relationship which are more affected than others.

UniSA (2021) conclude:

*“Most employees, managers and employers do not see significant negative impacts of remote working on productivity. While hour-for-hour, quantity and quality of work done remotely is reported to be lower on average, the majority of employees and managers agreed that they were still able to achieve their job objectives and outputs as expected when working remotely, likely due to increased flexibility, greater autonomy, and the ability to work longer hours if needed. However, 40-50% of employees and 60-70% of managers expressed concern about impacts on supervision, coordination, performance appraisal, career advancement, organisational loyalty and other aspects of human relations.”<sup>2</sup> UniSA (2021, p.110).*

## Looking forward

### Not every worker will get to work from home

Not every worker is able work from home and not every worker wants to work from home. Likewise, not every employer wants to, or is able to, offer a WfH employment option. The nature of an occupation – the job tasks performed – is key to the ability to work from home. The particular job tasks involved, required technology, worker and organisational-level productivity, and employer and employee preferences together establish the upper-bounds of WfH capacity. Contextual factors such as an economy’s labour market, industrial structure and the legislation and industry-specific codes that govern working arrangements play an important role.

Given these constraints, there is broad agreement across the research project groups that between 40-50% of job tasks cannot be done, or are not sufficiently well suited to be done, from home. It is, therefore, remarkable how many workers demonstrated at least some capacity to be productive working from home at the height of the lockdowns across Australia, increasing from less than 1 million workers on any particular day in 2019 to around 5 million workers out of a labour force of 13 million during the peak COVID lockdown periods in 2020.<sup>3</sup>

Significant recent advances in telecommunications technology and digital infrastructure investments have together enabled this feat. Increased bandwidth and lowered latency for Australian businesses and households has permitted an increasing number of occupations to work from home effectively.

Of course, the mandatory nature of the social distancing policies forced costly adaptation that may not have been considered worthwhile but for the fact that ‘there was no other option’. The real question, therefore, is what is the upper-bound for WfH in a voluntary post-COVID world?

### Some, though not all, of the WfH shift will be permanent

There is a consensus across the research project groups that there will be a structural increase in WfH arrangements in a post-COVID voluntary system.<sup>4</sup> The ABS, in its contemporaneous Household Impacts of COVID-19 survey, found that one-third of respondents would like to see WfH continue beyond the pandemic (ABS, 2021).

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<sup>2</sup> While the terms “working remotely” and “Working from Home” are used interchangeably in this report, there is a slight difference in meaning. If a worker is working from a café rather than the normal place of work, she is working remotely, but not at home.

<sup>3</sup> Tulipwood Economics estimate based on ABS Census data (2019) and ABS COVID survey data (2020).

<sup>4</sup> In economic analysis, a ‘structural’ change in a time series database is a discernible one-off adjustment, as opposed to seasonal, cyclical or trend changes.

This structural change in WfH is expected to impact the Australian economy (and society more broadly) in several ways:

- On any given day, up to one-quarter of Australia's workforce could be working from home operating in a hybrid WiO/WfH model whereby the working week is split between the workplace and the home (generally, in a 3:2 or 2:3 split across a five day work week). Preferences to WfH on certain days (e.g., a Monday or Friday) will affect the pattern of commuter demand.
- The bulk of these 'hybrid workers' will be professionals working in the service economy who are not always client, customer or patient facing, and who are likely to work in, or close to, the CBD across Australia's capital cities.
- Transport demand, especially between the suburbs and CBD's of Australia's capital cities, may decline by as much as 20% compared to pre-COVID levels and current growth trajectories.
  - This reduction, if it materialises, would impact public transport services most heavily. PT pricing policies, although not generally calibrated to achieve 'full cost recovery', may need to be reviewed.
  - Given that crowding in the peak is one of the key barriers for people choosing to use PT, WfH has the capacity to reduce crowding and thus, somewhat counter-intuitively, make it more attractive. Further, greater work flexibility means more flexibility in departure time choice. As a result, it may be that commuter demand might be distributed more evenly through the day, with a greater retention of pre-pandemic passenger load.
- The ITLS research group observed that any investment to promote WfH is an investment in the transport system – given that it defers capital investment and reduces operating costs. Abstracting from broader impacts, such investments, when weighed against alternative transport infrastructure investment options, may yield net benefits to the Australian community.
- All research project groups found evidence of businesses, particularly larger businesses with the necessary IT and HR systems in place and the financial capacity, pursuing a shift to a hybrid working model beyond the COVID period.

While the findings from the research project groups are clear and consistent, the long-term impacts of the increased prevalence of working from home are not yet certain. We do not yet fully understand the impact on factors such as ideas diffusion, worker and firm-level productivity, worker wellbeing (both mental and physical), family impacts, team culture and camaraderie, training, mentoring and career development and, for some, success in 'the market for mates'.

The mass adoption of WfH is a complex phenomenon with diverse economic and social impacts. As these impacts—both positive and negative—play out, there will be potentially many adjustments made to employer-employee agreements and household arrangements, which will in turn affect regional transport and property markets, transport network investment and planning, and government policy. With a greater focus on local activity, there may be a need to reprioritise improvements in local public transport, safer pedestrian walkways and precincts, and bicycle lanes, serving short distance trips throughout the day, with the added benefit of improving first and last mile connectivity to public transport and (hopefully) contributing to improved health outcomes through greater physical activity.

Many of the impacts will be, ultimately, translated into changes in the returns to labour (i.e. wages), capital (i.e. profits) and asset prices (e.g. commercial and residential land values). The transport market will adjust via fares and fees charged and network asset prices, and potentially government revenue and expenditure decisions.

Perhaps the most profound lesson to be drawn from the increased prevalence of WfH is Australia's demonstrated flexibility and resilience in adjusting to major shocks. That capacity to absorb shocks, by altering the way everyday things are done, is at the heart of Australia's economic resilience. Australia's largely successful weathering of the pandemic is in no small part a result of its flexibility, agility and willingness to make the best of a mandatory WfH model for most 'non-essential' Australian workers.<sup>5</sup>

## Recommendations

A number of policy recommendations have been developed based on the findings of the four research project groups as well as considering the potential costs, benefits, risks and barriers to WfH in a post-COVID world (set out in Chapter 2). In general, the role of public policy in relation to WfH should be to:

- Encourage technological innovation, workplace productivity and more fully engage the total available labour force;
- Achieve full employment, to meet both economic and social goals<sup>6</sup>;
- Support the voluntary bargain between employers and employees, whether individually or collectively; and
- While meeting the above three objectives, at the same time ensure that, as a result of moving to more WfH, individual workers or particular groups of workers are not severely disadvantaged or exploited, and that the minimum reasonable working conditions as set out in the *Fair Work Act 2009* and other legislation are met by employers.

Given these broad objectives, the following recommendations are made.

### Recommendation 1: Transport network infrastructure investment and public transport

The move to government-mandated WfH over significant periods of time in 2020 and 2021 has, to some extent, scrambled pre-COVID transport demand projections. The ongoing validity of these pre-COVID projections will depend on the degree to which the reduction in transport demand proves to be transient or permanent. While there are some indications that the demand for public transport may be reduced, that there may be a shift between preferred modes of transportation, or that the time profile of transport demand may change, such outcomes are by no means guaranteed. Predicting transport use has become significantly more uncertain, particularly over a longer-term time horizon when pandemic health concerns (e.g. biosecurity concerns about PT) may subside.

The ITLS research group advised that:

*With reduced commuting activity associated with an expected 1 to 2 days working from home for many occupations and industries, associated with releasing commuting time to spend on other activities including changed levels and patterns on non-commuting travel, it is necessary, indeed essential, to allow for the incidence of working from home in integrated strategic transport and location model systems. (Hensher, Wei and Lui, 2021).*

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<sup>5</sup> An 'essential worker' is, generally, defined as being physically required to perform tasks that cannot be completed from home. A 'non-essential' worker is defined as being able to perform job tasks at home.

<sup>6</sup> Full employment in Australia is, generally, considered to be achieved at an unemployment rate of 5%. This level of the 'natural rate' of unemployment may change because of the impacts COVID and WfH on labour supply, as more potential workers are able to enter the labour market.

It follows that governance arrangements for transport planning and investment processes need to be strengthened to address the scope for potentially very costly mistakes, in particular:

- Given the uncertainty around post-COVID private vehicle and PT demand, especially on major routes to capital city CBD's and inner-city areas, stronger 'gateway' review processes should be put in place to withhold approval for transport infrastructure projects – irrespective of transport mode – whose benefits do not exceed their costs:
  - Passenger and transport demand forecasts should be reviewed by state transport departments and revised to assess the implications of changed trends as a result of changed working practices. This may mean testing the viability of projects under a variety of scenarios to capture the range of uncertainties that exist.
  - If these come to pass, permanent (i.e. structural) post-COVID reductions in PT demand (relative to previous forecasts) will, all else equal, result in relatively lower levels of public benefits from mass-transit projects directed at moving people between suburbs and CBDs. On the other hand, the ITLS research group concluded that the value of time had risen – implying congestion imposes higher social costs, and offsetting at least some of the impact of reduced demand on the optimal level of infrastructure investment.
  - Irrespective of changes in WfH arrangements, it should be recognised that there are substantial differences across states/jurisdictions, reflecting (historical) differences in land-use and transport networks and services, as well as COVID-19 related status and measures. The need for PT investment, including PT in the multi-modal chain, is therefore likely to vary locally and regionally.<sup>7</sup> Overall, determining the implications of voluntary WfH for the future demand for different modes of PT is likely to require significantly more research.
  - Relatedly, if it emerges that there is a permanent impact of WfH on the shape of the transport task, all state and territory governments should reappraise their Origin-Destination (OD) matrices and other categorisations of travel demand prior to any future investments in physical transport infrastructure.
  - Any investments in physical transport infrastructure in the future should include an additional sensitivity test to consider the relative merits of alternative, or parallel investments in digital infrastructure.
- Infrastructure review bodies (such as Infrastructure Australia or its state counterparts) should carefully review the demand forecasts underpinning proposed transport infrastructure investments submitted in the future. This is not to say that public investment in transport infrastructure, or PT in particular, should be reduced. Rather, given the uncertainty around future transport demand and the opportunity cost of public resources, new projects should be reviewed in light of the potential structural changes in the Australian labour market and, as a consequence, transport demand, outlined in this report.

## **Recommendation 2: Industrial relations flexibility**

The Commonwealth Government should consider the suitability of the provisions of the *Fair Work Act 2009* to support voluntary agreements in respect of the extent and nature of working from home and propose changes where necessary.

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<sup>7</sup> For instance, PATREC indicate that in relation to WA, local conditions and the relatively low mode share for public transport, could support investment in public transport, rather than reductions in investment.

### Recommendation 3: Digital infrastructure

Experience during the lockdowns highlighted the pivotal role of digital infrastructure in establishing access to WfH and other flexible work patterns. As a result, estimates of the potential value of investments in digital infrastructure may need to be adjusted, possibly resulting in a stronger case for investments which strengthen digital networks in the areas where it is most likely to be used.

- This may not be new infrastructure spending but a diversion from other infrastructure outlays coming out of a review of future transport infrastructure investments.

As households transition to more flexible ways of working and data-intensive activities (e.g. video streaming) are used more heavily, their communications requirements will also change.

- The ACCC should continue to monitor the performance of Australia's communications industry and report in its annual Communications Market Report on the effectiveness of the measures adopted through the COVID period to ensure the sector maintains efficiency and supports increased data needs at least cost to the Australian community.
- In its ongoing monitoring of the communications industry, the ACCC should also report to the Commonwealth Government on the minimum viable standards of service that would ensure that housing location is not a predeterminant of the ability to WfH.<sup>8</sup>

### Recommendation 4: WfH Standard Industry Code of Practice

Without direct government involvement and without limiting firm-level flexibility, employer and employee representatives in occupations where WfH is likely to be common in the post-COVID period should consider developing a standard code of practice that could be voluntarily adopted in cases where that adoption would be less costly than developing bespoke codes by industry or occupation. The code would establish standard WfH conditions in relation to:

- Minimum work hours across standard time periods;
- Dress and appearance standards (for video conferencing);
- Who pays for capital equipment (laptop, screen, printer etc); and
- Who pays for home energy consumption (e.g. air-conditioning).

### Recommendation 5: Government employment

The Commonwealth, and State and Territory governments, should review the feasibility of increasing the prevalence of WfH for 'office-based' public servants where this offers real gains in productivity. The review should consider:

- Potential net financial savings to the taxpayer;
- Worker and workplace productivity;
- Early career training and mentoring opportunities; and
- Information security issues.

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<sup>8</sup> Under Part 19 of the *Telecommunications Act 1997*, Statutory Infrastructure Providers (SIP) are required to connect premises and provide wholesale services that support minimum broadband speeds (of 25/5 mbps). NBN Co is the default SIP for all parts of Australia, but other carriers may be SIPs in particular areas (such as where they have rolled out infrastructure in new developments). See: <https://www.acma.gov.au/statutory-infrastructure-provider-regime>

## Recommendation 6: Ongoing review of WfH

State transport departments should undertake annual surveys for at least the next two years and report on:

- the extent of the permanent (or structural) adjustment towards working from home by occupation, geographic and socioeconomic characteristics; and
- identify the scale of permanent change to:
  - Commuting and non-commuting demand;
  - PT demand;
  - Planned transport network investment;
  - Environmental impacts; and
  - Impacts on transport, land use and planning and cities policy.

## Recommendation 7: Productivity

The Commonwealth Government should assess the economic impacts of the mandatory shift to WfH during the COVID period (2020 and 2021) on Australia's productivity performance, including:

- The likely trends in WfH in the post-COVID environment and those trends likely impacts on Australia's productivity levels.<sup>9</sup>

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<sup>9</sup> The Productivity Commission released a research paper Working from Home on 16 September 2021. Accessed here: <https://www.pc.gov.au/research/completed/working-from-home>

# Part 1 Setting the baseline

# 1. Introduction

## 1.1 Background to the study

Tulipwood Economics has been engaged by iMOVE CRC (iMOVE) to compile research undertaken by several academic and government partners in relation to the prevalence and impacts of working from home (WfH) during the COVID pandemic in Australia in 2020 and 2021. The research project groups utilise the theoretical foundations and analytical tools of several disciplines, including transport economics, urban economics, land use and urban planning, macroeconomics, survey design and choice modelling, and public policy in broad terms.

In essence, the research project groups ask:

*To what extent will the remarkable increase in the prevalence of remote working during the two-year COVID period (2020-2021) continue into the future?*

## 1.2 About iMOVE and its research partners

iMOVE is a national transport R&D hub established in 2017 funded through the Australian Government's Cooperative Research Centre (CRC) Programme for a ten-year period.

iMOVE's research partners include:

- The Institute of Transport and Logistics Studies (ITLS) at the University of Sydney, led by [Professor David Hensher](#) and [Professor Matthew Beck](#). Established in 1991, the ITLS undertakes research that contributes to the design, management and optimisation of infrastructure, transport, logistics and supply chain initiatives around the globe.
- The Planning and Transport Research Centre (PATREC), led by [Professor Sharon Biermann](#). PATREC is a collaboration of leading experts and researchers from the University of Western Australia, Curtin University, Edith Cowan University, Department of Transport, Main Roads Western Australia, Western Australian Planning Commission and the Western Australian Local Government Association.
- A cross disciplinary team from the University of South Australia, comprising the Institute for Choice, UniSA Business School and the College of Business, Government and Law, led by [Dr Akshay Vij](#).

In addition to iMOVE's support, the research projects have been supported by the:

- Bureau of Infrastructure Transport and Research Economics (BITRE), which is an agency within the Federal Department of Infrastructure, Transport, Regional Development and Communications (DITRDC);
- Queensland Department of Transport and Main Roads (TMR);
- Transport for NSW (TfNSW);
- Department of Transport WA; and
- Main Roads WA (MRWA).

The projects are outline in Table 1-1 (below).

**Table 1-1 Summary of iMOVE partners and research collaboration streams**

Project		iMOVE Partners
Research stream 1	Working from Home (WfH) and implications for Revision of Metropolitan Strategic Transport Models	ITLS University of Sydney Queensland Department of Transport and Main Roads (TMR)
Research stream 2	Working from Home (WfH) and implications for Revision of Metropolitan Strategic Transport Models	ITLS University of Sydney Transport for NSW Department of Transport WA
Research stream 3	Encouraging the continuation of WfH practices in a post-pandemic world	University of South Australia (UniSA) BITRE (Federal)
Research stream 4	Working from Home (WfH) – changes in transport demand	Planning and Transport Research Centre (PATREC) UWA Main Roads WA (MRWA) Department of Transport WA

Source: Supplied by iMOVE.

## 1.3 Research themes and source documents

The research project groups undertook a range of analyses that were designed to capture changes in transport and labour market behaviour due to the spread and ongoing health threat of the pandemic, and the Federal and state government responses to the pandemic – such as the implementation of social distancing measures. Several field surveys (or ‘waves’) coincided with COVID-19 ‘waves’ (i.e. infection spikes) throughout the nation, with studies targeting and tracking periods of strict social distancing restrictions.

The research project groups outputs included several summary, milestone, draft and final reports, many academic papers, as well as PowerPoint presentation summaries of findings. This report draws on all of the material provided, but focusses on final versions of reports and published academic papers.

### 1.3.1 ITLS led research

The ITLS research stream focussed on changes in employment and travel conditions, including changes in the real cost of commuting, throughout the COVID period. Thirteen published papers and one summary PowerPoint presentation were the primary source documents relied on for this report, as follows:<sup>10</sup>

- Beck, M. and Hensher, D.A. (2020) Insights into the Impact of Covid-19 on Household Travel, Work, Activities and Shopping in Australia – the early days under restrictions, Paper #1, Transport Policy, 96, 76-93.<sup>11</sup>
- Hensher, D.A., Beck, M. J. and Wei, E. (2021) Working from home and its implications for strategic transport modelling based on the early days of the COVID-19 pandemic, Paper #2, Transportation Research Part A, 148, 64-78.
- Beck, M. J., Hensher, D.A. and Wei, E. (2020) Slowly coming out of COVID-19 restrictions in Australia: implications for working from home and commuting trips by car and public transport, Paper #3, Journal of Transport Geography, 88, 102466.

<sup>10</sup> The full list of published material, including podcasts and webinars, is available at:

<https://www.sydney.edu.au/business/our-research/institute-of-transport-and-logistics-studies/research-activity/projects/working-from-home-research.html>

<sup>11</sup> <https://doi.org/10.1016/j.jtrapol.2020.07.001> (one of top most downloaded papers in the journal).

- Beck, M. and Hensher, D.A. (2020) Insights into the impact of COVID-19 on household travel and activities in Australia – the early days of easing restrictions, Paper #4, *Transport Policy*, 99, 95-119. Online 19 August 2020 <https://doi.org/10.1016/j.tranpol.2020.08.004>.
- Hensher, D.A., Wei, E., Beck, M.J. and Balbontin, C. (2021) The impact of COVID-19 on the time and monetary cost outlays for commuting - the case of the Greater Sydney Metropolitan Area after three months of restrictions, Paper #5, *Transport Policy*, 101, 71-80.
- Beck, M.J. and Hensher, D.A. (2020) What does the changing incidence of Working from Home (WFH) tell us about Future Transport and Land Use Agendas? *Transport Reviews*, 41(3). (Shortened version for The Conversation, November 2020 to accompany Academy of Social Sciences Australia (ASSA) podcast).<sup>12</sup>
- Beck, M. J. and Hensher, D.A. (2021) Australia 6 months After COVID-19 Restrictions Part 1: Changes to Travel Activity and Attitude to Measures Paper #7a. *Transport Policy*, online 17 June 2021.
- Beck, M. J. and Hensher, D.A. (2021) Australia 6 months After COVID-19 Restrictions Part 2: The Impact of Working from Home Paper #7b. *Transport Policy*, online 17 June 2021.
- Hensher, D.A., Balbontin, C., Beck, M.J. and Wei, E. (2022) The Impact of working from home on modal commuting choice response during COVID-19: Implications for two metropolitan areas in Australia, Paper #8 For a Special Issue on COVID-19 (edited by Hani Mahmassani and Patricia Mokhtarian), *Transportation Research Part A*, 155, 179-201.
- Beck, M.J., Hensher, D.A., and Nelson, J.D. (2021) Public transport trends in Australia during the COVID-19 pandemic: an investigation of level of concern as a driver for use, Paper #9, *Journal of Transport Geography*, online 96, 103167.
- Hensher, D.A., Beck, M.J. and Balbontin, C. (2021) What does the quantum of working from home do to the value of commuting time used in transport appraisal? Paper #10, *Transportation Research Part A*, 153, 35-51.
- Balbontin, C., Hensher, D.A., Beck, M.J., Giesen, R., Basnak, P., Vallejo-Borda, J.A., Venter, C. Impact of COVID-19 on the number of days working from home and commuting travel: A cross-cultural comparison between Australia, South America and South Africa, Paper #12, *Journal of Transport Geography*, 96, 103188
- Hensher, D.A., Beck, M.J., Nelson, J.D. and Balbontin, C. (2022) Reducing congestion and crowding with WFH, in Mulley, C. and Attard, M. (editors) *Transport and Pandemic Experiences*, Emerald Press, Paper #14.
- Vallejo-Borda, J.A., Lira, B.M., Basnak, P., Reyes-Saldías, J.P., Giesen, R., de Dios Ortúzar, J., Hensher, D.A., and Beck, M.J. Characterising public transport shifting to active and private modes in South American capitals during the Covid-19 pandemic, Paper #6. Submitted to a Special Issue on COVID-19 (edited by Hani Mahmassani and Patricia Mokhtarian), *Transportation Research Part A*, January 2020.
- Beck, M. J. and Hensher, D.A. Insights into Work from Home in Australia in 2020: Positives, Negatives and the Potential for Future Benefits to Transport and Society, Paper #11 submitted to a Special Issue on COVID-19 (edited by Hani Mahmassani and Patricia Mokhtarian), *Transportation Research Part A*, 12 January 2021, referees reports 25 May 2021, revised 1 June 2021.
- Balbontin, C., Hensher, D.A. and Beck, M. J. Relationship between commuting and non-commuting travel activity under the growing incidence of working from home and people's attitudes towards COVID-19, Paper #15, submitted to *Transportation* 6 July 2021
- Jose Agustin Vallejo-Borda, Ricardo Giesen, Beatriz Mella Lira, Paul Basnak, José P. Reyes, Francisco Pasqual, Guillermo Petzhold, Matthew J. Beck, Juan de Dios Ortúzar, David A.

<sup>12</sup> <https://doi.org/10.1080/01441647.2020.1848141>.

Also <https://theconversation.com/covid-has-proved-working-from-home-is-the-best-policy-to-beat-congestion-148926>

Hensher. Paper #16, Characterizing public transport shifting to active and private modes in Brazil during the Covid-19 pandemic, 4 May 2021.

- Hensher, D.A., Beck, M. and Balbontin, C. Time allocation of reduced commuting time during COVID-19 under working from home, Paper #18, submitted to Journal of Transport Economics and Policy, 29 September 2021.
- Hensher, D.A., Wei, E, and Liu, W. Accounting for the spatial incidence of working from home in MetroScan - an integrated transport and land model system, Paper #19, submitted to Transportation Research Part A, 5 November 2021.
- Balbontin, C., Hensher, D.A. and Beck, M. J. Balbontin, C. Advanced modelling of commuter choice model and work from home during COVID-19 restrictions in Australia Paper #13, early version presented at the 2021 International Choice Modelling Conference online and Chilean Transport Research Conference, 23 May 2021, submitted to Transportation Research Part E, 1 December 2021.
- Beck, M., Nelson, J. & Hensher, D. (2021), Restoring Confidence in Public Transport post Delta COVID-19 Lockdowns: Identifying User Segments and Policies to Restore Confidence, [unpublished, Version: 20 November 2021]. [Paper #20]
- Hensher, D., Beck, M. & Balbontin, C. (2021), Time Allocation of Reduced Commuting Time during COVID-19 under Working from Home, Institute of Transport and Logistics Studies, University of Sydney (supplied). [Submitted to Journal of Transport Economics & Policy, 29 September 2021]. [Paper #18].
- Hensher, D., Beck, M., Nelson, J. & Balbontin, C. (2022), Reducing Congestion and Crowding with Working from Home. Book Chapter in Transport and Pandemic Experiences, Emerald Press. [Paper #14].
- A summary PowerPoint presentation was also used: Working from Home (WFH) and Implications for Revision of Metropolitan Strategic Transport Models (February 2021).<sup>13</sup>

### 1.3.2 PATREC led research

PATREC's research focussed on conditions in Western Australia, and Perth in particular. The research considered the prevalence of WfH in Perth during the two-year COVID period, whether those trends were likely to continue and the implications for individuals, the transport system, and the economy at large.

The PATREC research group work is ongoing and additional evidence gathered from subsequent surveys as well as transport modelling of WfH scenarios, a stakeholder Delphi process to elicit policy actions and a productivity benefits assessment, will be adding to an updated overarching report at some point in 2022.

As at 31 December 2021, the main PATREC reports that this report relies on are as follows:

- Working from Home – Changes in Transport Demand Perth, Progress Report – June 2021.
- Working from Home – Changes in Transport Demand Perth, Progress Report – supporting document, June 2021.
- Employee Perspectives on Working from Home, Wave 1 Survey Results, 22 September 2021.
- Working from Home: Employer Perspectives, Draft Report, 22 September 2021.

### 1.3.3 UniSA led research

The UniSA research project group undertook a number of separate studies, including:

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<sup>13</sup> Version: 9 February 2021, 1 pm.

- Developing a conceptual framework to consider the costs and benefits of WfH;
- Providing policy analysis;
- Undertaking a qualitative survey of employer preferences in relation to WfH; and
- Undertaking a quantitative survey of employee and manager preferences in relation to WfH.

UniSA summarised their research stream into a single report, which this overarching report relies on solely, as follows:

- Encouraging the continuation of work-from-home practices in a post-pandemic world, (UniSA 2021, Version 14th September).

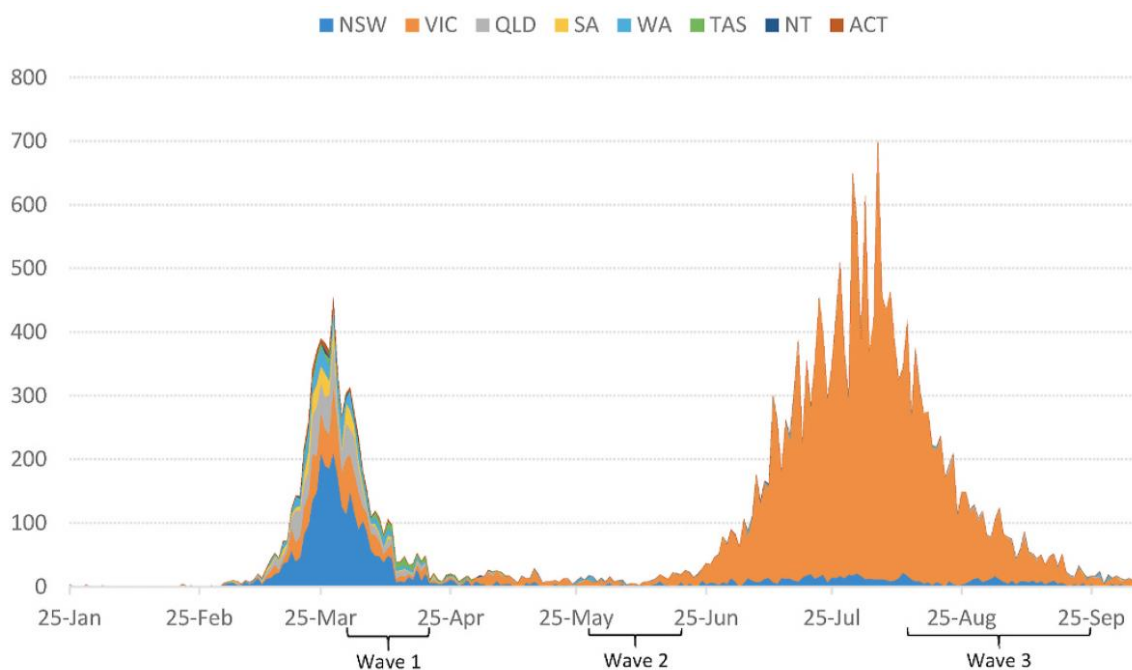
## 1.4 Brief description of survey instruments

### 1.4.1 ITLS

The two projects led by ITLS utilised survey data collected over four ‘waves’ across all Australian states and territories through 2020, as follows:

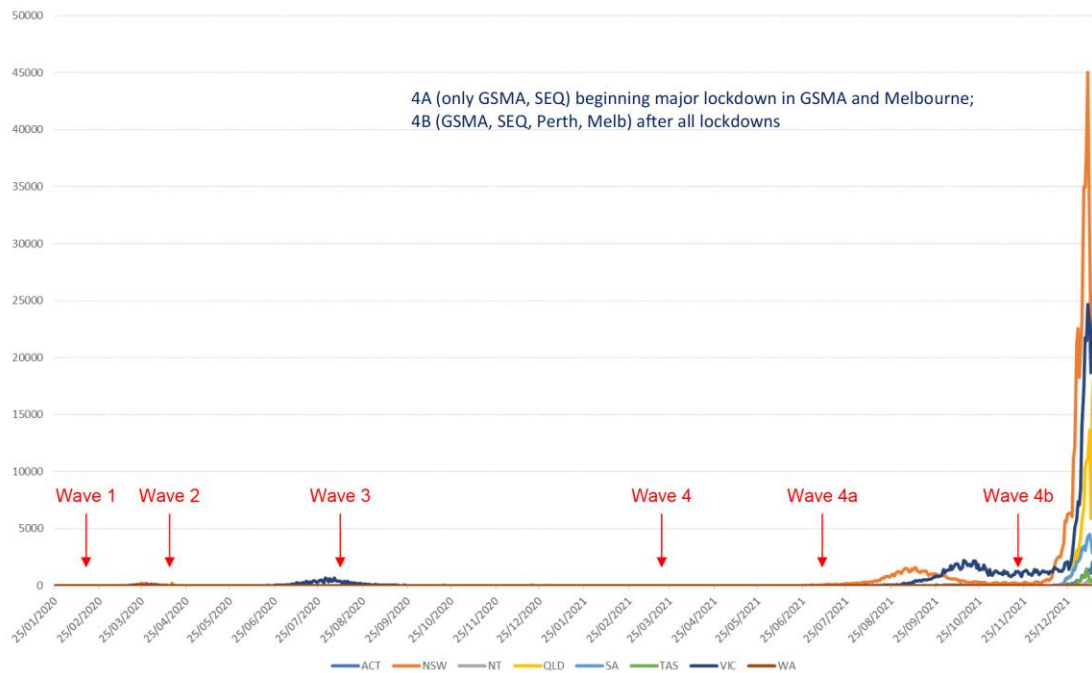
- Wave 1 collection – data collected at the height of the initial spike in new cases from 30<sup>th</sup> March 2020 to 15<sup>th</sup> April 2020;
- Wave 2 collection – data collected during a period of relatively low new infections from 23<sup>rd</sup> May 2020 to 15<sup>th</sup> June 2020; and
- Wave 3 collection – data collected during 4<sup>th</sup> August to 10<sup>th</sup> October 2020. (Figure 1-1 and Table 1-2).
- Wave 4a collection – data collected starting 2<sup>nd</sup> March to late July 2021.
- Wave 4b collection – data collected in late November 2021 (Figure 1-2 and Table 1-2).

**Figure 1-1 New COVID cases in Australia in 2020 (by State/Territory) mapped onto ITLS survey waves 1-3**



Source: Beck & Hensher (2021a).

**Figure 1-2 New COVID cases in Australia (by State/Territory) mapped onto ITLS survey waves 1-4 (with Omicron surge)**



Source: ITLS PowerPoint Presentation supplied (2 March 2022).

**Table 1-2 Overview of ITLS national sample, by wave**

	Wave 1	Wave 2	Wave 3	Wave 4
Female	52%	58%	58%	59%
Age	46.3	48.2	48.2	48.3
Income*	\$92,826	\$92,891	\$62,551	\$61,410
Have children	32%	35%	35%	32%
Number of children	1.8	1.7	1.8	1.8
Workers**	714	916	741	1,149
Total sample	1,074	1,457	956	2,019
Share of total sample, by state				
NSW	22%	32%	31%	44%
ACT	2%	2%	1%	1%
Victoria	28%	24%	24%	2%
Queensland	22%	18%	22%	43%
South Australia	11%	11%	9%	4%
Western Australia	11%	10%	10%	4%
Northern Territory	1%	1%	1%	0%
Tasmania	2%	3%	1%	1%

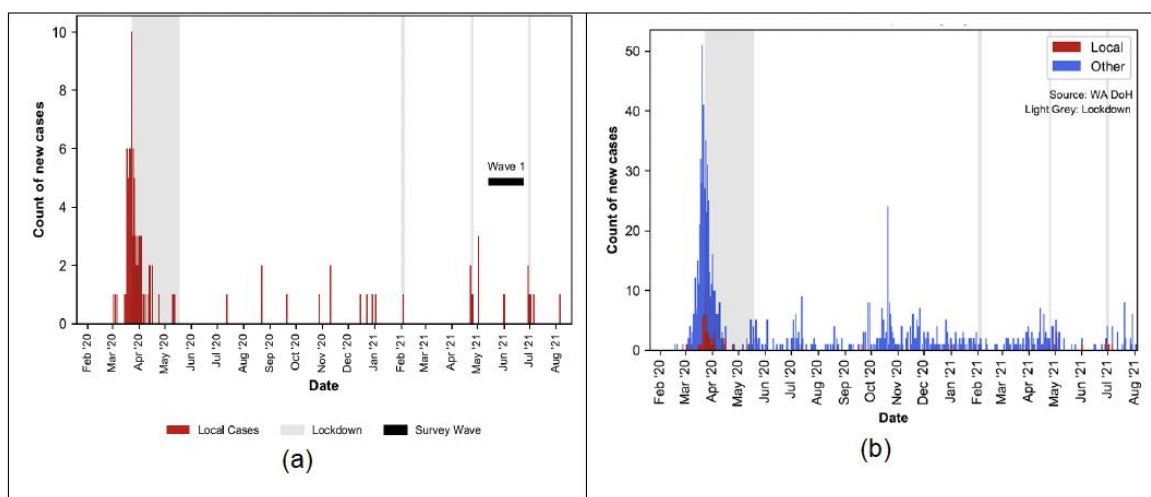
Source: ITLS research group (supplied).

Notes: This is a simplified summary of the ITLS data. A full description is at Appendix B. \* In Waves 1 and 2 household income was asked, in Waves 3 and 4 personal income was asked. \*\* A worker is defined as anyone who was working at least 1 day prior to COVID-19 restrictions.

## 1.4.2 PATREC

The PATREC research group developed its 'Wave 1' survey to gauge the attitudes of employers and employees to WfH, and to monitor the changes in transport demand in Western Australia. The Wave 1 survey was in the field from 14 May 2021 to 24 June 2021, between two short snap lockdowns in WA, but with very few cases and a time of low infection rates across the country. Of the 2,799 Western Australians who completed at least one module, 1,923 completed the travel module and 1,456 completed all three modules.

**Figure 1-3 Timing of PATREC survey waves vis-a-vis COVID cases**



**Figure 3: Timing of survey waves in relation to the number of new COVID-19 cases per day in (a) WA and (b) Australia. (Source: WA Department of Health)**

Source: PATREC research group (supplied).

## 1.4.3 UniSA

The UniSA research group used a mixed methods approach that comprised four stages:

- First, UniSA undertook a literature review on remote working arrangements, their impacts on productivity, health and wellbeing, and transport, energy and land use behaviours, and policies that could be used to support and enable their adoption.
- Second, UniSA reviewed the ABS 2016 Census data and other Australian labour market data to examine how the uptake of remote working arrangements has varied historically.
- Third, UniSA collected and analysed qualitative data from different employers drawn from across the country to understand their experiences with remote working arrangements.
- Fourth, UniSA collected and analysed quantitative data from a large-scale nationwide online survey of employees and managers to understand their attitudes and preferences towards remote working arrangements.

The UniSA qualitative and quantitative survey was launched on 11 December 2020, paused from 14 December 2020 to 11 January 2021, and concluded on 4 May 2021. UniSA surveyed roughly 150 employees and 50 managers each week. Data collection was deliberately staggered over a five-month period, to allow us to observe how preferences for different WfH arrangements evolve over time, as a function of concurrent changes in contextual factors relating to the spread and containment of the pandemic, and as a function of employee and manager experiences with different arrangements in practice over extended periods of time.

## 1.5 Structure of this report

This summary report is set out in three parts – Setting the Baseline; Assessing the Evidence; and Policy Considerations and Recommendations.

### Part 1 – Setting the Baseline

- Chapter 1 provides an introduction to the report, including information about the project funders, research groups and data sources for the analysis.
- Chapter 2 presents a conceptual framework used to assess the evidence on working from home provided by the research project groups; and
- Chapter 3 summarises the WfH trends in Australia before COVID and, thus, establishes a pre-COVID baseline.

### Part 2 – Assessing the Evidence

- Chapter 4 summarises the evidence collected by the research streams in relation to the capacity to work remotely, hence setting an upper-bound on the potential for WfH arrangements in the future;
- Chapter 5 summarises the evidence in relation to the prevalence of WfH during the two-year COVID period (of 2020 and 2021);
- Chapter 6 summarises the research streams analyses of the impacts of WfH on transport demand; and
- Chapter 7 reviews the evidence collected on employer and employee preferences for WfH arrangements, including views about work and firm-level productivity.

### Part 3 – Policy considerations and recommendations

- Chapter 8 identifies relevant policy considerations; and
- Chapter 9 sets out policy recommendations.

### Appendix

- Appendix A provides a summary concordance of the evidence across the four research project groups.
- Appendix B provides a description of the ITLS survey data, by wave.

## 2. WfH conceptual framework

### 2.1 Introduction

This chapter sets out a conceptual framework to guide an assessment of the impacts of the increased prevalence of WfH during COVID and in a post-COVID world. The chapter builds on the theoretical and empirical literature cited by the four research project groups.

In its qualitative assessment of employer preferences, UniSA recognised the “many conceptual questions” raised by WfH. And while it is true that “many of these questions cannot be addressed at this stage in the evolutionary process”, setting out a structured framework to evaluate these questions will be beneficial.

*“This qualitative component of the research raises many conceptual questions about how we view our time at work and what corporate Australia will look like moving forward. Are we going to see the rise of the ‘hot desk’, with personal workspaces no longer viable for occupation only one or two days a week? Will employees be freed of living within a ‘commutable’ distance from the office and will organisations be prepared to employ someone living in different city, state or country and never see them in the office? What would giving up the large city centre office block mean for corporate identity? Many of these questions cannot be addressed at this stage in the evolutionary process, as changes in how Australians work and where they work are still emerging.” (UniSA 2021, p.88).*

### 2.2 WfH – Benefit and cost trade-offs

#### 2.2.1 From mandatory to voluntary WfH

When considering the prospects for working from home, it is important to keep in mind that predictions about the prevalence of what will be, post-COVID, a voluntarily negotiated activity, based on the lived experience of a largely mandated activity, contain a large element of uncertainty.

As a mandatory activity, the net gain or loss from enforced WfH (whether defined as private or social) to the parties directly involved—employers and employees—were of secondary importance; rather, the decision to mandate WfH was based on its social costs and benefits. In contrast, as a voluntary activity, a WfH arrangement would only be agreed to if there were private gains from doing so; that is, the employer and the employee secure gains from trade, although this may impose costs on third parties. In that sense, voluntary WfH is the inverse of mandatory WfH: in the latter, the dominant consideration is the impact on society as a whole, whereas in former, it is the balance of advantages and disadvantages to the parties themselves.

Obviously, where contracts cannot be individualised, for instance where the extent of WfH is set for a collective bargaining unit which includes people with different preferences, some employees may lose out, getting more or less WfH than they would individually prefer, but still the median member of the bargaining unit would normally be expected to be no worse off (otherwise, the membership of the collective bargaining unit wouldn't approve the agreement).

#### 2.2.2 Catalyst or mirage?

It is natural to ask why, if there are indeed net gains to WfH, it was not adopted on a broader scale before having been mandated; equally and symmetrically, one could ask why the situation would not revert, after the element of compulsion had been removed, to the *status quo ante*. While the ultimate

outcomes remain to be seen, it seems reasonable to propose that the episode of mandated WfH could have had two enduring effects.

First, it induced learning, and the parties discovered WfH was less problematic (and potentially more rewarding) than they had expected. Employees saw real budgetary and time savings from WfH, although for many those savings were at least somewhat offset by increased expenditure on the 'home office'.<sup>14</sup>

Second, the mandates may have overcome collective action problems which until then impeded widespread use of WfH. For instance, in an environment in which the vast majority of one's colleagues work at an employer's location, an individual employee may be reluctant to WfH, both because that might be viewed as signalling lower commitment to the job and because it would impose burdens on colleagues (such as needing to ensure that meetings were accessible online) which they would otherwise not have incurred. However, once WfH becomes widespread, each employee may actually prefer it, shifting the pattern to a new equilibrium.

That said, there are also costs to WfH, and so the question remains of assessing its net impacts. Because voluntary WfH will only be adopted where it results in gains (to the parties immediately involved), many of those impacts will ultimately be reflected in adjustments to wages and conditions. For example, higher agency costs because employees are harder to monitor and less improvement in workforce skills because of reduced supervision and interaction, would eventually be reflected in lower employee compensation. (Note that "lower" is measured relative to the levels which would otherwise have prevailed, rather than necessarily involving a fall in absolute terms). In the same way, welfare gains to workers from reduced commuting costs, both in terms of time and money, would lead employees to accept lower wages. But while wages might be lower in both cases, employees would still be better off, as the non-pecuniary gains from WfH exceeded any foregone compensation.

### 2.2.3 Benefits and costs of WfH

There are a number of benefits of working in close proximity to colleagues; in economics, those benefits form part of the "economies of agglomeration," which more broadly encompass the net gains that arise from geographical concentration.

For example, when firms and employees are co-located in CBDs, 'information costs' are likely to be lower, with the more rapid spread of information increasing the diffusion of innovations, encouraging greater competition (e.g. because retail outlets are closer to each other, and so face greater competitive pressure), and improving the depth and efficiency of labour markets (e.g. because employees can learn about job opportunities through word of mouth). Whether the online environment can replicate those economies is still an open question.

Moreover, there are lower transaction costs (primarily travel costs) associated with face-to-face meetings held in locations of high agglomeration relative to places with lower levels of agglomeration. A worker can have many more face-to-face meetings per day if they are all in the CBD compared to a situation where they are spread out across several suburbs.

On the other hand, the clustering of firms and employment in CBDs increases congestion, at least partially offsetting the gains from agglomeration. Moreover, the gains from agglomeration may themselves attract more firms (and employment) to CBDs than would be socially optimal; indeed, economic models suggest that CBDs will continue to expand until the gains from agglomeration are

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<sup>14</sup> The increased expenditure on home office equipment is likely to be, on average, quite marginal relative to travel savings (discussion with ITLS researchers).

entirely dissipated. Because that involves expansion continuing beyond the point at which the marginal benefits of agglomeration are equalised to its marginal costs, CBDs are likely to be inefficiently large, absorbing more employment than would be socially optimal. To that extent, WfH may help move the extent of agglomeration back towards a socially preferable level.

There are also obvious benefits from the agglomeration of employees at a common workplace. These include:

- greater formal and informal interaction and hence easier exchange of information;
- readier socialisation into ways of doing things, which is especially important for activities characterised by tacit—that is, not readily codified—knowledge and by “learning by doing” and “learning by watching” (Arrow, 1971); and
- an enhanced capacity to respond smoothly and in a coordinated manner to unexpected contingencies; and lower supervision costs, which can result in better performance in individual roles and an improved match between people and roles.

At the same time, these benefits are bought at some cost, including higher transport costs and costs for offices and other physical accommodation. Moreover, it is likely that some part of the time spent in congregated workplaces is devoted to rent-seeking, notably in the form of office politics. While these costs clearly do not outweigh the benefits of congregation, it is by no means clear that the balance between these will be struck optimally.

Balancing these considerations is not solely a matter of making a binary choice between working from home or in the office. Importantly, achieving the benefits of agglomeration does not necessarily require a 5:0 split between working in the office and working from home. Employers and employees may seek to find the optimal combination of WfH and WiO, for instance in a 3:2 or 2:3 ratio across a five-day working week such that net benefits are maximised.

### 2.2.3.1 Productivity

While the early evidence on the impact of WfH on productivity is mixed, it would be expected that moving from a mandatory to voluntary ‘hybrid system’ will have a positive effect on worker and firm-level productivity since agreements made between employers and employees must lead to an overall net gain to the parties. This is not to say that small business owners and the managers of larger firms may reduce office space and stagger working hours, thus requiring more WfH for those workers who elect to remain with the firm.

It follows that, in the longer-term, productivity performance could improve to the extent that the pandemic catalyses wider and smarter adoption of efficient WfH practices, raising worker wellbeing and efficiency and lowering firms’ costs (OECD 2020a). As the OECD has observed in its recent work on ‘telework’:

*This could speed up the transition into a “new normal”, which would have been more gradual in the absence of the crisis, given uncertainties and costs around the necessary organisational and management changes and other hurdles (e.g. cultural reluctance or legal constraints). (OECD, 2020a).*

### 2.2.3.2 Risk of double-counting benefits

In thinking about the aggregate effects, it is important to understand the distribution of benefits and costs and avoid double counting. For example, it would be expected that most of the effects that were internal to any individual employer and its employees would be captured in wages, profits and consumer surplus. For example, say the employer saves \$10 per employee on rent and each employee

saves \$10 on transport costs, then there is an aggregate gain of \$20 which will be distributed somehow. Clearly, if wages increased, that wouldn't be another gain, it would, rather, simply be a distribution of the savings. Moreover, the reduced rent and the reduced use of the road aren't losses: they are simply another way of measuring the gains. At least in the long run, the resources that are no longer consumed will be put to other uses, expanding output and incomes overall.<sup>15</sup>

### 2.2.3.3 Incidence of benefits

Quite where the changes will ultimately fall—in terms of incomes—is hard to predict. This is a question of what economists call incidence: that is, of where the burden of a change, such as an increase in a tax, ultimately lands: thus, an increase in the GST might be shifted forward to consumers (in the form of higher prices), backwards to employees, shareholders and other input suppliers, or to some combination of the two. In the same way, changes which make WfH more attractive could ultimately translate into a broad range of income adjustments, including on land rents.

This can be seen by considering what happened when the development of modern offices, the rise of car ownership and the public investment in radial transport systems increased the efficiency of locating jobs in CBDs; some part of the resulting efficiency gain would have accrued to the owners of land in CBDs as an increase in rents. Moreover, the greater the extent to which land in CBDs was in fixed supply and the costlier it was to increase the effective availability of space by substituting capital for land—i.e. by building ever taller buildings—the greater would have been the share of the efficiency gain that ultimately accrued to landowners.

Viewed in that perspective, improvements in the technology and acceptability of WfH would at least partially reverse that rise. In other words, while employees and employers would be better off, the value of land in CBDs would decline until the 'next best' alternative use was found, imposing losses on the owners of that land. Those losses would provide an indicator—albeit one that in practice was likely to be partial—of the efficiency gains from the increased reliance on WfH.<sup>16</sup>

Other changes in land rents could occur too. For example, people who, before WfH, had bought homes close to the CBD so as to reduce commuting costs may now face a capital loss (because being close to the CBD yields fewer benefits), while those who had put up with being a long way out secure a capital gain, as the land price gradient (the curve relating property prices to distance from the city centre) becomes flatter.<sup>17</sup>

In short, it is important to trace out the long-run adjustments in prices and incomes that greater use of WfH may impose, bearing in mind that many of those adjustments will not be straightforward.

### 2.2.4 The value of time

The well-known aphorism that “time is money” is applied in transport economics to monetise travel time savings. Since the supply of time is limited, it has value. For example, saving 60 minutes by working from home and avoiding a daily two-way commute means a worker has an additional hour in

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<sup>15</sup> This simple example is not to say that employees may, in some circumstances, be faced with a net increase in costs. For instance, employees might be required to pay more for the costs of the 'home office' such as internet, electricity, rent, stationery, and tea and coffee.

<sup>16</sup> Initial 'ballpark' estimates of the fall in CBD land rents are around 20% (discussion with ITLS research group).

<sup>17</sup> While there may be cases whereby a particular inner-city resident/CBD worker might still reap the benefits of face-to-face interactions and low transport costs (i.e. living close to, and working in, the CBD), at a macro level, house prices will be tied to the overall benefits of working in the CBD, and to the extent that those benefits are diminished by fewer people working there, inner city house prices will ultimately reflect that diminution.

their day to work more (whether paid or unpaid), spend time with family or friends, exercise, sleep etc.

Time spent commuting is a derived demand, in the sense that what a worker really wants is to work, not to travel to work. Therefore, a reduction in demand for commuting would generally be considered a benefit, since the commuting per se provides no real benefit. Of course, that is not entirely true and one can imagine situations where commuters derive a benefit from commuting – perhaps peace and quiet before and after their work day—though this is more likely to reduce the dis-amenity from commuting than to offset it altogether.

The trade-off between travel and leisure, and between travel and work, underpins much of the economic theory on the allocation and valuation of travel time, with varying constraints associated with these trade-offs (Jara-Díaz 2000). A particular focus for the value of time has been that spent on commuting, given that commuting activity is often a necessary (and typically viewed as a negative) by-product of work and thus unavoidable, and via the creation of accentuated peaks of travel demand in morning and afternoon peak periods, places large pressures on transport networks.

### 2.2.5 Distributional effects and broader consequences

Different groups of workers are exposed to the opportunities and threats of WfH in different ways (OECD, 2020b). As these potentially complex, distributional effects of greater reliance on WfH play themselves out, there may be broader economic consequences which also need to be considered.

A number of the potentially significant distributional effects will take place within the labour market itself. For example, new hires may suffer relative to veterans in firms because, without as many opportunities for interaction, they learn the ropes more slowly, reducing the rate at which their productivity (and hence compensation) rises. Moreover, employers may find it harder to assess the quality of new hires, as they don't observe them as closely, making them reluctant to employ new hires and more focussed on employee retention. If those effects are priced in, being a new hire becomes less attractive, harming younger workers and reducing job turnover (and hence the quality of labour market matching) as employees who are already in jobs show greater reluctance to leave them. The labour market will, in other words, become 'stickier', potentially reducing economic efficiency overall.

Slightly offsetting the above, the increased bandwidth, lower latency and proliferation of business 'apps' reduces many of the former constraints on the size of an employee's professional network, both inside and outside their firm. This is not to say however, that a worker's professional network is as valuable as 'hands on' day-to-day mentoring from within one's own firm.

There are gains and losses too to the people who cannot WfH either because their job task does not allow it (e.g., frontline essential worker), or their home is not properly configured to complete job tasks that might normally be considered possible in the home environment (e.g., no spare room). For example, these workers would benefit from lower congestion and lower PT crowding, but in the long run may lose from a reduced range of potential employers because they miss opportunities to learn how to work effectively with WfH, reducing the extent of their work opportunities in the future. There could, in other words, be a growing degree of segmentation in the labour market over time between those who are effective in a WfH environment and those who are not.

From the firm perspective, managing a workforce that is working from home requires management skills as well as corporate organisational capital and the availability of high-quality IT infrastructure. Firms' preparedness to transition to WfH is impacted by their size, industry and location. While larger firms often have experience with WfH and can largely benefit from economies of scale, SMEs are

frequently not familiar with it and lack the know-how, financial resources and skills necessary for adapting to it (OECD 2020b).

Finally, there may be long-run social consequences from greater isolation for some workers. For example, the sense of attachment to firms and one’s co-workers may decline, inducing a greater degree of anomie. Equally, without access to places at which employees congregate—such as cafes and restaurants in CBDs—it may become harder for young people to form relationships, increasing the reliance placed on alternatives such as dating sites, with all the risks they involve. On the other hand, the extra time made available from WfH, may encourage some people to deepen family, friends and neighbourhood relationships. To that extent, the concern about social isolation, for many workers, may ultimately be overstated.

Overall, if WfH leads to some workers missing out on training, mentoring and career development opportunities while others have access to these opportunities, WfH may eventually lead to a widening of the income and skill distribution. While this may not necessarily be ‘inefficient’, particularly in the short run, from a macroeconomic perspective, it may nevertheless lead to a deterioration in knowledge/skills accumulation in the long run and put greater pressure on the welfare of some groups in the Australian community and, hence, strain the social fabric.

## 2.3 Impacts identified by the research projects

Each of the collaboration projects focussed on specific aspects of the broader analytical framework set out above, which has then guided their assessment of the evidence and helps categorise the ‘benefits and opportunities’ and ‘challenges and concerns’ of employees and employers, and society more broadly (UniSA, 2021).

Table 2-1 (below) summarises the main themes covered by the collaboration streams. All three frameworks have, at their centre, the individual ‘employee-commuter’ who faced a sudden change in circumstances in early 2020. The ITLS framework focusses on the complex interactions between the labour market and transport market and the ripple effects on other markets and policy. The PATREC framework is similar, and also considers broader macroeconomic issues such as the impact of WfH on household consumption. The UniSA framework covers several markets and policy issues relevant to WfH, including productivity, health and wellbeing, environment and energy, and land use issues.

This discussion that follows briefly summarises the issues relevant to the economic agents and most impacted markets.

**Table 2-1 Conceptual frameworks guiding iMOVE WfH research**

ITLS	PATREC	UniSA
Travel demand (commuter, PT, freight, air travel)	Travel demand	Productivity
Commuter behaviour (incl. COVID impacts)	Organisational productivity	Health & Wellbeing
Negative externalities from transport (i.e. congestion)	Negative externalities from transport (i.e. congestion)	Transportation
Land use planning and cities policy	Employee impacts and worker wellbeing	Environment & Energy
Public transport investment	Macroeconomic impacts (esp. household consumption)	Land Use
Labour market		

Source: ITLS (2020, 2021), PATREC (2021), UniSA (2021).

## 2.3.1 Market analysis

### 2.3.1.1 Labour market

The analysis of the implications of WfH for labour markets focuses in more depth on the range of potential trade-offs sketched out that arise within the broader context of the employee – employer relationship; for instance, in terms of worker wellbeing, productivity, and development opportunities. How these trends will play out going forward depends on how the shift from mandated to voluntary WfH is reflected in bargaining agreements between the parties.

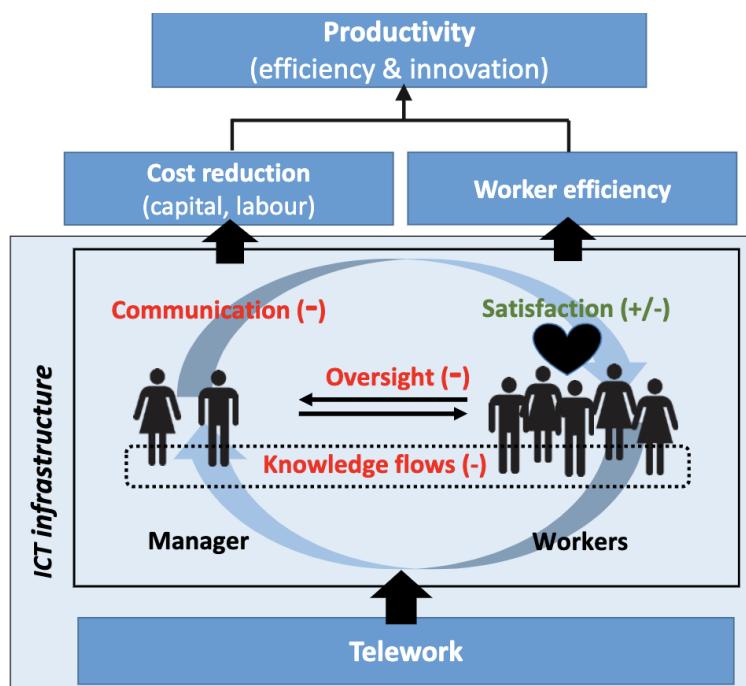
While all economic agents are heterogeneous to some extent, employers (whether as small business owners, or HR managers in large firms) generally seek a combination of characteristics in their employees, as follows:

- A (negotiated) gross salary (including ‘on-costs’) commensurate with worker productivity;
- Reasonable requirements in terms of ‘on-costs’ such as office furniture, computing and communications equipment, initial training (induction and familiarisation) and ongoing training costs;
- Worker reliability;
- Loyalty and longevity (i.e. a ‘contented’ employee); and
- Continual professional development (i.e. improved skills and experience over time) that is likely to generate a positive return to the employer in the future.

The OECD found that WfH affects firm performance via two channels:

- A direct channel affects firm performance through changing the efficiency, motivation and knowledge creation of the workforce.
- An indirect channel is when WfH facilitates cost reductions that free up resources for productivity enhancing innovation and reorganisation. The functioning of either channel presupposes an appropriate ICT infrastructure (Figure 2-1, OECD, 2020a).

**Figure 2-1 WfH and productivity, via two channels**

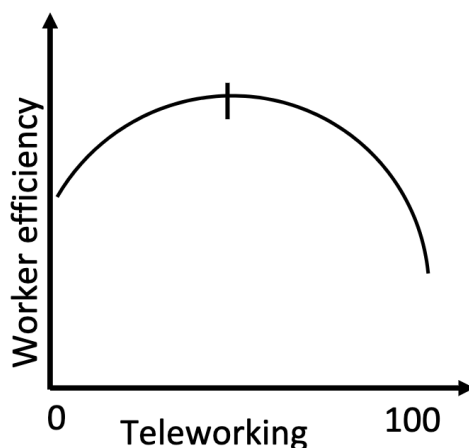


Source: OECD (2020a).

For firm-level productivity to increase with WfH, average worker efficiency needs to increase by enough to offset the potentially negative effects on communication, collaboration, ideas generation, knowledge flows and managerial oversight. The relative strength of these channels in turn is likely to depend on the intensity of WfH – the negative effect due to the lack of personal interactions likely becomes stronger with WfH intensity, as opportunities for in-person communication diminish, while worker satisfaction improves with low levels of WfH but may suffer from ‘excessive’ WfH (e.g. due to solitude or a fusing of private and professional life). On the other hand, greater digital collaboration may lead to increased knowledge flows and interpersonal connectedness.

According to the OECD, in theory, worker efficiency improves with low levels of WfH but decreases with too much WfH, implying a ‘sweet spot’ where worker efficiency – and thus productivity – is maximised at some intermediate level of WfH (OECD 2020a, Figure 2-2). As discussed, it will take time for the empirical evidence to indicate the impacts one way or another.

**Figure 2-2 WfH and worker efficiency trade-off**



Source: OECD (2020a).

As economic agents, employees are, perhaps, more heterogeneous than employers. Employees who are in the early stages of their careers are usually young, and value training and mentoring opportunities in addition to salary considerations. Others are mid-career and may value the flexibility to balance work and family responsibilities. Still others are close to retirement and may be looking to work fewer hours.

Regardless of their career stage, some employees value their careers over other aspects of their lives while others do not. While each employee has unique needs and preferences in terms of their working situation, there are a number general, common, employee characteristics, as follows:

- A rational worker considers their ‘take home’ wage net of taxes and other costs (such as commuting costs (both in terms of money and time), and ‘incidentals’ (like the cost of buying their lunch relative to eating at home);
- Generally, employees value and consider the non-monetary benefits of work related to, for example, social interaction and camaraderie;
- Job security, especially in times of economic uncertainty and/or high unemployment; and
- Ongoing professional development at least cost to the employee.

All things being equal, the relative bargaining power of employees and employers is affected not only by their unique characteristics but also by market conditions. But, through COVID, not all things remained equal.<sup>18</sup> The Australian and state governments intervened by temporarily suspending the previous arrangement and imposing a new one – this changed the incentives faced, and relative bargaining power enjoyed, by employers and employees. For many businesses and their workers, the shift to working from home was not a choice, but a directive. Economic agents had to do their best to adjust to new the circumstances.

The table below summarises the considerations highlighted in the collaboration streams and also draws on the Productivity Commission (2021).

**Table 2-2 Benefits and costs of WfH, Employers and Employees**

	Benefits	Costs
Employers	<ul style="list-style-type: none"> <li>▪ Higher productivity if employees have better ability to manage their time and concentrate, and/or are better rested because of the lack of commute.</li> <li>▪ Greater output if workers work longer hours (and productivity does not decrease).</li> <li>▪ Rental savings on office space.</li> <li>▪ Ability to recruit from a greater geographic and demographic pool.</li> <li>▪ Retention of staff who prefer working from home.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Lower productivity if employees cannot concentrate, coordinate, collaborate and share knowledge effectively in a WfH environment.</li> <li>▪ Workplace culture decays due to fewer or lower-quality interactions among workers.</li> <li>▪ Potential for remote workers to shirk; additional costs to monitor employees or change workplace processes.</li> <li>▪ Capital expenditure on equipment and telecommunication systems to enable working from home.</li> </ul>

<sup>18</sup> In this report, the ‘COVID period’ refers to the 2020 and 2021 calendar years.

	Benefits	Costs
Employees	<ul style="list-style-type: none"> <li>▪ Commute savings (time and transport costs), resulting in more free time for other activities such as more work, exercise, housework and family time.</li> <li>▪ Flexibility to combine work and non-work activities; work close to home (e.g., library, café); smaller time increments of work.</li> <li>▪ Higher productivity due to greater autonomy to manage workflow and ability to concentrate on tasks (less interruption by colleagues).</li> <li>▪ Potential incidentals savings (such as coffee, snacks and lunch) relative to grocery costs.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Decrease in job effectiveness due to distractions at home or lack of suitable working space.</li> <li>▪ Less socialising with colleagues; increased isolation.</li> <li>▪ Blurring of lines between home and work, leading to extra hours of work and inability to ‘switch off’.</li> <li>▪ Higher energy costs (to heat or cool home during the day).</li> <li>▪ Costs associated with setting up a home office or purchasing a larger property to accommodate a home office.</li> <li>▪ Fewer training, development, networking and promotion opportunities due to decreased visibility to managers.</li> </ul>

Source: Based on research group findings, including ITLS (2020, 2021), UniSA (2021), PATREC (2021) and Productivity Commission (2021).

### 2.3.2 Transport market

As noted above, time spent commuting is a derived demand. Changes in transport markets as a result of WfH (including for different transport modes) are therefore closely linked to changes in working patterns, and the extent to which both employees and employers prefer a shift to more flexible or remote work.

Transport markets are localised in the sense that the demand for travel is specific to a particular origin and destination, and alternative paths may be highly imperfect substitutes. Beck & Hensher (2020) observe that the transport market for workers in Australia’s major cities is localised with very few workers travelling more the 25 km to work, though the overlap between the many origin-destination trips underway at one point in time can create significant ripple effects throughout a transport network.

To a greater extent than most other markets, markets for transport exhibit a number of significant unpriced (at point of demand) negative externalities, namely:

- Congestion, which is exacerbated by the prevalence of traditional working hours, which see most employees arriving at and leaving work at the same time, bunching travel into peak periods (e.g. 7-9 am and 4-6 pm) and exacerbating congestion;
- Pollution, where each vehicle contributes to GHG and air pollution that affects population health, although environmental regulations and taxes have reduced this externality in recent years; and
- Traffic crashes, whereby an accident imposes a direct cost on its immediate victims, potentially injures bystanders and may affect all other vehicles on the road in terms of congestion costs, although improved safety technology and high deductibles on car insurance work to reduce this externality.

These negative externalities are likely to be exacerbated by the mispricing of transport services. For example, the absence of congestion charges on roads induces greater congestion than would otherwise occur. Partly so as to reduce that congestion, public transport is priced at substantially less than would be required for recovery of even variable cost; but the imposition of taxes to make up the

resulting shortfall imposes a deadweight cost on the economy in terms of reduced economic efficiency.<sup>19</sup>

The ITLS research project group argues that the shift to WfH has, and will continue to, reduce congestion and its costs and, therefore, should be used as a policy tool to manage this negative externality. Moreover, it is possible that increased WfH might also lead to the increased dominance of the private vehicle in commuter mode choice, due to changes in the travel cost and time budget. Accordingly, this would require:

- long run adjustments in Federal, state and local government investment in transport network infrastructure, as demand changes in line with stabilised use of WfH; and
- a reconsideration of road pricing policies that focus on road use rather than a flat fee. (Hensher, Beck, Nelson & Balbontin, 2022).

### 2.3.3 Commercial and residential property market

While this may not be immediately apparent, changes in commercial and residential property markets may represent one aspect of the distributional impacts if WfH becomes more prevalent.

Australia's commercial and residential property markets are geographically separate (e.g., the Sydney market is separate to the Brisbane market) although all markets are somewhat connected via relative price, yield and arbitrage opportunities. The markets within cities are highly connected.

The ITLS research group has argued that:

*All of these locational responses will present challenges for property developers and property agents who manage office space. Rents, relative to the average trend, may decline in the CBD as large enterprises rethink their priorities (especially the reduced number of workers in the office at any one time), and while lower rents may attract a new class of small to medium sized businesses into (or back into) the CBD, we would suggest that this will be balanced against the benefits of a more local office plan, where rents will also be competitive and office space more convenient to where people live, again reducing the pressures of the commute and supporting more flexible working hours (Hensher, Beck, Nelson & Balbontin, 2022).*

There is evidence that during the period of mandated WfH the reduction in office workers travelling to the CBD has lowered demand for office space, rents and the demand for a range of goods and services in Australia's CBD's, including food and entertainment, and medical services (like dentists and pharmacists and specialists). If these trends continue when WfH becomes a matter of employee/ employer choice, it is possible to envisage a number of longer-term impacts of WfH on the commercial and residential property markets in Australia's capital cities:

- Reducing demand for CBD commercial property and a switch from 'tables and chairs' to digital systems (cloud computing capacity);
- Increasing demand for suburban commercial property;
- Increasing demand for larger homes, with room for a home office;
- Spreading cities out, all things being equal; and

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<sup>19</sup> While taxes are simply a transfer from households to government, the act of raising taxes creates a deadweight loss that reduces economic efficiency because it reduces disposable income and, hence, the number of voluntary 'gainful trades' that can be made.

- Increasing the attractiveness of mixed office and residential precincts, such that workers might choose to ‘work near home’ and use medical and other services ‘near home’ (as opposed to ‘near work’).

At the same time, land use planning considerations would also involve corridor reservations and new zoning of commercial centres in suburbs if trends towards WFH move activities away from CBDs. From this perspective, the effects of the increased WFH incidence on consumers property preferences, locational choices and land use behaviour may be more gradual and subtle than their impact on travel demand. More research may be required to investigate these issues closely when the incidence of WFH stabilises and when more data (in particular from a post-pandemic environment) become available.

### 2.3.4 Education market

The Australian education market has been significantly impacted by the international border closure, state border closures and social distancing measures (such as mandatory schooling from home, masks – which affect teaching effectiveness, and lockdowns). In summary:

- Primary and secondary students studying from home (SfH) increased demand for higher bandwidth and lower latency telecommunications services. SfH also put more pressure on families where one or both parents were also working from home *and* supervising children<sup>20</sup>;
- University courses were transferred online, including for overseas students, increasing the demand for the ‘digital highway’;
- A reduction in foreign demand for places at Australian universities; and
- A switch away from university-based capital investment to investment in digital capability (such as online lectures);
- All of these impacts worked to:
  - Increase the demand for ‘digital highway’ services; and
  - Lower the demand for the ‘traditional highway’ services (private car travel, PT).
- Were SfH to become durably more widespread, this would likely reduce transport demand that largely involves trips within residential areas, rather than between those areas and CBDs. Since these trips are bunched in time—e.g. at school drop-off and pick-up times—there would be some easing of congestion, and of other negative externalities associated with transport, in those areas.

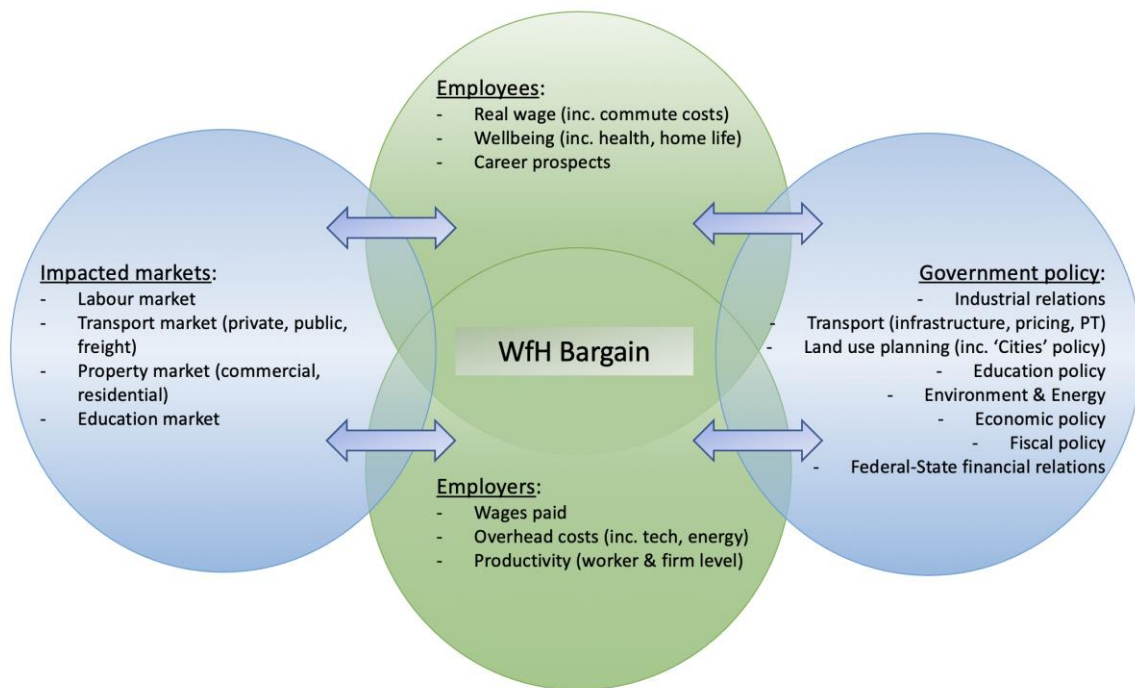
## 2.4 Summary

This chapter has set out a conceptual framework to consider the impacts of WfH. Bringing together the common themes that have been emphasised by the research projects, Figure 2-3 (below) puts the primary economic agents (being employees and employers) at the heart of the conceptual framework, and the markets and policy considerations affecting employee and employer decisions in a simple graphical representation.

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<sup>20</sup> SfH is an acronym coined by ITLS (2020, 2021).

**Figure 2-3 Conceptual framework for assessing WfH impacts**



Source: Tulipwood Economics based on ITLS (2020, 2021), UniSA (2021), PATREC (2021) and Productivity Commission (2021).

## 3. WfH trends before COVID

### 3.1 Introduction

This chapter describes WfH trends in the decade before COVID. The chapter uses the evidence cited by the research project groups and other publicly available material, including the 2011 and 2016 ABS Census data.

### 3.2 ABS Census data

The ABS collects information about working from home at each census via its Method of Travel to Work (MTWP) question. The census asks specifically about work travel choices, covering, for example, combinations of private vehicle, bus, train, taxi and walking. Of the 234 possible combinations, one response option is 'work from home'.

#### 3.2.1 2011 ABS census

At the 2011 Census, the proportion of Australians indicating that they worked from home (on Census night) was 3.8% of the labour force, measured across 17 of Australia's largest cities using the GCCSA specification and accounting for more than 80% of the Australian labour force (Figure 3-1).<sup>21,22</sup> The key findings in relation to WfH at the 2011 Census were:

- cities proximate to Australia's largest cities (and hence proximate to Australia's deepest labour markets) exhibit relatively high WfH prevalence, including the Sunshine Coast (7.2%), Gold Coast (5.5%), and Central Coast (4.5%);
- the variation around the average proportion across the 17 largest cities is low, with Greater Sydney (4.0%), Melbourne (3.7%) and Brisbane (4.0%) being close to the weighted average of 3.8% across the 17 cities; and
- industrial or resource-based cities such as Newcastle (3.1%), Greater Darwin (2.7%) and Wollongong (3.0%) were below the average WfH prevalence (Figure 3-1).

#### 3.2.2 2016 ABS Census

In its research, UniSA (2021) analysed the 2016 Census data to establish a pre-COVID WfH baseline. UniSA analysed the prevalence of WfH across Australia's 17 largest cities and, similar to the 2011 findings, found significant variation in prevalence, by city:<sup>23</sup>

- The average WfH prevalence was around 4% across Australia's 17 largest cities, which accounted for over 80% of Australia's workforce;
- Australia's three largest labour markets (Sydney, Melbourne, Brisbane) together averaged just over 4.5% WfH prevalence, more than double the prevalence just five years earlier;
- Similar to the findings in the 2011 Census, urban areas in close proximity to a major capital city, such as Sunshine Coast (8.2%) and Gold Coast (6.4%) in relation to Brisbane, and Central Coast (5.4%) in relation to Sydney, exhibited a significantly higher prevalence;
- Darwin (-1.5 std dev) and Townsville (-1.1) are more than one standard deviation below the average WfH percentage across the 17 cities:

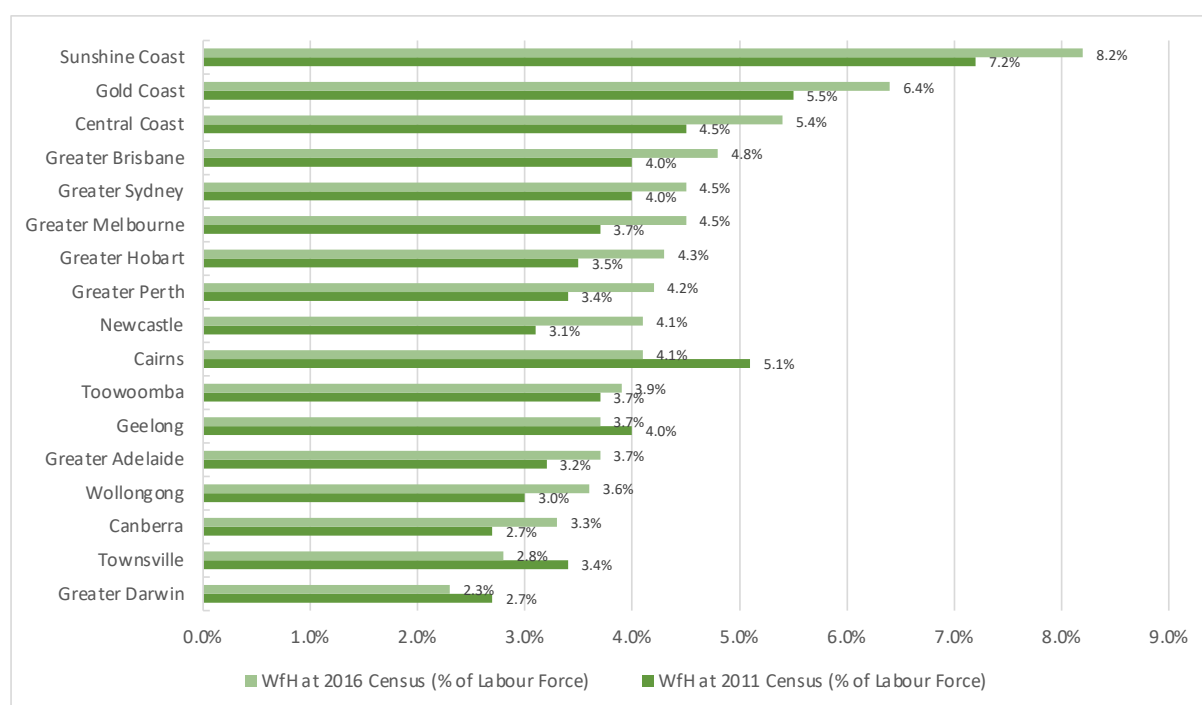
<sup>21</sup> GCCSA – Greater Capital City Statistical Area.

<sup>22</sup> In 2011, Census night was Tuesday 11 August.

<sup>23</sup> The 2016 Census night was Tuesday 9 August. The interpretation of these data assumes that 'census night' was reflective of the work week in general. How individuals interpret Census questions is, of course, unknown.

- Darwin is a resources-based city with a relatively smaller finance and administration sector that would, therefore, not support widespread and effective WfH practices;
- Townsville’s industrial structure has a relatively higher proportion of tourism and resources services, and a large military employment component where, in 2016, it was not common to work from home.
- The Sunshine Coast (+2.8 std dev) is more than two standard deviations above the mean and the Gold Coast (+1.5) is more than one standard deviation above the mean:
  - Both the Sunshine Coast and Gold Coast have workers who travel to Brisbane (usually by car or rail), but because of the increased travelling distances workers have a greater incentive to negotiate with their employers to WfH some days per week (Figure 3-1).

**Figure 3-1 Prevalence of WfH at 2011 and 2016 Census, Australia’s major cities**



Source: Tulipwood Economics and UniSA (2021) based on ABS 2011 and 2016 Census data.

UniSA (2021) also used the 2016 Census data to examine the relationship between working from home and education levels and found that higher levels of education are typically more likely to have higher WfH uptake, although the correlation is likely driven by the nature of the occupation rather than directly by income level. For example:

- People with Certificate III or IV as their highest level of education are more likely to be in vocational jobs that require a worker to be physically on-site.
- Conversely, individuals who have university degrees are more likely to be in white-collar jobs that, in many cases (though not all) may be easier to do remotely.

UniSA (2021) also examined the prevalence of WfH by income level and found a “U-shape” in the distribution by income. In other words, the highest prevalence of WfH in 2016 was at the lowest and highest deciles of income, while middle income earners exhibited a lower prevalence:

- 6.4% for incomes above \$156,000 (in 2016 dollars);
- 4.6% for incomes between \$104,000 and \$155,999 per year; and

- Between 6.4%-10.1% for incomes between \$1 and \$33,799.

While it's true that the highest average taxable incomes, by occupation, in the 2016-17 financial year were for surgeons, anaesthetists and other medical specialists (who presumably could only perform a very limited number of work tasks at home), the census data is likely reflecting the fact that it is more likely that senior white-collar workers are able to negotiate remote working arrangements than their junior counterparts who might perform similar tasks (ATO Tax Stats, 2018).

The Productivity Commission released its research paper *Working from Home* in September 2021 (PC 2021). The Commission draws on a number of sources including the work of the ITLS research group, ABS census data and the HILDA database. Their key findings were:

- Prior to the pandemic, about 8 percent of people regularly worked from home. Of these, more than half worked at home one day or less per week. As a result, the number of hours worked from home each week constituted only about 2% of the total hours worked (PC, 2021).
- As at the 2016 Census, approximately 35% of the workforce had jobs that were amenable to working from home (PC, 2021).
- Office-based jobs including 75% of clerical and administrative workers, 53% of professionals, and 52% of managers could have worked from home prior to the pandemic. Labourers, machinery operators and drivers, and technicians and trades workers are shown to have a very low potential for working from home (PC, 2021).

### 3.3 WGEA survey

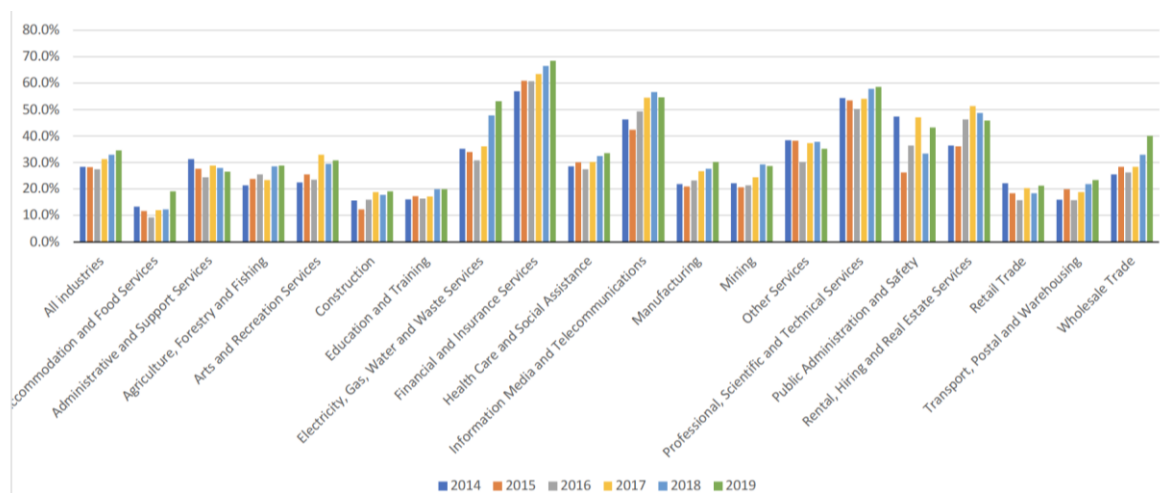
UniSA (2021) utilised the Workplace Gender Equality Agency (WGEA) database, which spans a 6-year period from 2014 to 2019 and covers 4.3 million Australian employees across almost 5,000 organisations.<sup>24</sup> UniSA found that the WGEA data revealed a clear trend across most industries towards an increase in WfH as a feasible option in the five years leading up to the pandemic.

The greatest rises were in Electricity, Gas, Water and Waste Services (+18%), Financial and Insurance Services (+13%), Rental, Hiring and Real Estate Services (+10%), and Information, Media and Telecommunications (+9%), (Figure 3-2). Analysing WfH trends by industry can yield some seemingly implausible results. In this regard, it should be kept in mind that not all workers in 'outdoor type' industries actually work outdoors, with many working in administrative, clerical or management roles able to WfH.

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<sup>24</sup> See here for more information about WGEA: <https://www.wgea.gov.au/resources>

**Figure 3-2 WGEA telecommuting database (over time, by industry)**



Source: WGEA (from UniSA 2021, Chapter 5).

### 3.4 Summary

The main findings of the research project groups in terms of the prevalence of working from home in the decade prior to COVID were as follows:

- Historically, many firms were reluctant to allow employees to work from home due to concerns about a drop in the worker’s productivity.
- The prevalence of working remotely increased steadily over the 2010s decade, from 4.4% of the Australian labour force at the 2011 Census to 4.7% at the 2016 Census.
- Based on ABS surveys, about 8% of workers regularly worked from home in 2019, just prior to the pandemic.
- The occupations that were most amenable to WfH were office-based jobs such as clerical and administrative workers, professionals and managers.
- Prior to COVID, more than 70% of the labour force never worked from home (see discussion at section 5.2.1).
- At the 2016 Census, around one-third of the Australian labour force had jobs that were amenable to working from home.
- A large portion of the people who worked from home pre-COVID, did so for specific reasons such as: living in a remote location, or the need to care for children or for someone with a disability.

## **Part 2 Assessing the evidence**

## 4. Capacity to WfH

### 4.1 Introduction

This chapter identifies the upper bounds of the prevalence of WfH during COVID and the potential for WfH post-COVID based on surveys of employer and employee preferences undertaken by the research project groups during the COVID period.<sup>25</sup>

- UniSA (2021) asked employees and employers from different occupations, industries, and regions/cities what proportion of their respective jobs could be completed from home (i.e. capacity of different jobs to WfH).
- PATREC (2021) were interested in understanding how employees and employers from different occupations, industries, and regions/cities transitioned during the peak periods of the pandemic (i.e. what happened with working arrangements during COVID).
- ITLS (2020) asked respondents in its Wave 3 survey whether their work could be done from home.

Before reviewing the evidence on the upper limits of remote working, it is worth making a distinction between how many *workers* work from home, and how many *hours worked* were performed in the home (or away from the office). Applying a simple explanatory example, if each worker in Australia's 13 million strong labour force worked from home 1 day per week (out of, say, 5 days), then:

- 100% of Australian workers could identify as having worked from home that week; however
- Only 20% of the total hours worked were carried out in the home during that week.

### 4.2 Findings by industry

UniSA (2021) asked employees about their ability to do some of their job tasks and activities remotely and found that the range of responses, identified by 1-digit ANZSIC industry, was wide:<sup>26</sup>

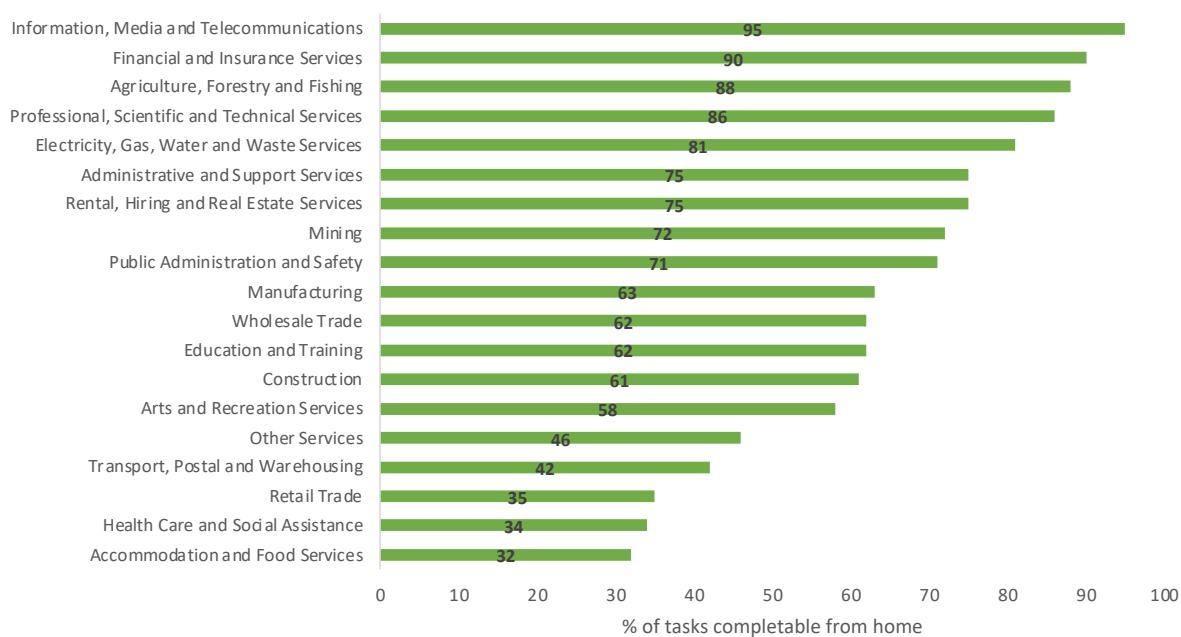
- Information Media and Telecommunications (95%); Financial and Insurance Services (90%); Professional, Scientific and Technical Services (88%); and Electricity, Gas, Water and Waste Services (81%) industries had the highest self-reported positive responses.
- *Transport, Postal and Warehousing* (40%), *Retail Trade* (35%), *Health Care and Social Assistance* (34%), and *Accommodation and Food Services* (32%) had the lowest self-reported positive responses (Figure 4-1).

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<sup>25</sup> For the purposes of this overarching report, the COVID period is defined as the 2020 and 2021 calendar years.

<sup>26</sup> See UniSA (2021, section 7.3). The results reported have been reweighted (by UniSA) to reflect the structure of the Australian labour market.

**Figure 4-1 Self-reported ability to do job tasks remotely, by industry (Per cent)**



Source: UniSA (2021, p.65).

### 4.3 Findings by occupation

All four research project groups recognised that it is more meaningful to analyse WfH capacity by occupation, rather than industry. The ANZSIC system classifies workers by the final industrial output (e.g. Manufacturing), making it difficult to infer a workers capacity to work remotely (since not all workers classified as ‘Manufacturing’ actually make things). Assessing WfH by occupation (e.g. machine operator or manager) is much more closely aligned to job tasks and, therefore, provides a more intuitive understanding of the capacity to work remotely.

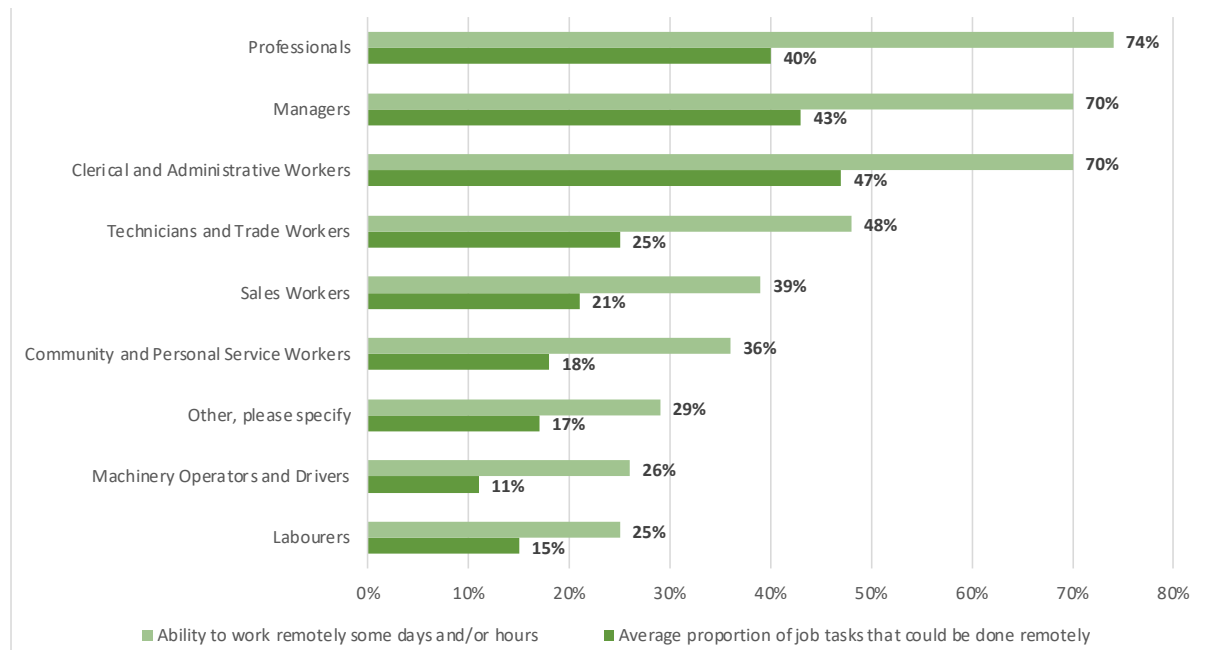
#### 4.3.1 UniSA findings

Figure 4-2 plots the self-reported ability to work remotely and the average proportion of job tasks that could be done remotely by 1-digit ANZSCO occupation types, as reported by UniSA:<sup>27</sup>

- Employees in white collar jobs, such as Professionals (74%), Managers (70%), and Clerical and Administrative Workers (70%) reported the greatest capacity to work remotely. Conversely, employees in blue collar jobs, such as Labourers (25%), Machinery Operators and Drivers (26%) report the lowest ability to work remotely.
- More white-collar employees would like to continue working online into the future, but not to the same level as during the peak of the pandemic. (UniSA, 2021).

<sup>27</sup> ANZSCO refers to the Australian and New Zealand Standard Classification of Occupations.

**Figure 4-2 Self-reported ability to WfH, by 1-digit ANZSCO**

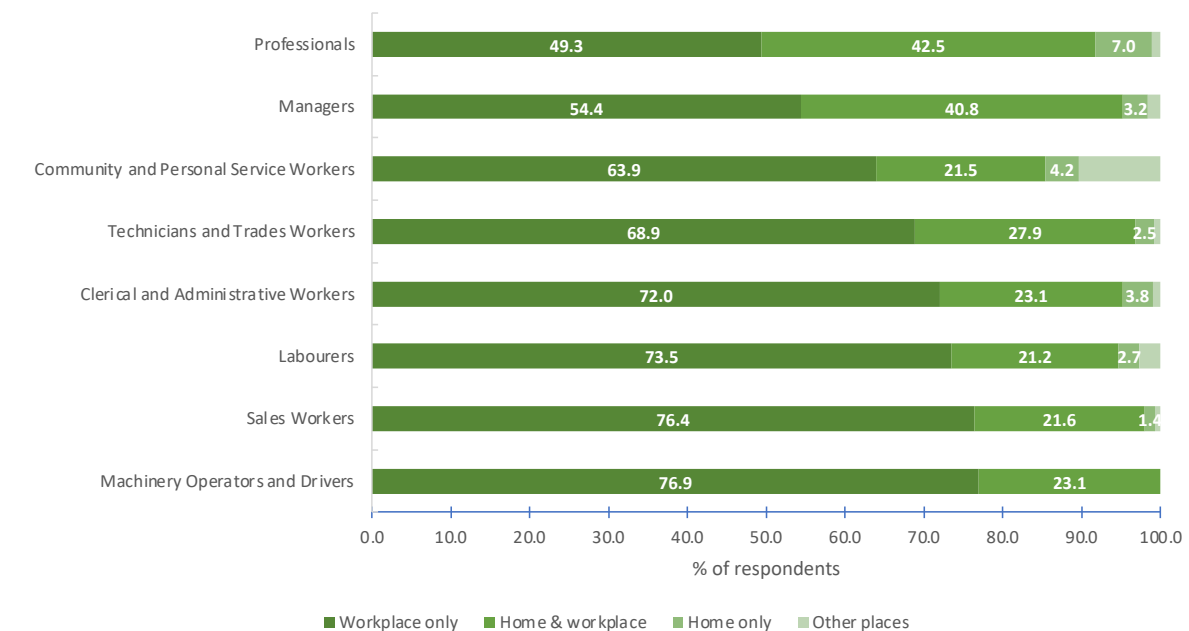


Source: UniSA (2021, Chapter 7).

### 4.3.2 PATREC findings

PATREC (2021) found that Professionals (42.5%) and Managers (40.8%) were most able to work within a hybrid employment structure where work was split between the office and the home (Figure 4-3). 76% of Machinery Operators and Drivers had to work on site.

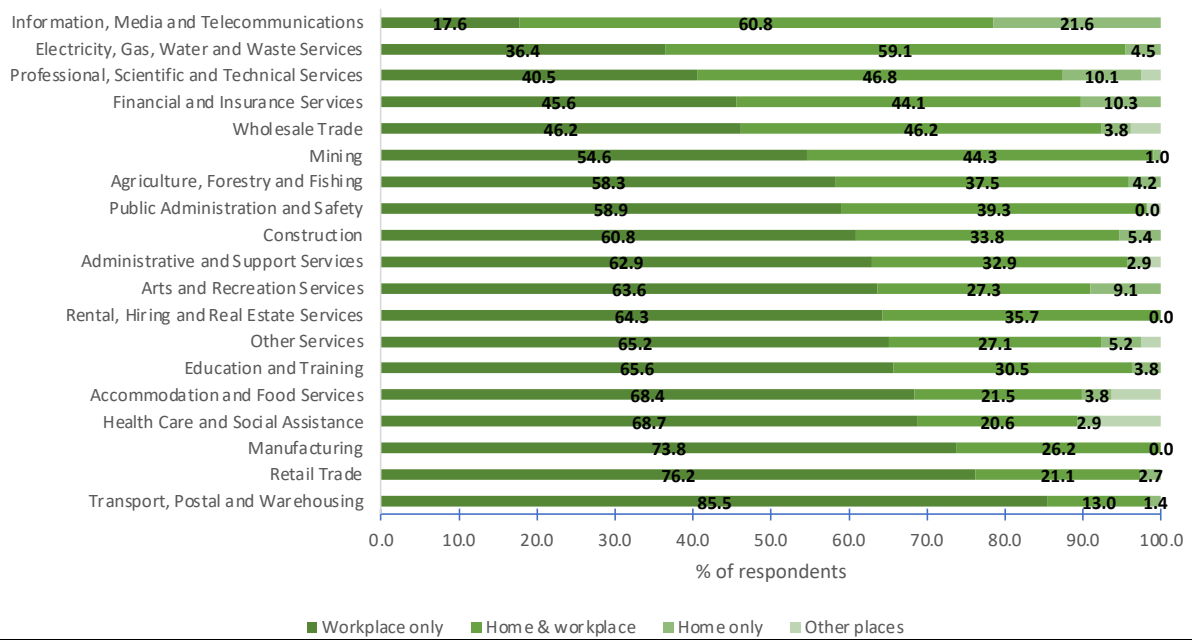
**Figure 4-3 Location of work, by occupation (COVID – 2021)**



Source: PATREC (2021, p.8).

PATREC (2021) found that WfH arrangements were most prevalent in the Information, Media & Telecom and Professional, Scientific and Technical Services industries (Figure 4-4). WfH was least prevalent in the Transport, Postal and Warehousing sector (85% had to be done in the workplace).

**Figure 4-4 Location of work, by industry**



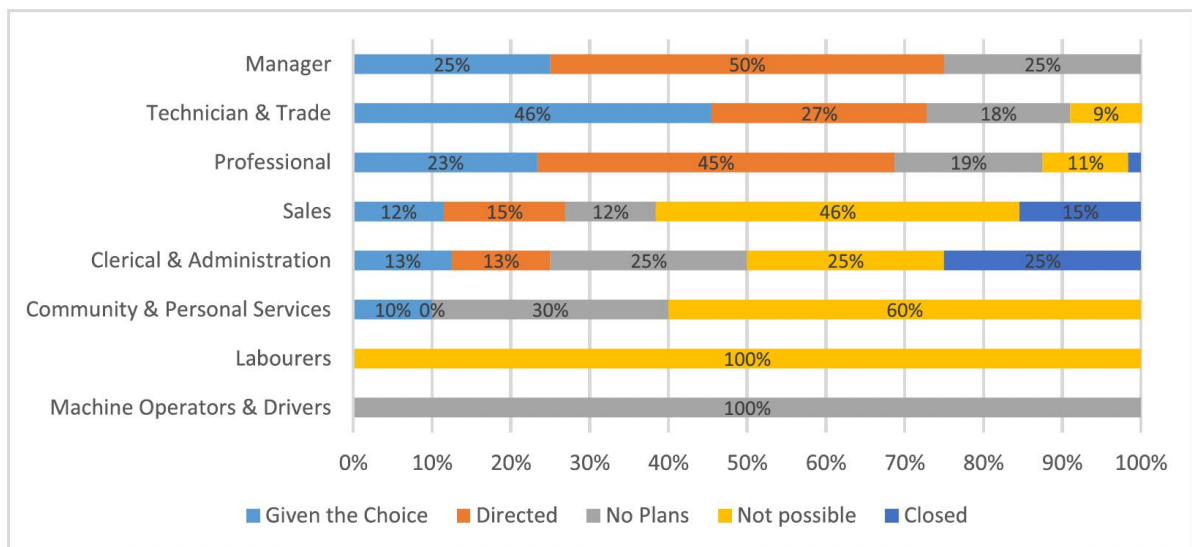
Source: PATREC (2021b, slide.9)

### 4.3.3 ITLS findings

The ITLS research group, in their Wave 2 survey of the Greater Sydney Metropolitan Area (GSMA) found:

- 75% of Managers and 68% of Professionals were either directed or given the choice to WFH; whereas
- Zero% of Labourers and Machine Operator and Drivers were offered the opportunity to WfH.

**Figure 4-5 Work from Home Policy by Occupation**



Source: ITLS (2021a).

## 4.4 Findings by job task

UniSA found:

- Education and Training (88.3%), Professional, Scientific and Technical Services (82.7%), and Financial and Insurance Services (72.7%) are the industries with the most tasks that can be completed from home.
- Overall, 51% of employees believe that some of their job tasks and activities could be done remotely;
- The self-reported average proportion of job tasks that could be done remotely is correlated to the previous 'capacity' question, with the four highest and four lowest industries being identical for both questions;
- In the four highest industries identified above, between one-half and three-quarters of job tasks could be done from home; and
- In the four lowest capacity industries identified above, between 15-25% of job tasks could be done from home.
- Only 22% of employees had formalised remote working arrangements with their employers.

The ITLS research group found:

- In its Wave 3 survey (August-October 2020), 29% of respondents indicated that all their work could be done from home, and a further 33% indicated that some of their work could be done from home.

As noted above, in its research, PATREC (2021) observed that occupation and industry type were not accurate predictors of WfH capacity:

*"Tasks that required close collaboration between colleagues were seen as needing to be carried out in the workplace." (PATREC 2021, p.18; Table 1).*

### 4.4.1 Findings by State

UniSA (2021) considered the geographical distribution of WfH jobs by Australian State and Territory, based on the percentage of tasks that could be completed from home by occupation.

- ACT (57%), New South Wales (43%) and Victoria (42%) were above the national average (of 41%) in terms of how many tasks could potentially be done from home.

## 4.5 Overseas evidence of WfH capacity

In an early COVID analysis of the capacity to work from home in the United States, Dingel & Neiman (2020) found that:

- 37% of jobs in the United States can be performed entirely at home, although with significant variation across cities and industries; and
- WfH jobs typically pay more than jobs that cannot be done at home and account for 46% of all US wages.

## 4.6 Summary

Across the four research project groups, the main findings in relation to the capacity to work remotely are as follows.

- Overall, about one-half of workers could work from home, although the capacity to do so varies widely across industries and occupations.
- Generally, office workers with both low client/customer/patient interaction and low capital requirements other than a computer and internet access (e.g., Professional, Managers) had the highest capability to working from home.
- However, even workers most amenable to working from home, could only perform between 40-50% of tasks from home, thus limiting the feasible number of days working remotely.
- Jobs that require large capital inputs or on-site work (e.g. construction site worker) or travelling (e.g. delivery driver) were not amenable to working from home (e.g., Machinery Operators and Drivers, and Labourers).

## 5. Prevalence of WfH during COVID

### 5.1 Introduction

This chapter summarises the evidence developed by the four research project groups on the prevalence of working remotely through the COVID period.<sup>28</sup> WfH prevalence across industries and occupations during the COVID period was mixed, reflecting the very different capacities of workers to switch from WiO to WfH arrangements.

- Essential industries such as emergency services, public transport, hospitals, large supermarkets and takeaway food delivery services largely continued operating;
  - In fact, employment and output in the grocery industry increased in 2020.
- The hospitality and tourism industries (e.g. airlines, hotels, cafés and restaurants) effectively shut down with workers going into a ‘deep freeze’, with millions of workers supported by the JobKeeper scheme;
- Apart from day care centres, the education sector largely moved online with teachers continuing to work – developing and presenting online material and monitoring students; and
- During the mandatory lockdown periods, non-essential office-based workers switched *en masse* to working from home.

### 5.2 National findings

Based on surveys conducted by the ABS during the pandemic, at least 40% of the Australian workforce reported working remotely one or more times a week during the peak of the pandemic, and 30% reported working remotely most days (UniSA, 2021).

#### 5.2.1 ITLS - overall prevalence

Utilising the evidence collected from its ‘three-wave’ national survey during 2020, compared to a pre-COVID baseline the ITLS research group found:<sup>29</sup>

- At Wave 3 (August – October 2020), in the Rest of Australia (excluding Victoria), just over half of respondents (57%) reported that they were working the same number of days/hours as before the pandemic, almost a third (29%) were working less, and a small number (13%) were working more days or hours than before COVID-19.
- ITLS found the differences in Victoria to be stark during Wave 3, with roughly the same number of respondents (44%) reporting less work, as the number who are working the same amount relative to before COVID-19 (43%).
- In the pre-COVID period, 70% of respondents worked zero days from home. This figure had declined by more than 30 percentage points to be below 40% at Wave 1 (in April 2020), before recovering roughly one-half of that decline to be 55% during Waves 2 and 3.<sup>30</sup>
- In Victoria however, the figure remained at the Wave 1 low point during the Wave 3 survey period.
- The average number of days worked in Wave 3 (3.8 days) remained significantly below the average number worked prior to COVID-19 (4.5 days).

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<sup>28</sup> This overarching report focusses on the findings of the four research project groups, rather than the methodologies used. Full methodologies are outlined in the source documents.

<sup>29</sup> A brief description of the ITLS research group survey instrument is at section 1.4.1.

<sup>30</sup> Pre-COVID period results were derived (via respondent answers) from the same set of 2020 surveys.

- Within Victoria, the stringent restrictions on movement during the Wave 3 survey period resulted in the level of work being below the national average (at 3.1 days).
- In terms of average days worked at home per week, the pre-COVID average was 0.86 days, during Wave 1 this increased to 2.4 days, and by Wave 2 it had declined to be 1.7 days per week.
- In Wave 3, average days worked at home in the Rest of Australia excluding Victoria, was around 1.5 days per week.<sup>31</sup>
- ITLS found broad geospatial differences in terms of the type of employment where work can be done from home, with regional respondents less able to WfH (46%) versus those in metropolitan areas (32%) at Wave 3.
- In aggregate, those in metropolitan regions, those who are in the middle age group, those on higher incomes, and males all report higher average number of days worked from home during Wave 3.

**Figure 5-1 Changes to Work and WfH in the last week**



Source: Beck & Hensher (2021b).

### 5.2.2 UniSA findings

The UniSA research project group monitored the prevalence of WfH during the pandemic across 17 of the largest Australian cities via an online weekly survey of roughly 150 employees and 50 managers over the period mid-January to early May 2020.

UniSA found that about one-half of employees working in these large Australian urban areas believed that some of their jobs tasks and activities could be done remotely. However, only 16% have formalised remote working arrangements with their employers.

*Ability to work remotely tends to be highest across white-collar sectors, such as information, media and telecommunications, and financial and insurance services, and white-collar occupations, such as professionals, managers, and clerical and administrative workers. Not all businesses are able to adopt remote working arrangements. For example, firms working in construction, manufacturing, warehousing and agriculture reported little change in workplace practices even during the peak of the pandemic. (UniSA 2021, p.11).*

UniSA found that:

<sup>31</sup> This figure is not directly comparable to Waves 1 and 2, because it excludes Victoria.

- at the peak of the pandemic, the average employee was doing 31% of their job tasks and activities remotely (compared to 17% pre-COVID);
- larger firms were more able to adopt remote working arrangements while smaller businesses generally lacked the resources and organisational processes to enable remote working; and
- the relationship between income and ability to work remotely is U-shaped, such that the proportion that are able to work remotely is high for individuals employed in low and high-paying jobs, and comparatively lower for individuals employed in medium-paying jobs.

## 5.3 Prevalence by occupation

In terms of WfH prevalence by occupation, utilising the evidence collected from its ‘three-wave’ national survey throughout 2020, compared to a pre-COVID baseline the ITLS research project group found:

- During Wave 3, 51% of white-collar workers were either directed to, or had the choice, to work from home compared to 14% for blue collar workers;
- For a large majority of blue-collar workers, the workplace policy towards WfH remains highly restrictive;<sup>32</sup>
- As a result, those in white-collar occupations work significantly more days from home than others (4.2 days on average compared to 1.5 for blue-collar);
- These differences existed through each wave of data collection (Table 5-1).

**Table 5-1 Workplace WfH policy, by occupation (Wave 3)**

**Table 2: Workplace Work from Home Policy by Occupation (Wave 3)**

	No Plans to WFH	Cannot WFH	Choice to WFH	Directed to WFH	Workplace Closed
White Collar	31%	16%	24%	27%	2%
Blue Collar	40%	45%	10%	4%	1%

**Table 3: Change in Workplace Work from Home Policy by Occupation (Wave 3)**

	None before, none now	Could before, same now	More now allowed	Less now allowed
White Collar	40%	16%	39%	4%
Blue Collar	84%	9%	5%	2%

Source: Beck & Hensher (2021b).

## 5.4 Regional evidence

### 5.4.1 ITLS findings

The ITLS research project group also analysed the disruptions to employment rates and conditions caused by the COVID pandemic in the Greater Sydney Metro Area (GSMA) in late May 2020, which followed a two-month period of stability in terms of new COVID cases:<sup>33</sup>

<sup>32</sup> Generally, ‘white collar’ workers refer to office workers, and ‘blue collar’ workers refer to outdoor and factory workers, although these definitions are less meaningful these days.

<sup>33</sup> The GSMA includes Newcastle, Sydney, Central Coast, Illawarra, Nowra-Bomaderry, St Georges Basin-Sanctuary Point, Milton-Ulladulla, and Kangaroo Valley-Southern Highlands.

- Over the Wave 2 collection period, workers in the GSMA were working on average, 2.5 days per week from home, compared to 0.8 days per week before the pandemic.
- Table 5-2 illustrates the numbers of days worked before COVID and compares that to the number of days worked during Wave 2 (both in total and at home).
  - It appears that Labourers were put in the JobKeeper “deep freeze” given that 100% of “days worked” were worked from home.
  - In contrast, many other occupations continued to work with Managers and Clerical and Administration workers switching mainly to remote working.
  - Patient or client facing occupations, which are deemed to be ‘essential services’ were largely unable to shift to remote work.

**Table 5-2 Average days worked, and worked from home, by occupation**

	Days Worked Before COVID-19	Days Worked Wave 2	Days WfH Wave 2
Manager	5.0	5.0	4.3
Professional	4.5	3.7	2.7
Technician & Trade	3.5	3.3	1.5
Community & Personal Services	3.6	2.7	0.1
Clerical & Administration	3.1	1.8	1.4
Sales	4.3	2.1	0.8
Machine Operators & Drivers	5.0	6.0	1.3
Labourers	3.5	2.5	2.5

Source: (Hensher, Wei, Beck & Balbontin, 2021).

#### 5.4.2 PATREC findings

The PATREC research project group assessed WfH impacts in the WA context. Its Wave 1 survey covered the period 14<sup>th</sup> May to 24<sup>th</sup> June 2021 and found:

- There was a 9.86% reduction in average number of commute days per week (from 4.36 days per week pre-COVID compared to 3.93 days ‘last week’ in 2021);
- Respondents in industries most amenable to WfH (Electricity, Gas, Water and Waste Services; Information, Media and Telecommunications; Wholesale Trade; Financial and Insurance Services; Professional, Scientific and Technical Services) had the highest prevalence of WfH;
  - Roughly 90% of respondents working in Information, Media and Telecommunications worked from home during the survey period.
  - Utilities industries have a high proportion of office-based workers who are able to work from home.
- Those in the most flexible occupations (Managers; Professionals) had the highest proportion of respondents who worked from home (22.1%) and the lowest commute rate (3.86 commute days per week).
- Roughly 50% of Managers and Professionals transitioned to complete or partial WfH arrangements. Other occupations remained mostly in the workplace.

- Those in the ‘frontline’ occupations had the highest commute rate (4.11 commute days per week).<sup>34</sup>

PATREC found that just over two-thirds of respondents worked from the workplace most of the time (68%), with one-quarter working in a hybrid WiO/WfH model (25%), or almost always from home (7%).

Almost half of respondents stated their preference to work in a hybrid mode in 2022, and nearly 10% preferred to work only from home. PATREC concluded that this suggests that hybrid working is likely to persist in jobs that permit it in the post-COVID environment.

## 5.5 Summary

Broadly speaking, the studies are in alignment regarding the increased prevalence of working from home during the COVID period.

- The prevalence of WfH peaked during the times WfH was, essentially, enforced via mandatory lockdowns.
- However, WfH did not return to pre-COVID levels in non-lockdown periods through 2020-2021, indicating some structural shift towards WfH, apparently above and beyond the gradually rising trend of the past decade.
- ITLS found that, in the pre-COVID period, 70% of respondents worked zero days from home. This figure had declined by more than 30 percentage points to be below 40% at Wave 1 (in April 2020), before recovering roughly one-half of that decline to be 55% during Waves 2 and 3.
- In Victoria however, the figure remained at the Wave 1 low point during the Wave 3 survey period.
- The average number of days worked in Wave 3 (at 3.8 days) remained significantly below the average number worked prior to COVID (at 4.5 days).

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<sup>34</sup> Frontline occupations are the subset of essential workers who must physically report to their jobs and are most vulnerable to health risks (Brookings, 2021). For example, see here: <https://www.brookings.edu/research/to-protect-frontline-workers-during-and-after-covid-19-we-must-define-who-they-are/>

## 6. Impacts on travel activity

### 6.1 Introduction

This chapter assesses the evidence developed by the four research project groups in relation to the impact of WfH on travel activity.<sup>35</sup> All project groups investigated the influence of COVID and WfH on Australia's capital city and regional transport networks through 2020 and 2021. In particular, the studies examined changes to:

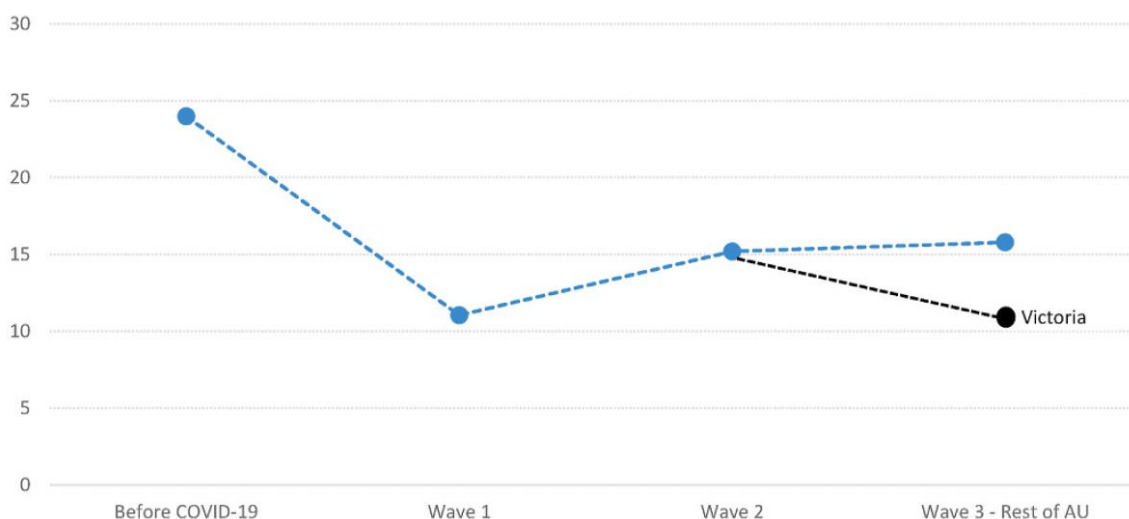
- total weekly travel activity, nationally and by region;
- the number of weekly commuting trips, both at the individual level and by geographic region (e.g. city/state);
- the number of weekly non-commuting trips (e.g. for shopping), by socioeconomic characteristics and region;
- commuter behaviour in response to the threat of being infected, for example when using PT;
- transport demand, by mode (e.g. private transport versus public transport);
- changes to the cost of commuting, including time and congestion costs; and
- changes to the use of time (e.g. for increased leisure).

### 6.2 Travel activity – National

#### 6.2.1 All trips

The ITLS research project group estimated the average number of one-way trips across its three survey waves throughout 2020. ITLS found that, nationally, the average number of trips per week declined from a pre-COVID baseline of 24 per week to 11 per week in Wave 1, before stabilising at around 15 by Wave 2 and Wave 3. However, in Victoria, travel activity in Wave 3 remained at the national Wave 1 levels due to the lockdowns in place through the Wave 3 survey period (Figure 6-1).<sup>36</sup>

**Figure 6-1 Average travel activity, by one-way trips per week**



Source: Beck & Hensher (2021a).

<sup>35</sup> In the transport literature, travel activity is defined as the sum of commuting and non-commuting trips. A person travelling to and from work is classified as a commuter, whereas a person travelling for any other purpose (e.g. medical, shopping, gym) is classified as a non-commuter.

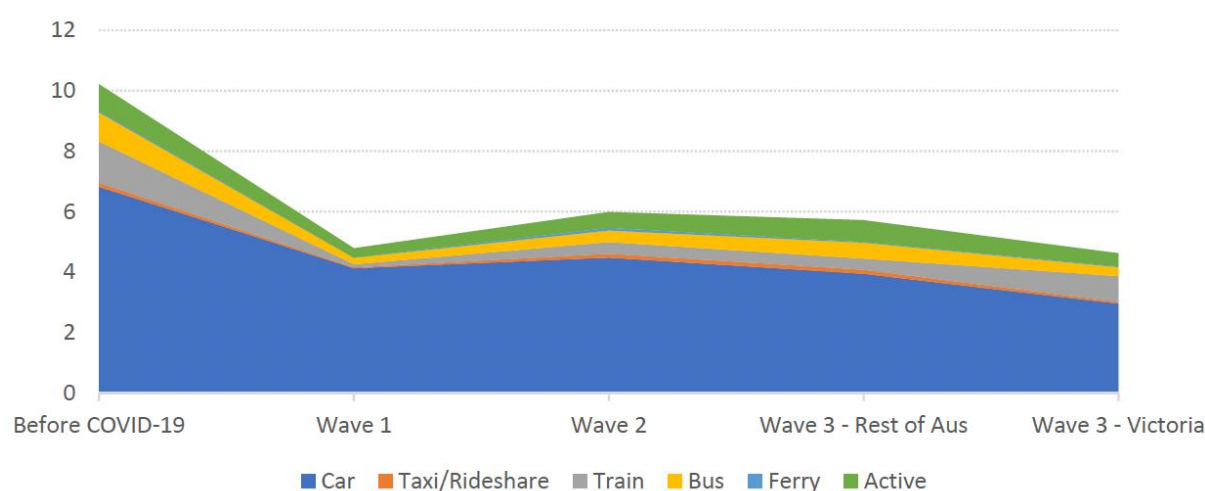
<sup>36</sup> The ITLS research group use 2019 as their pre-COVID baseline. The information about 2019 is sourced from survey respondents in their 2020 survey waves.

## 6.2.2 Commuting trips

The ITLS research group compared commuting activity by mode across three survey waves through 2020 and compared those results to a pre-COVID baseline:<sup>37</sup>

- The number of commuting trips more than halved in Wave 1 compared to the average number of one-way trips at the 2019 pre-COVID baseline.
- There was a reduction in commuting trips across all modes, but it was particularly pronounced for train (92% below pre-COVID levels) and bus (78% lower).
- In Wave 2 there was an uptick in commuting as restrictions eased and more people returned to work at the office (41% below pre-COVID).
- The trend appeared to stabilise for all states by Wave 3, excluding Victoria which was in lockdown during the survey period (Figure 6-2), (see discussion at section 6.3).

**Figure 6-2 Commuting activity by mode, Waves 1-3**



Source: Beck & Hensher (2021b).

## 6.3 Travel activity – Regional

### 6.3.1 Victoria

The Wave 3 survey undertaken by the ITLS research group coincided with metropolitan Melbourne moving into stage-four lockdown (from 2 August 2020), where travel activity was severely restricted – being only allowed to shop for food and necessary supplies within 5 km of their home, exercise for one hour once per day within 5km of home, and a stay-at-home curfew from 8:00pm to 5:00am each night. At approximately the same time, regional Victoria was placed in stage-three "stay at home" restrictions.

As a result, Victoria was 'out of sync' with the rest of Australia during the Wave 3 survey whereby commuting activity was equivalent to the amount of commuting activity during Stage 1 for Australia as a whole. (Figure 6-1 and Figure 6-2).

<sup>37</sup> The ITLS research group survey data is discussed in detail at section 1.4.1. Briefly, the ITLS database is comprised of three waves of data collection throughout 2020. Wave 1 was in the field from 30 March to 15 April 2020. Wave 2 was in field from the 23 May 23 to 15 June 2020. Wave 3 was in the field from 4 August to 10 October 2020.

## 6.4 Modal choice – GSMA v SEQ

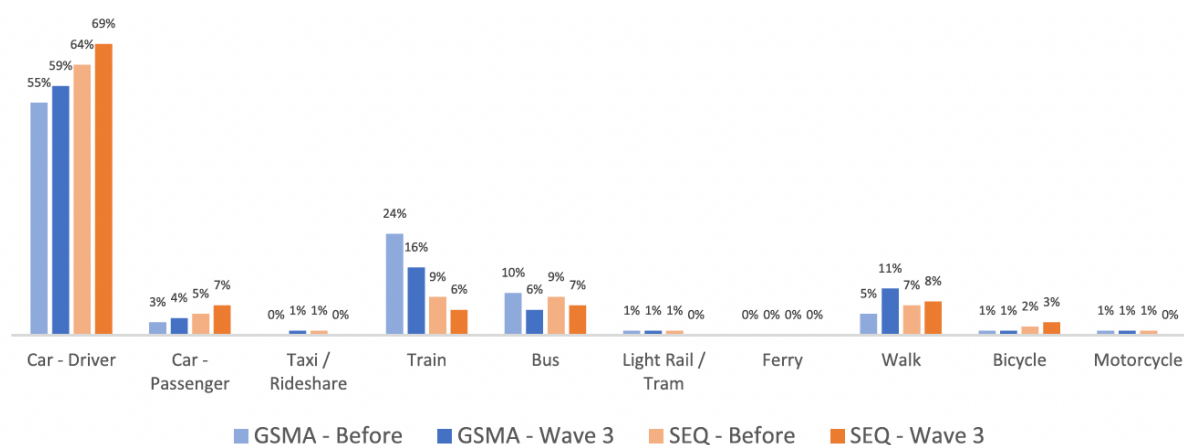
The ITLS research group examined the impacts of COVID and WfH on modal commuting choice in GSMA and SEQ. Together, these conurbations account for 40% of Australia’s total population and a corresponding proportion of total annual transport network infrastructure investment.

Based on its Wave 3 survey (4<sup>th</sup> August – 10<sup>th</sup> October 2020), ITLS developed a model of the relationship between WfH and commuting to better understand the drivers of commuting choice.<sup>38</sup> Specifically, the work aimed to identify the drivers of the number of one-way weekly trips by each mode (e.g. car, bus) and trip purpose (e.g. work, gym).

Compared to a pre-COVID baseline, during Wave 3 car use remained the dominant transport mode, increasing its share, while train utilisation declined significantly. The study found that:

- Car use increased in both GSMA and SEQ, by 7.3% and 7.8% respectively;
- There was a significant increase in car passengers in both GSMA and SEQ, by 33% and 40% respectively;
- Train utilisation declined in GSMA by one-third, from 24% to 15%;
- train utilisation declined in SEQ by one-third, from 9% to 6%;
- It is possible that part of the significant decline in train commuting was caused by the severe restrictions placed on domestic and international air travel for many months in 2020;
- Bus utilisation declined by 40% in GSMA and by 22% in SEQ; and
- Walking more than doubled in GSMA, from 5% to 11%. (Figure 6-3).

**Figure 6-3 Mode chosen for commuting trip, GMSA v SEQ**



Source: Hensher, Balbontin, Beck & Wei (2022).

## 6.5 Cost savings from WfH

In a study focussed solely on GSMA, the ITLS research project group compared travel costs borne by commuters during Wave 2 (in late May 2020) compared to a pre-COVID baseline (in 2019). Travel costs include weekly travel expenditure (e.g. bus fare) as well as the opportunity cost of commuting, which is a monetised estimate of a commuter’s value of time (see section 6.6).

<sup>38</sup> The ITLS research group supports the development of revised strategic transport models for the NSW and Queensland Governments. Briefly here, the models developed by ITLS are used to identify key drivers of the probability of WfH by origin–destination pair and then used to embed in TMR and TfNSW strategic transport models for SEQ and GSMA respectively to obtain WFH incidence by location.

In weekly terms:

- ITLS found that car commuters average total costs declined from \$161.83 in 2019 to \$90.81 during COVID; and
- Total public transport commuter costs averaged \$189.13 in 2019 and decreased by more than 50% to \$72.70 per week during COVID.

In annual terms, ITLS found that:

- the weighted average of car and PT monetary costs declined from \$2,105 to \$461, or by 78%;
- the weighted average of car and PT time costs declined from \$5,841 to \$2,686, or by 54%; and
- taken together, total generalised costs declined from \$7,946 to \$3,147 or by 60%. (Figure 6-4).

**Figure 6-4 Commuter costs, pre-COVID v COVID (May 2020)**

<i>Base: average per passenger before COVID-19</i>	Car	Public Transport	Weighted average for both modes
Annual monetary costs before COVID-19	\$1950	\$2482	\$2105
Annual monetary costs during COVID-19	\$376	\$668	\$461
Annual monetary costs reduction	80.70%	73.09%	78.08%
Annual time costs before COVID-19	\$5601.76	\$6421.93	\$5841
Annual time costs during COVID-19	\$3289.93	\$1219.24	\$2686
Annual time costs reduction	41.27%	81.01%	54.02%
Annual generalised costs before COVID-19	\$7551.70	\$8903.54	\$7946
Annual generalised costs during COVID-19	\$3666.36	\$1886.94	\$3147
Annual generalised costs reduction	51.45%	78.81%	60.40%

Source: Hensher, D. Wei, E., Beck, M., Balbontin, C. (2021).

Note: The values shown consider all the car and public transport passengers before COVID-19. The cost reduction reflects the decrease in the number of trips. Monetary costs include only running costs. The weighted average is based on the number of one-way commuting trips by each mode.

At a high level, the findings by the ITLS research project group are comparable to monetary cost saving estimates by Global Workplace Analytics, which was cited by the OECD (2020b):<sup>39</sup>

*“A typical employer can save approximately USD\$11,000 per year for every person who works remotely half of the time, thanks to reduced office space and business travel costs. Employees can save between USD\$2,500 and USD\$4,000 a year (working remotely half the time) and even more if they are able to move to a less expensive area and work remotely full time.” (OECD, 2020b).*

<sup>39</sup> Methodologies between the two studies are very different and dollar figures are reported in home country market exchange rates and not adjusted for purchasing power parity. Nonetheless, a separate US study has made similar findings to the ITLS research project group.

In the same study, the ITLS research group then calculated the overall cost savings based on ABS (2018) estimates of the number of commuters in the GSMA each day (being around 1.3 million car commuters – including passengers, and just over half a million PT commuters).

ITLS estimated the annual cost reduction for all car commuters in the GSMA to be:

- \$1.970 billion for monetary costs; and
- \$2.894 billion for time cost; equalling
- \$4.864 billion for total generalised cost.

ITLS estimated the annual cost reduction for all public transport commuters in the GSMA to be:

- \$0.936 billion for monetary costs; and
- \$2.685 billion for time costs; equalling
- \$3.621 billion for total generalised cost.

ITLS concluded that the reduction in total travel time costs (across car and PT) is a significant figure in terms of future public policy deliberations:

*“The \$5.579 billion of reduction in travel time costs represents a 54.02% reduction in the pre-COVID-19 total time costs of \$10.3 billion, much of which we would suggest can be associated with congestions costs.” (Hensher, Beck & Balbontin, 2021).*

## 6.6 Time savings

### 6.6.1 Reallocation of time

The ITLS research group studied how commuters reallocated saved time from commuting less (Hensher, Beck & Balbontin, 2021b).

Commuting time is, generally, considered a cost that should be minimised.<sup>40</sup> The benefits of reduced commuting time might include more work (whether paid or unpaid), or more leisure (including resting). That said, recent studies have identified some benefits of commuting, especially with advances in telecommunications technology that allows for multi-tasking (e.g. checking emails) and pleasurable activities (e.g. listening to music or podcasts).<sup>41</sup> For some, there may be benefits is being temporarily ‘isolated’ from others.

In its Wave 4 survey, the ITLS study used a sample of 270 survey respondents from NSW and QLD (undertaken during March-August 2021) who were still working from home to a greater extent than prior to COVID-19 (thus exhibiting time savings from reduced commuting).

Across the whole sample, the ITLS study found that:

- of the average 1 hour per week saved from avoided commuting, almost half the time (at 47%) is allocated to more leisure;
- a further 29% is allocated to paid work; and
- 23% to unpaid work (eg. housework).

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<sup>40</sup> Generally, commuting time is considered a ‘derived demand’ rather than a ‘good’ directly desired. That said, this is not always the case, with a proportion of commuters seeking a longer commute for a variety of reasons.

<sup>41</sup> For some, the opportunities for multi-tasking and enjoyment while commuting may be limited by their susceptibility to motion or travel sickness.

The proportion of the reallocation of work and leisure time in the sample by the number of days WfH and by region (QLD or NSW) was not constant.

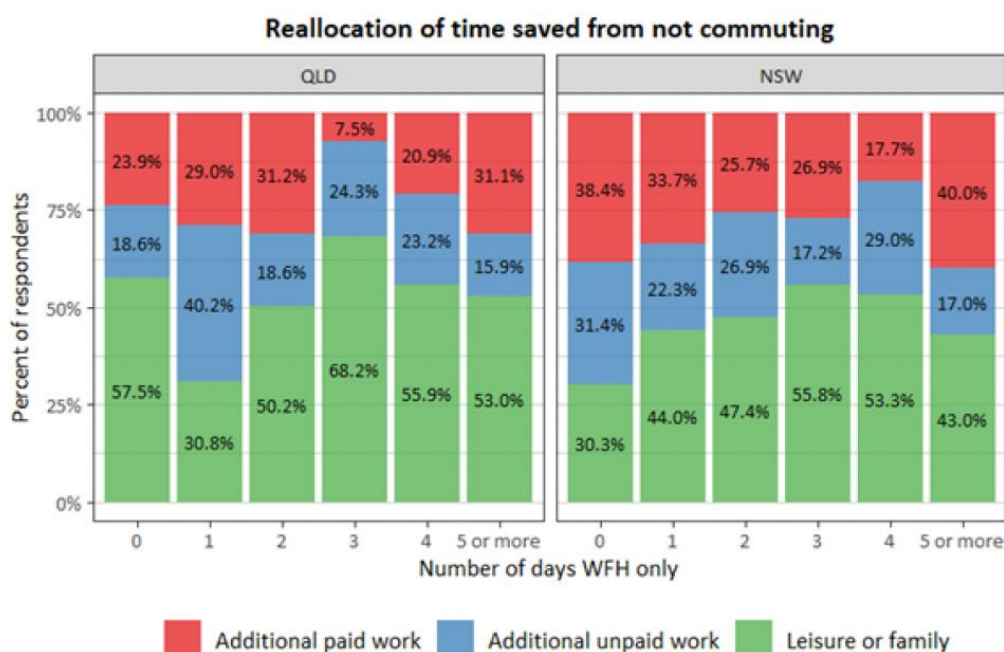
In Queensland:

- additional leisure or family time was most preferred by those respondents who WfH 3 days per week;
- additional unpaid work was most preferred by those respondents who WfH 1 day per week; and
- additional paid work was most preferred by those respondents who WfH 2 days per week and 5 or more days per week (both at 31%). (Figure 6-5).

In NSW:

- additional leisure or family time was most preferred by those respondents who WfH 3 days per week (55.8%) followed by 4 days per week (53.3%);
- additional unpaid work was most preferred by those respondents who WfH zero days per week (that is, those respondents who generally do not WfH); and
- additional paid work was most preferred by those respondents who WfH 2 days per week and 5 or more days per week (both at 31%). (Figure 6-5). (Hensher, Beck & Balbontin, 2021).

**Figure 6-5 Incidence of work and leisure time, by days WfH (Wave 4)**



Source: Hensher, Beck & Balbontin (2021).

### 6.6.2 Changes in commuter’s value of time

The idea that ‘time is money’ is used in economic analysis to translate time savings into a monetary value. A person’s ‘value of time’ (VoT), usually measured in \$/hour and related to their earning capacity, is used in transport infrastructure project appraisal, for example to consider a ‘congestion busting’ proposal where the primary potential benefit of the project is time saved commuting.

The ITLS research group investigated the relationship between a worker’s value of time and the number of days worked from home. Working from home leads to more time and income (since the

time and monetary costs of commuting are avoided), (Hensher, Beck & Balbontin, 2021). Because both time and income are more plentiful as a result of WfH, their average value declines.<sup>42</sup>

The ITLS study found that, as a result of reduced weekly commuting activity, an individual is willing to pay more to save time on a single trip because they have more travel budget to spend to maximise the utility of commuting. In other words, all else being equal, if the same total travel budget is now being allocated over a reduced number of commuting trips, the willingness to pay per trip (to minimise the cost of commuting time) would increase.

The main point of the study is that, with reduced commuting as a result of WfH, some travel budget is being freed up and there is an impact on the marginal (dis)utility of commuting travel time and cost outlays such that a rational commuter would be willing to pay more to save time on a given commuter trip since they can afford to now, compared to before.<sup>43</sup> For example, a commuter switches to a hybrid WiO/WfH model (say, 2:3 days split) and saves \$15 per week in PT commuting costs. The commuter elects to use the avoided PT expenditure to take the faster toll road on the two days WiO.

The overall mean estimate for the VoT is \$25.53 per person hour with a distribution from a low mean estimate of \$20.39 for individuals who do not work from home at all (i.e., commute 5–7 days a week), to a high mean estimate of \$36.95 per person hour for individuals who WFH five to seven days a week but still might commute a small amount. In other words, the more days someone works from home in a week, ceteris paribus, the more they value a unit of commuting travel time (Figure 6-6).

Hensher, Beck & Balbontin (2021) conclude:

*The impacts of this for ongoing research are two-fold. Firstly, transport agencies should continue to monitor how values of time have changed and/or continue to change during COVID-19 to provide better insight for future disruption, and equally this research should be ongoing into the long-term as we do not yet know if the budgetary allocation of time or money as it pertains to commuting will remain the same into the long-term or be reallocated to other expenditure, changing the constraints and thus the calculus once more. (Hensher, Beck & Balbontin, 2021, p.47).*

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<sup>42</sup> As an example, holding the demand for diamonds constant, if the supply of diamonds increases, the average value of a unit of diamonds declines.

<sup>43</sup> The study recognises that the additional travel budget can also be used in other travel and non-travel activities and, in the long-term, travel budgets would likely adjust to the new situation (Hensher, Beck & Balbontin, 2021).

**Figure 6-6 Value of Time (\$/person hour), by number of days WfH in GSMA, Wave 3 (September 2011)**



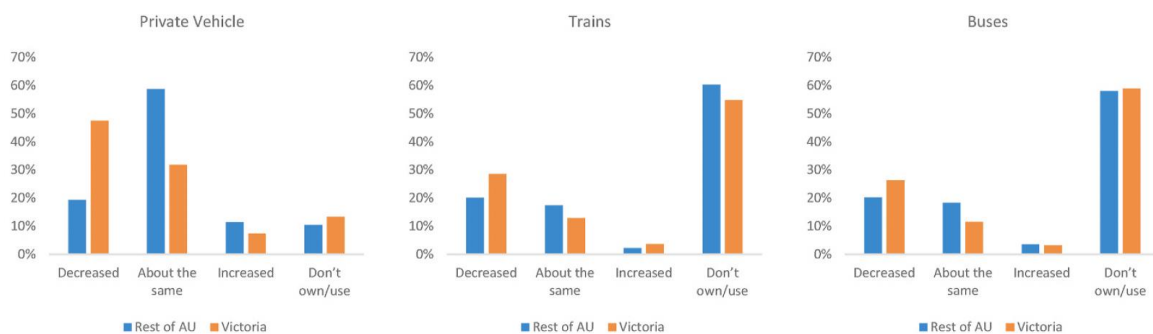
Source: Hensher, Beck & Balbontin (2021b, p.45).

## 6.7 Perceptions about travel

The ITLS research group collected data (during Wave 3 in August-October 2020) about how respondents perceived the changes in their level of use of different modes of transportation and found:

- Younger respondents make an average of 5 more trips per week than older respondents;
- Respondents on lower incomes make significantly less trips than those on higher incomes;
- In Victoria during Wave 3, when significantly tighter restrictions were in place compared to the rest of Australia, there was a corresponding significant reduction in travel by car; whereas
- Across the rest of Australia, 60% of people said their travel habits hadn't changed compared to Waves 1 and 2;
- People living in metropolitan areas reported a larger decrease in local travel compared to regional areas; and
- Anecdotal evidence suggested that travel within local towns/suburbs was more common than travel in a wider radius from home (Figure 6-7). (Beck & Hensher, 2021a).

**Figure 6-7 Perceptions of changed use of modes, Wave 3**



Source: Beck & Hensher (2021a).

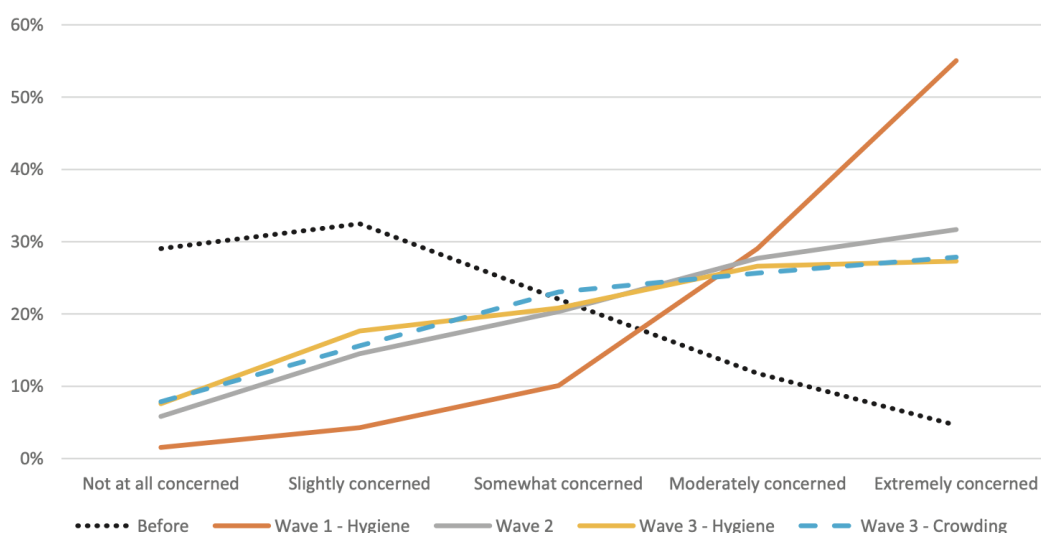
## 6.8 Biosecurity concerns about public transport

### 6.8.1 National findings

The ITLS research group tracked respondents concerns with public transport over the three waves of its survey compared to a pre-COVID baseline.

- With respect to hygiene and crowding on public transport, there was a dramatic increase in concern between the pre-COVID baseline and after the first outbreak.
  - Pre-COVID, only about 5% of people were extremely concerned about public transport hygiene. During Wave 1, over 50% of respondents were extremely concerned. By Wave 3 this had dropped to under 30%
- When questioned about crowding on public transport (Wave 3), over 50% of those surveyed said they were moderately or extremely concerned. (Figure 6-8).

**Figure 6-8 Concerns about PT, level of hygiene (all waves) and crowding (Wave 3 only)**



Source: Beck, Hensher & Nelson (2021).

### 6.8.2 Regional findings

The ITLS research group compared data collected from Southeast Queensland (SEQ) against the Greater Sydney Metropolitan Area (GSMA). The public transport data was collected as part of survey 'Wave 4a' conducted over two days in early July 2021 (5<sup>th</sup>-7<sup>th</sup>), during a period when the Delta variant caused the entire GSMA to be in lockdown for, initially one week, but ultimately a total period of 107 days ending on 11<sup>th</sup> October 2021.<sup>44</sup>

ITLS found:

- Concerns about hygiene on public transport in GSMA was 0.5 points higher on a 5-point scale in GSMA than in SEQ, reflecting the more severe outbreak in GSMA;
- During lockdown, 38% of respondents in GSMA said they were extremely concerned about hygiene on public transport, compared to 20% in SEQ;

<sup>44</sup> Brisbane was placed in lockdown from 29 June to 3<sup>rd</sup> July, which was just before the survey period.

- During lockdown, 36% of GSMA respondents said they were extremely concerned about crowding on public transport, compared to 20% in SEQ;
- When asked about barriers to using public transport, the highest response in GSMA was “Worried about COVID-19” and “Inability to social distance” was the highest barrier in SEQ;
- Regarding measures to increase confidence in public transport, in both GSMA and SEQ, the highest responses were: cleaning/hygiene, limit number of people, and mask wearing;
- Bio-security risks associated with public transport remain despite the effort by government to move away from the initial messaging (in the Wave 1 and 2 periods) to not use public transport, to Wave 3 where the message was that, *with social distancing and recommended mask wearing*, it was now safe to use these modes; and
- ITLS found that biosecurity concerns associated with using public transport were a statistically significant positive influence on the increased probability of WfH. (Beck, Nelson and Hensher, 2021d).

## 6.9 Transport model development

The four research groups recognised the importance of recalibrating integrated transport and land use models to account for the impact of COVID on traffic demand.

The ITLS research group observed that:

*With reduced commuting activity associated with an expected 1 to 2 days working from home for many occupations and industries, associated with releasing commuting time to spend on other activities including changed levels and patterns on non-commuting travel, it is necessary, indeed essential, to allow for the incidence of working from home in integrated strategic transport and location model systems. (Hensher, Wei and Liu, 2021).*

The ITLS research group found that existing modelling frameworks will require significant adjustment to account for the new incentives facing employers and employees in terms of working from home vis-à-vis working in the office. The ITLS research group identified several parameters that would require recalibration, such as:

- the quantum of commuting trips as a result of an increased prevalence of WfH;
- the quantum of non-commuting trips as a result of increased local travel, including for leisure activities;
- unique regional (or spatial) impacts that could not be accounted for with a generalised model; and
- changes to the distribution of the morning and afternoon commuter peaks (Hensher, Wei and Liu, 2021).

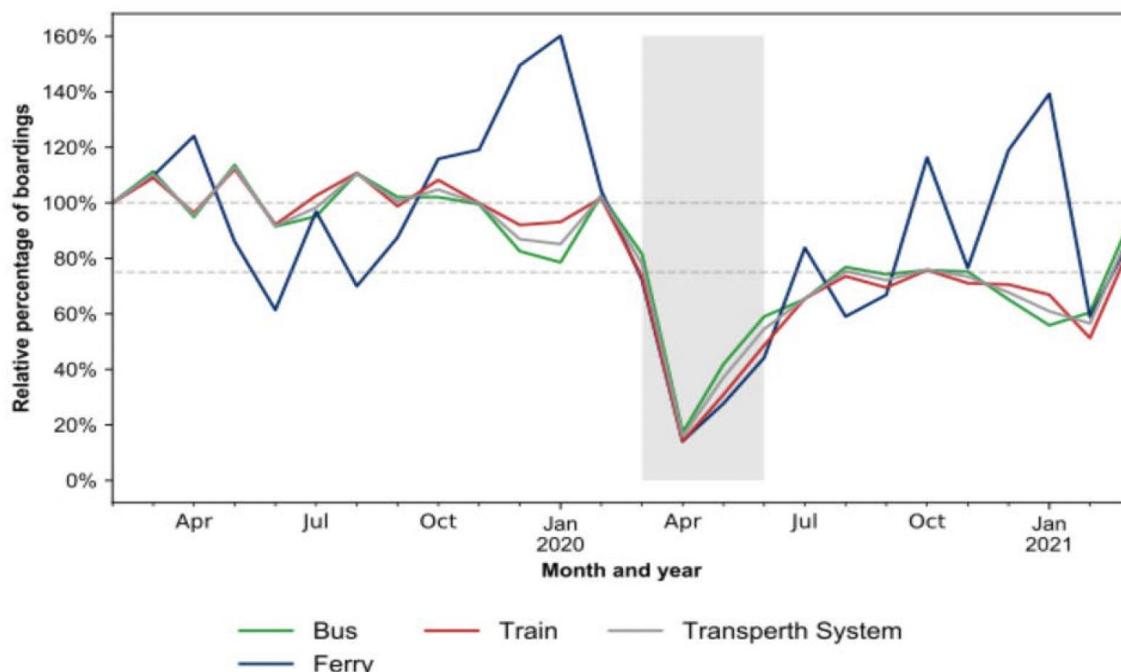
The objective for the revised transport models is to find stability or the ‘next normal’ with increased WfH as “a solid reference point” in going forward in analysis as part of both ‘predict and provide’ and ‘vision and validate’ (Jones 2016, cited in Hensher, Wei and Lui 2021). In other words, transport models can in future be used not only to guide future infrastructure investment but also to guide much broader policy questions related to the labour market, environmental policy and cities policy.

## 6.10 PATREC research

The PATREC research project group focussed on the Greater Perth Area, and found:

- Daily traffic volumes across the Perth CBD cordon dropped by 40% during the first lockdown (March-April 2020) and by 60% during the second lockdown (in late-January/early-February 2021); and
- Public transport patronage in Perth dropped by 80% during the first lockdown and by 40% during the shorter second lockdown period (Figure 6-9).

**Figure 6-9 Public transport boarding, by mode, 2020**



Source: PATREC (2021, p.41).

In a separate study, as part of its Wave 1 survey (14<sup>th</sup> May 2021 to 24<sup>th</sup> June 2021) of WA-based employees, PATREC (2021b) found:

- The average number of commute days per week decreased, from a pre-COVID baseline of 4.31 days to the survey period of 3.96 days;
- During the survey period, across the week the busiest commuting day is Wednesday, and AM peak commuting prevails, compared to other times of the day;
- Where the main mode of transport on typical commuting day was concerned, car driving increased from 70.6% pre-pandemic to 72.9%; the use of public transport decreased from 19.3% to 17.3%; and walking increased from 1.9% to 3%;
- 61% of respondents choose the fastest mode of commuting, with only 1.1% reporting a fear of contamination;
- 52% of respondents were not deterred at all by compulsory mask-wearing on public transport, 30% were deterred to a limited extent, and 18% to a large extent;
- The number of monthly online deliveries for households increased from 1 to 1.15 (groceries), and 1.97 to 2.26 (other); and
- There was no significant change in mode share between pre-COVID-19 and 'last week', although car and active travel increased the share by 1–2%, and public transport ridership decreased (PATREC, 2021).

## 6.11 Summary

The ITLS and PATREC research groups undertook real-time monitoring of the changes in transport demand through the COVID period compared to a pre-COVID baseline.

- ITLS undertook a national ‘three wave’ survey through 2020;
- ITLS also look specifically at SEQ and GSMA;
- ITLS also examined commuter concerns about PT hygiene, crowding and the biosecurity threat in general; and
- PATREC focussed its transport demand analysis on Western Australia.

In summary:

- The three project groups found large reductions in the frequency of commutes compared to pre-pandemic levels during the lockdown stages of COVID;
- Both research streams found significant reductions in transport demand that matched the severity of the social distancing measures;
- ITLS estimated the cost savings to individuals of WfH, in terms of car and PT financial savings as well as time savings:
  - ITLS estimates a reduction in travel time costs of \$5.6 billion as a result of COVID restrictions and the switch to WfH. This is a significant figure in terms of public policy considerations such as transport network investment;
  - On the other hand, ITLS found that commuter’s value of time had increase, implying higher social costs to congestion (see policy discussion in Chapter 8); and
- ITLS found a significant increase in concern about the use of PT in relation to hygiene, crowding and the biosecurity threat more generally. Further, this concern was a statistically significant driver of WfH.

# 7. Employer and employee preferences

## 7.1 UniSA studies

UniSA undertook a qualitative analysis of employer and manager preferences for WfH by interviewing 37 businesses across 13 (of 18) ANZSIC industries.<sup>45, 46</sup> The characteristics of the participating businesses were as follows:

- Most employers/managers were from the Professional, Scientific & Technical Services (6), Construction (5), Health Care & Social Assistance (4), and Retail Trade (4) industries;
- The majority of respondents represented SMEs, with only eight being businesses having more than 100 staff, of which three businesses were very large national corporations; and
- Fourteen respondents were Sydney-based, although the remaining thirteen respondents comprised a national sample representing every state and territory.

Respondents were asked to read a discussion paper that considered the impacts on their business operations from COVID and the long-term prospects for WfH.<sup>47</sup> Specifically, the discussion paper posed three broad questions, as follows:

- i. How much of your business was able to pivot to WfH?
- ii. What were the concerns/issues for you in moving to a 'work from home' approach?
- iii. How have your employees approached or accepted WfH?

In the second-round of interviews, businesses were asked to rank the significance of a number of themes that emerged from the initial responses, namely:

- Working from home is not a long-term strategy;
- Employee working times, work organisation and performance management;
- Technology and security systems and upgrades;
- Communication and collaboration;
- Health & Safety, and employee wellbeing; and
- Corporate image and external facing engagement.

### 7.1.1 Findings and respondent feedback

The feedback from respondents, in their own words, was a valuable part of the UniSA work. The quote below from a finance and insurance business is typical in articulating the trade-offs involved for employers.

*“Nearly 90% of staff would like to continue to WfH at least 2 days a week. We planned for 50-70% returns but saw 20-30%, even in “safe” states like WA. People preferred to work flexibly and at home. Some staff have mentioned that they have much better work/life balance and fewer commute times have been cited regularly. Some staff mentioned increased costs of WfH, which were covered while the allowance of \$40/month was provided (now removed). Staff have*

<sup>45</sup> Excluded industries included mining, Information Technology, and Accommodation and Food Services.

<sup>46</sup> UniSA (2021, Chapter 6).

<sup>47</sup> This iterative process is used to reach a consensus and is known as the Delphi Method. While this paper doesn't focus on methodologies used in the research project group analyses, more on the Delphi process can be found here: <https://www.rand.org/topics/delphi-method.html> and here: [https://en.wikipedia.org/wiki/Delphi\\_method](https://en.wikipedia.org/wiki/Delphi_method)

*been formally surveyed and their responses considered for input into the remote working strategy which is being piloted now.” (Finance & Insurance, Sydney).*

### 7.1.2 Juggling tasks

A strong theme that emerges from the evidence produced by the research streams is that, while an industry or occupation might be generally suitable or unsuitable to working from home, the many individual tasks of an employee are most often shared between these two categories. For instance, even for occupations where it’s completely out of the question to work from home, there are likely to be administration and ‘housekeeping’ tasks that can be efficiently completed at home so long as the employee has internet access. Even for outdoor workers for instance, team meetings could be conducting via video conference from home. That said, for some jobs, a physical presence is required. A typical quote from the survey:

*“The people who do the office work are also the people packing the orders for delivery. While you can do one job from home, you can’t do the other so they need to be here, in the warehouse.” (Wholesaler, Sydney).*

There is also the cost to consider and the structures need to be in place to transition to a remote working system. As this quote identifies:

*“Technology was both an enabler and also a constraint (we did not initially have sufficient laptops for staff who usually worked at a desktop in the office). We facilitated “drive through” pick up of desktops and purchased more laptops. We provided \$400 per person to purchase miscellaneous items for their home office (e.g. monitor) and provided \$40/moth per person allowance towards ancillary costs such as utilities an internet costs.” (Finance & Insurance, Sydney)*

### 7.1.3 UniSA quantitative study

In its quantitative study of employee and manager preferences, the UniSA research project group concluded that future workplaces are likely to adopt one of two hybrid approaches to incorporate remote working within their existing practices.

- First, individual employees might be offered increased flexibility to work remotely some workdays and/or workhours:
  - About one-third of employees reported wanting a mix of working on-site and remotely;
  - UniSA found that, for the average employee, the flexibility to work remotely some days is worth \$6,000 in annual full-time wages, or roughly 10% of their wages (upper-bound estimate was \$24,000);
  - Similarly, about one-third of managers believed their companies should prioritise offering more flexibility to employees.
- Second, companies may significantly increase their remote workforce, while maintaining a sizable fraction of on-site only workers:
  - UniSA found that almost one-half of managers believed their companies should focus more on hiring remote workers.

Together, these findings suggest that future workplaces are likely to comprise a mix of both arrangements. Based on our findings on the viability and uptake of remote working arrangements across different sectors, occupations, etc., we estimate that roughly half of existing jobs will continue

to be done completely on-site, up to 50% of existing jobs could have flexible arrangements that allow individual employees some ability to work remotely, and 10% or more of existing jobs could transition to permanent remote working arrangements.

### 7.1.4 Summary of UniSA findings

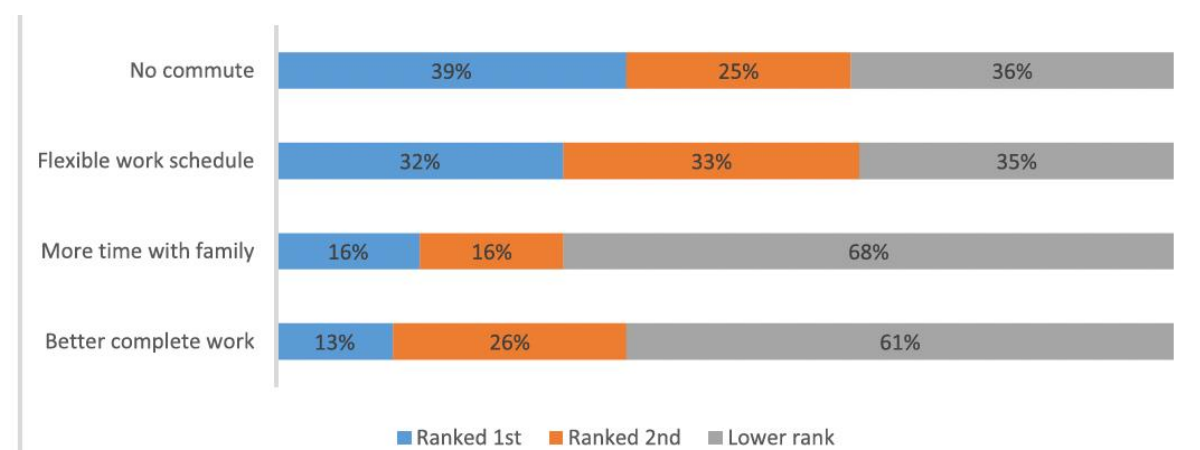
UniSA made the following findings based on its qualitative and quantitative surveys:

- Most employees, managers and employers do not see a significant negative impact of remote working on productivity on average, but most also agree that remote working is not beneficial for all:
  - Roughly one-half of employees report that the quantity and quality of work that they are able to do remotely per hour is less than what they are able to do at their workplace, one-quarter report it being the same, and one-quarter report it being more;
  - Roughly 59% of employees agree that they would still be able to achieve their job objectives and outputs as expected if they were working remotely, likely due to increased flexibility, greater autonomy, and the ability to work longer hours if needed;
- Not every business can pivot to working from home practices and there needs to be a critical mass to enact long-term changes;
- The best and most likely strategy will be to embrace the “hybrid workplace”, that is a combination of WfH and working in the office (WiO); and
- Employees might be willing to accept (WTA) a lower salary to WfH, given the commute cost and time savings, and increased flexibility available.

## 7.2 ITLS surveys

In its late-May 2020 survey of GSMA residents, ITLS asked respondents who (at the time) were able to work from home to rank (from most to least) the benefits of working from home. Sixty-four per cent of respondents ranked “no commute” either first or second. And 65% of respondents ranked “flexible work schedule” either first or second (Figure 7-1).

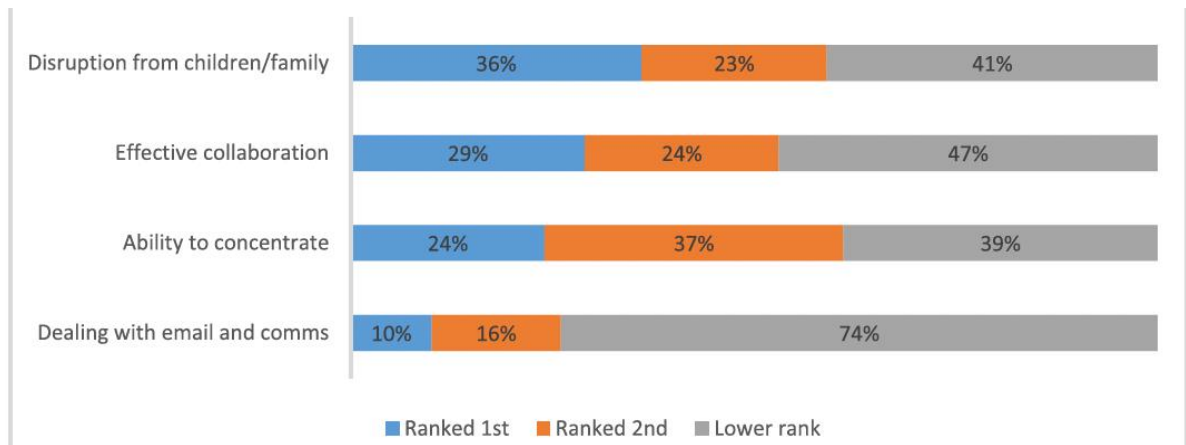
**Figure 7-1 Benefits of WfH, ranked (GSMA)**



Source: Hensher, Wei, Beck & Balbontin (2021).

ITLS then asked respondents who (at the time) were able to work from home to rank (from most to least) the barriers to working from home. Fifty-nine per cent of respondents ranked “disruption from children/family” either first or second. Fifty-three% ranked “effective collaboration” either first or second. And 61% of respondents ranked “ability to concentrate” either first or second (Figure 7-2).

**Figure 7-2 Barriers to WfH, ranked (GSMA)**

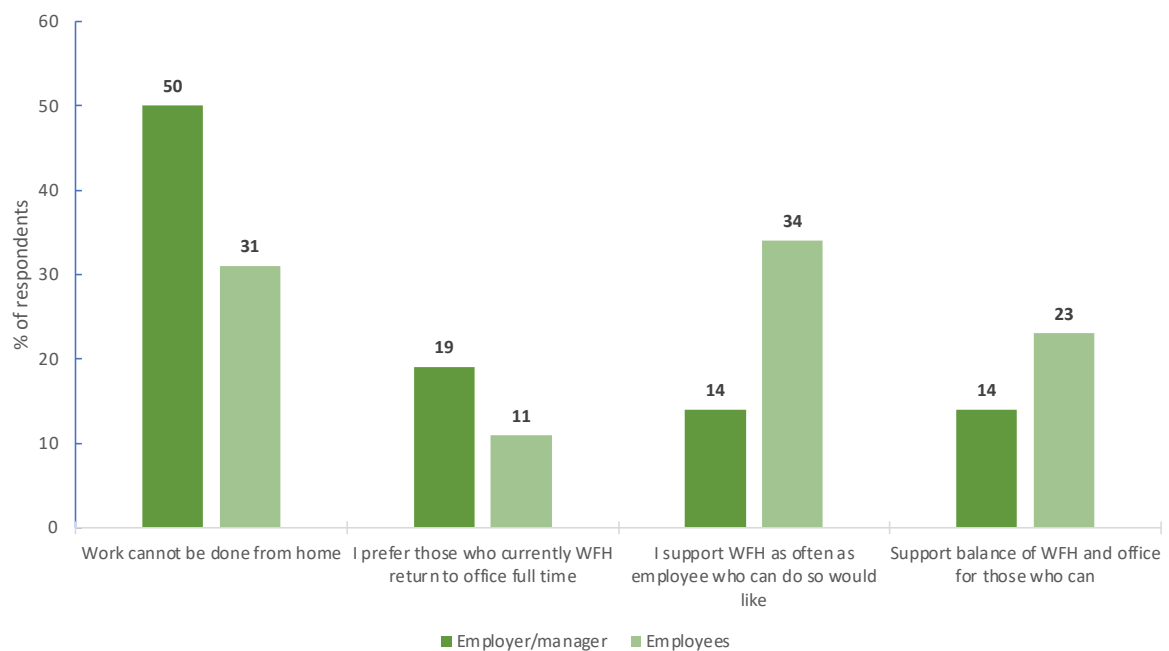


Source: Hensher, Wei, Beck & Balbontin (2021).

In a later Wave 3 survey in August-October 2020, ITLS asked for employer and employee views on whether they preferred to return to the office once COVID restrictions ended:

- One-half of employers stated that work cannot be done from home, and a further 19% of employers preferred those workers currently (at the time) working from home to return to the office full-time; and
- Employees were much more positive about WfH, with 34% support WfH arrangements as often as the employee would like and a further 23% of employees supporting a balance of WfH and time in the office for those who can (Figure 7-3).

**Figure 7-3 Employer and Employee perspectives on WfH Policy when Wave 3 restrictions end**



Source: ITLS (2021c, slide 11).

The ITLS research group collected data on the impact of working from home 6 months after COVID restrictions were enforced. Their key findings included:

- The overall experience with working from home remains, on average, a positive one for employees;
- Those working from home perceive little difference in productivity relative to before COVID-19;
- When asked about working from home in the future, employees reported:
  - Half believe that their work cannot be done from home, while 31% believe that their employer would support working from home in the future.
  - They would like to work from home more often, would like more flexible work times and to commute at less busy times.
  - Workers in metropolitan areas, females, older respondents and those on middle and high incomes all express significantly higher average number of days they would like to work from home (Beck & Hensher, 2021).

## 7.3 PATREC surveys

### 7.3.1 PATREC survey of employers

PATREC undertook a series of in-depth interviews with 20 Perth-based businesses spanning the private (incl. legal, property, planning and aged care) and public sector (incl. Commonwealth, State, Local). The purpose of the interviews was to understand employer perspectives on WfH. The interviews were carried out in mid-2021.

The main findings of the interviews were as follows:

- WA's first lockdown saw a major shift to WFH practices, and a need by businesses to equip and support staff to do so,<sup>48</sup>
- There has been a significant acceleration of WFH practice with almost all businesses now practicing a hybrid WFH model, with two days at home and three days in the office being the most common work pattern;
- Work from home was more suited to certain types of tasks, rather than being distinguished by occupation or industry type, with tasks that required close collaboration between colleagues being seen as needing to be carried out in the workplace:
  - More critical, was the need for regular work-based social connection to build the workplace culture of the organisation.
- Performance has not suffered as a result of WFH and has built confidence that WFH is effective:
  - There were, instead, concerns with over-productivity in relation to staff working longer hours, which are being addressed as part of the business 'wellness' approaches; and
  - Staff were particularly keen on the hybrid WFH model since they could avoid a long commute into work on some days, giving them more energy and improving productivity.

### 7.3.2 PATREC survey of employees

PATREC (2021d) also surveyed employees in its 'Wave 1' survey that was in the field from 14 May 2021 to 24 June 2021, between two short snap lockdowns in WA. Of the sample, the largest proportion of respondents (68%) worked from the workplace most of the time, with the remainder working in a

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<sup>48</sup> Lockdown periods in Western Australia: 1) 29 March to 28 April 2020 – WA wide; 2) 31 January to 5 February 2021 – Perth, Peel and South West regions; 3) 23 April to 28 April 2021 – Perth and Peel regions; 4) 29 June to 2 July 2021 – Perth and Peel regions.

hybrid mode (25%) or almost always from home (7%). Almost half of the respondents indicated a preference to work within a hybrid model from 2022 and a further 10% indicating a preference to work only from home.

PATREC (2021d) highlighted a number of important findings in relation to employee preferences, as follows:

- Considering WfH and travel in 2022 and beyond, the strongest agreement was with the statements that the pandemic would have long-lasting effects on travel and that physical distancing will continue as a practice;
- Hybrid workers reported a higher level of scheduling autonomy and vigour, but also higher home–work conflict and close monitoring, and higher loneliness than respondents working at the workplace;
- Employees working primarily at the workplace benefit from higher levels of colleague support than hybrid or home workers;
- No significant differences were revealed in participant’s general wellbeing according to work location, and there were no concerning levels of anxiety or depression during the ‘last week’;
- Hybrid workers experienced less loneliness than those working primarily from the workplace, suggesting that individuals and managers need to be careful to ensure needs for social connection are met whether working from home or the workplace; and
- Productivity was predicted by the amount of colleague support and a moderate workload and decreased with more home–work conflict and close monitoring (PATREC 2021d).

## 7.4 Conclusion

It is clear from a review of the evidence on employer and employee preferences that the WfH experiment is still very much in progress. While there are many clear benefits from switching to WfH, there are also potential costs, some of which may not be immediately obvious to either employers or employees.

Early career training and mentoring is an example. As the PATREC research group concluded:

*One business noted that advances in digital technology had made things like video conferencing much more seamless and facilitated WFH. However, this did not remove that real need in business around mentoring and making sure that the younger people grow in their abilities and confidence and knowledge. For this there needed to be some element of office-based attendance. This, they noted, would result in various degrees of WFH hybridity, where an office becomes the base where you go in and connect, and have meetings. This will also lead to these offices becoming ‘agile-workplaces’. This model was, however, stressed as being dependent on a really strong culture of support within the business. (PATREC 2021c, p.12).*

The survey evidence helps illuminate these potential costs and, thus, contribute to the ‘learnings’ and development of protocols to maximise the benefits for all parties involved:

*Many businesses noted that with increased WFH they had made a point of ensuring their staff had opportunities to connect socially, an important aspect of team building and collaboration. Some businesses reported that staff enjoyed the ‘camaraderie’ of being in the office, with opportunities for more casual encounters with, for example senior staff, that prompt useful incidental conversations that are difficult to achieve via digital team’s meetings. During lockdowns, Friday night drinks occurred as online get-togethers, set up as trivia and quiz nights, art shows and so on, with family members and pets encouraged to join in as part of the*

*interaction. Other businesses noted that they valued times during the week where everyone was encouraged to be in the office to share thoughts and ideas and build collaboration. Other initiatives had included 'lunch and learn', providing a light lunch and bringing staff together. For one business that had embraced WFH for the majority of staff and majority of time, they offered a dinner with ice-breaker games as a way of staff meeting each other face-to-face. (PATREC, September 2021, p.12).*

## **Part 3 Policy considerations and recommendations**

## 8. Policy considerations

### 8.1 Overview

The central plank of Australia’s public policy response to COVID in 2020 (before an effective and trusted vaccine became widely available) was social distancing. A key component of the social distancing policy has been the requirement to work from home, whether mandated by government, employers or by voluntary agreement.

Considering the evidence produced by the four research project groups, it seems almost certain that a hybrid WiO/WfH model will evolve for the approximately 50% of the Australian labour force able to do a significant proportion of their job tasks away from the workplace. Indeed, a gradual trend towards more WfH was evident in the decade before the global pandemic arrived in Australia (Chapter 3).

The research project groups identified many direct financial and economic benefits of WfH as well as broader social benefits that are, often, more difficult to measure. These include:

- reduced commuting expenditure, whereby for most commuting is generally considered to be a derived demand (i.e. not necessarily a desired ‘good’);
- commuting time savings; leading to more time for leisure or work (whether paid or unpaid);
- reduced traffic congestion, thus benefiting those still using the transport networks;
- reduced crowding on public transport, providing reassurance to individuals as well as wider public health benefits in terms of better managing biosecurity threats;
- reduced future public infrastructure investment and operating expenditure required (holding congestion and crowding at pre-COVID levels and assuming no change in a commuter’s VoT);
- seemingly no loss in productivity, at least at a macro level, although this remains an open question; and
- some evidence of improved wellbeing, although it is early days.

It may be that the benefits of the increased prevalence of WfH are more obvious in the short-term than any costs, which may take more time to bear out. These costs could include:

- Reduced training, mentoring and career development opportunities, especially for early career workers; and
- Reduced collaboration and ideas generation (or cross-pollination).
- Taken together, the above costs may have long-term impacts on productivity growth;
- Unsustainable disruption to household and family routines, which may have long-run consequences for Australia’s overall level of public health and wellbeing;
- for some workers, greater overall costs in terms of reconfiguring their home office at their own cost; and
- higher social costs of congestion, driven by an increase in a worker’s value of time (VoT).

### 8.2 Policy considerations by policy area

The table below provides a brief overview of the policy issues considered by the four research project groups.

**Table 8-1 Summary of policy considerations, by policy area**

Policy	Federal / State Government
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<b>Industrial relations</b>	<ul style="list-style-type: none"> <li>i. Minimum ‘core’ hours worked (i.e. being present and available to colleagues).</li> <li>ii. Maintaining a separation of family life, especially for parents of young children.</li> <li>iii. Health &amp; safety and insurance issues.</li> <li>iv. Who pays for capital and operating costs (e.g. laptop and aircon)?</li> <li>v. Minimum dress and appearance standards, online bullying and harassment policies.</li> </ul>
<b>Transport</b>	<ul style="list-style-type: none"> <li>i. How to deal with reduction in network demand; should it be a one-off gain to those who still travel to work (and greater efficiency for emergency services/first responders); how has commuter VoT affected these decisions?</li> <li>ii. Revising transport demand forecasting models.</li> <li>iii. Reconsidering transport policy reform (governance, pricing).</li> </ul>
<b>Land use, planning and cities policy</b>	<ul style="list-style-type: none"> <li>i. Corridor reservation.</li> <li>ii. Zoning – new commercial centres in the suburbs.</li> </ul>
<b>Education policy</b>	<ul style="list-style-type: none"> <li>i. Ensure education benefits are maximised and costs minimised through policy changes e.g. pre-recorded lectures from school teachers – more flexibility (teaching from home).</li> </ul>
<b>Digital Economy policy</b>	<ul style="list-style-type: none"> <li>i. Network capacity.</li> <li>ii. Last mile issues (NBN).</li> <li>iii. Competition regulation.</li> <li>iv. Data security and privacy.</li> </ul>
<b>Economic policy</b>	<ul style="list-style-type: none"> <li>i. Fiscal policy.</li> <li>ii. Infrastructure investment (esp. ‘mega-project’).</li> <li>iii. Federal-State financial relations (transport infrastructure grants)</li> </ul>

Source: Tulipwood Economics based on ITLS (2020, 2021), UniSA (2020, 2021), PATREC (2020, 2021), Productivity Commission (2021) and OECD (2020).

## 8.3 WfH policy reform options

It is likely that governments will need to at least consider whether policy changes are required to ‘smooth the way’ for a structural shift to increased WfH if such a shift materialises. The two policy areas that are the main focus of the research project groups work are and ‘transport, land use and cities’ policy and ‘industrial relations’ policy.

### 8.3.1 Industrial relations policy

An increase in WfH is leading legislators and policy makers to consider amending industrial relations laws governing aspects of employer-employee relations and appropriate workplace behaviours to, more effectively, address situations where workforces are not, generally, physically co-located (OECD, 2020b).

In the Australian context, negotiations between employers and employees are essentially voluntary, with minimum standards established by law. There is anecdotal evidence of employees ‘demanding’ a fixed number of WfH days and even of employers ‘demanding’ the same thing, for instance to reduce office overhead costs. In this regard, it would appear that there will be innumerable voluntarily made adjustments to working conditions that will lead to a net gain for both employer and employee.

In a voluntary system, Australian public policy involvement should be limited to:

- reconsidering minimum hours of work and allowable breaks, and minimum standards in relation to OH&S regulations;
- ensuring minimum standards, such as in relation to occupational health & safety, are met;
- considering whether legislation, regulations or standards need to be adjusted to accommodate home access to confidential data (e.g. in hospitals or banks);
- considering whether legislation, regulations or standards to be reviewed and adjusted to, on the one hand accommodate employer needs for worker ‘surveillance’ and, on the other hand, protect workers from excessive surveillance;
- considering whether WfH may require more public services being offered online, which in turn may entail changes to the legal framework, (e.g. notaries accepting digital signatures);
- monitoring any distributional effects (e.g. if those on lower incomes are expected to, but unable to afford, supplying their own office equipment); and
- monitoring the long-term macroeconomic impacts on Australia’s productivity levels and growth rate in a post-COVID environment.

Largely, the role of government at this stage should be to monitor developments, collect information and review current policy settings rather than attempt to micro-manage the transition to WfH. For example, it is important that the Commonwealth Government continue to monitor WfH trends to ensure that the *Fair Work Act 2009* and associated regulations continue to be fit-for-purpose. The Act already provides some employees with a right to request home-based work based on their individual circumstances. This includes for parents of young children, carers, people with a disability, older workers, and people experiencing family violence (Productivity Commission, 2021).

In its work, the UniSA research project group concluded:

*The Australian Fair Work Act 2009 provides employees in the national workplace relations system with a legal right to request flexible working arrangements. Employees need to have worked for the employer for at least 12 months on a full-time or part-time basis. Long term casual employees who have a reasonable expectation of ongoing employment are also eligible. Employees are eligible to request flexible working arrangements in the following circumstances, and employers must seriously consider a request for flexible working arrangements but may refuse on reasonable business grounds. UniSA (2021).*

### 8.3.2 Firm level policies

At the firm level, there are undoubtedly countless policies, processes, and procedures and overall ‘workplace culture’ to consider in light of the increased prevalence of WfH. During interview discussions with survey participants, the UniSA research group found that the transition to WfH was much easier for larger organisations that were able to properly fund the required changes, as well as having in place the pre-established reporting, communication, security, and data-access systems set up. For smaller operations, the costs, efforts, and benefits of setting up new WfH systems are not always clear (UniSA, 2021).

The challenges, for both large organisations and SMEs, include:

- Ensuring home offices are safe workspaces.
  - PATREC found that some organisations requested home workers filled in a compliance checklist and/or provided a photograph of the home workspace, or required an ergonomic assessment.

- Financial incentives for workers to invest in their home office, utilising savings from firms from lower capital and rental costs, for example.
- Investment in worker training, especially for early career workers who may need additional ‘soft skills’ training to realise the full benefits of their knowledge and skills.
- How to pay workers who choose to work at different times of the day, for instance whether to pay ‘out-of-hours’ workers ‘out-of-hours’ rates.
- Maintaining an employee’s mental health and considering how to keep people connected and motivated in the long run.
- Maintaining strong connections with the wider workforce. PATREC found that while respondent firms had systems in place to ensure teams worked well together, there was a need to consider how this could be taken beyond the immediate team and particularly with staff changeover and renewal. (PATREC, 2021).

In its work on the broad economic impacts of ‘teleworking’, the OECD (2020a) made the following recommendations.

- Policies should ensure that teleworking remains a choice so as to prevent remote working arrangements being ‘overdone’ (Figure 2-2).
- The importance of in-person communication especially for complex tasks and innovation implies that too much telework can decrease worker efficiency and long-term productivity growth.
  - The high importance given to clusters of entrepreneurship and the geographical concentration of high-tech firms in the ICT sector (e.g. Silicon Valley), and the role of labs and departments in academia, strongly suggest that sharing the same physical space is essential for innovation.
- Policies targeted towards increasing the capacity for telework of disadvantaged worker groups (e.g. low-skilled, older or rural workers) can help spread the benefits of telework more widely and guard against telework widening the skill and income distribution.
- The adaptability of workers, and thus the efficiency gains stemming from improved worker satisfaction, depend crucially on working conditions while teleworking (e.g. in terms of ICT equipment, office space, or childcare options).
- The reduction in direct oversight may require managers to shift from “a culture of presenteeism to an output-oriented assessment of worker performance”.
- Better managed firms may be better able to establish a trusting relationship between managers and subordinates, making oversight less important in the first place.
- Management can also compensate for the lack of ‘chance encounters’ due to increased telework by deliberately creating opportunities for knowledge sharing, thereby counteracting the potential negative effect of telework on long-term productivity growth.
- Finally, policies should support the provision of access to a fast, reliable and secure ICT infrastructure for firms and workers. The readiness of the ICT infrastructure, which often varies across regions and tends to be less well-developed in more rural areas, is a key pre-requisite for enabling telework and its quality matters greatly for the efficiency of teleworking. (OECE, 2020a), (Figure 8-1).<sup>49</sup>

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<sup>49</sup> NBN Co has already adjusted its timeframes for further investment in the NBN as a result of accelerated demand on the network by changes in the way people began to work, study and communicate in response to the global health crisis. Announced in 2020 through its Corporate Plan (2021-24), NBN Co is investing \$4.5 billion, including \$3.5 billion to enable 8

**Figure 8-1 Firm-level policies to facilitate greater WfH, OECD summary**

Disseminate best management practices	Facilitate an optimal level of teleworking	Provide an appropriate working environment from home	Provide fast, reliable and secure ICT infrastructure
Promote 'right to telework' and 'right to disconnect'			Consider additional data protection regulation to ensure privacy rights
Information campaigns and management training	Offer bilateral tax agreements	Stimulate company-provided allowances for home office	Fund relevant research, e.g. Virtual Reality
Stimulate investments in ICT infrastructure and ICT upgrades			
	Increase digital capacity of public sector, e.g. to showcase benefits of telework and facilitate remote work	Reassess supportive infrastructure, e.g. promote childcare being offered closer to home	
	Promote co-working spaces across the country		
	Promote investments in required skills, e.g. through online learning		

Source: OECD (2020a).

### 8.3.3 Transport, land use planning and cities policy

The most active policy area in relation to WfH in the next few years may be in transport, land use planning and cities policy, especially at the state government level. The advent of an effective and trusted COVID vaccine and the shift away from mandatory social distancing towards a voluntary hybrid model of working will give rise to many complex policy questions at the nexus of transport network funding and financing and land use planning in our largest and densest capital cities.<sup>50</sup>

This broad policy area involves all three levels of government in the Australian Federation, however most of the responsibility is held by the large state government transport bureaucracies. The policy area is at times beset by the uncertainties of Federal-State financial relations, which can often be in conflict over major infrastructure project decisions, and their funding, for example.

The ITLS research group considered the implications for transport and land use planning policy and identified a “growing number of structural responses that should be given serious consideration, which will have a direct or indirect impact on congestion and crowding” in a post-COVID world (Hensher, Beck, Nelson & Balbontin, 2022). There are a number of open policy questions that will require the further “serious consideration”.

- Should transport policy makers ‘bank the benefits’ of WfH in terms of the reduction in congestion and crowding or, alternatively, ‘bank the benefits’ of reduced planned infrastructure investment and annual operating and maintenance expenditure, saving the taxpayer but allowing congestion and crowding to creep back to pre-COVID levels?
- Should governments ‘back in’ the structural adjustment of the labour market away from the CBD and into the suburbs? ITLS identified the potential for the revitalisation of suburban areas

million premises or 75 per cent of NBN fixed-line premises to be able to order ultrafast services of 500 megabits per second up to 1 gigabit per second speeds by 2023; \$700 million for business fibre initiatives; and a \$300 million co-investment fund for regional areas. NBN Co is also committed to investing in, and innovating with the NBN fixed wireless and satellite networks to further improve performance and customer’s experience.

<sup>50</sup> As of 15 December 2021, 89.5% of Australians over 16 years were fully vaccinated (i.e. received a double dose). The ACT (>99.0%), NSW (93.2%) and Victoria (91.8%) had vaccination rates over 90% while all other state and territories had vaccination rates over 80%.

in our major capital cities that already resemble mini-CBDs. These locational adjustments of WfH align well with promoting the 20 or 30 minute city, which remains a challenge given a strong radial and CBD focussed strategy in many cities. That said, ITLS highlight that one potential downside of this change will be potentially greater congestion at the local level in contrast to the longer trip setting.

- Another option that may balance the benefits and costs of more WfH could be to work in a local shared or satellite office, often referred to as the ‘third office’ or neighbourhood business hub. This has the advantage of supporting ‘working close to home’ (WCTH) (reduced time spent in travel), but not at home with all of its accompanying limitations such as lack of social interaction, and poor space to work effectively without interruptions from, or interrupting, other family members.
- The ITLS research project team also highlight the implications of a significant reduction in domestic business air travel, replacing for example, the Sydney to Melbourne return flights (typically 4 hours out of the day) to attend a one-hour meeting with an online meeting. This may translate into a growth in local non-commuting activity with time freed up. This growth is already being witnessed in regional aviation travel, with State border closures contributing to increased tourism to regional locations that are, for some people, too far away to drive for a short getaway.
- ITLS argues that, with a greater focus on local activity, there will be a need to reprioritise improvements in local public transport, safer pedestrian walkways and precincts, and bicycle lanes, serving short trips throughout the day, with the added benefit of improving first and last mile connectivity to public transport and (hopefully) contributing to improved health outcomes through greater physical activity.
- Further, local road amenity and safety may also need to be revisited, with a greater focus on localised maintenance and traffic control measures to cope with a potential change to localised traffic flow.

Overall, the ITLS research project team argues that:

*With fewer days commuting, we can expect to see a greater use of the private car in general, but specifically for commuting, since commuters who were previously public transport users might be more prepared to put up with traffic congestion and parking costs for two to three days a week, but not necessarily for five days. This has important implications for public transport patronage, and indeed may require a rethink of the structure of fares (beyond a peak and off-peak differentiation) and local on-demand services. This also has impact for travel demand management measures typically in use to reduce congestion. (Hensher, Beck, Nelson and Balbontin, 2022).*

## 8.4 Conclusions

Arguably, the global COVID pandemic interrupted Australian life more than at any time since the Second World War and gave rise to an unchosen ‘policy challenge’ for millions of Australian workers, and their families, friends and housemates. In June 2021, the ABS found one-third of Victorians and almost one-quarter of Australians (excluding Victoria) believed that it will take more than a year for life to return to normal (ABS, 2021).

While the pandemic forced change without choice for almost all individuals and households, it has resulted in both positive and negative, short- and long-term, intended and unintended, consequences. This suggests that policy makers should continue to support the positive consequences of the social distancing (and other) policies while being vigilant to the potential short- and long-term negative impacts. Continued monitoring of the structural adjustments resulting from the COVID period are

essential, especially in relation to worker wellbeing and productivity, as questions remain around the long-term impacts of social connectedness, training, collaboration, and ideas generation (see Chapter 9 Recommendations).

The long run implications for land use planning and cities policy will take time to play out. Outside of inner urban areas, Australian cities are zoned in such a way that suburbs (or collections of suburbs) are mini-circular cities, with a 'centre' where all the retail outlets, offices, medical centres and so on are in a 'periphery' which is entirely made up of residential housing. If more people are spending time at home, there may be increased demand for suburban cafés and smaller grocery shops, allowing home-workers to pop out and get a coffee as they would in the CBD. That is the typical pattern in much of continental Europe and seems to work well, especially in those urban areas of high density. For this pattern to materialise, changes to state and local government land use and planning policies will be required, otherwise existing policies may act as a barrier to the increased prevalence of working from home.

For over a century, public policy has been designed within a framework whereby the workplace was separate from the home for almost all workers. But under the hybrid model of working up to one-half of the Australian labour force will complete up to one-half of their job tasks away from the workplace. And, around these averages, the range across industries and occupations is wide – from those 'frontline workers' unable to WfH at all to those who will not be required to set foot in their traditional office. In a voluntary system, productivity would be expected to be higher in the long-term since only mutually beneficial arrangements would be agreed to by employers and employees.

While it's important to remain vigilant across several policy areas, by and large Australia's policymaking framework and policy settings are flexible enough to handle the increased prevalence of working from home. The most important task for government is to support the free voluntary negotiations between employers and employees while at the same time continually monitoring changes in work and firm level productivity and individual and household wellbeing.

Moreover, governments must continue to monitor the performance of transport networks to efficiently meet the needs of commuters and non-commuters, on suburban-CBD routes as well as within Australia's suburbs. In this regard, understanding the changing nature of a commuter's 'opportunity cost of time' is important as it informs the monetary value of travel time savings and avoided commutes.

Finally, governments must maintain an adherence to economic efficiency, flexibility and resilience, but at the same time ensure that policies are in place to address any distributional (equity) issues that may arise as a result of the shift to more working from home. There is clear evidence in the surveys of employers and employees, that potential distributional issues are lurking in the transition to more working from home.

The ITLS research group sums up the issue:

*In summary, the liminal threshold imposed on society by the COVID-19 pandemic provides an opportunity to allow decision-makers to take a hard look at the assumptions being used pre-COVID-19 that underlie many of the decisions made on transport and land use futures. Doing this offers a real opportunity for sustained change that many have been seeking. COVID-19 has brought us all together and the future must be seen as an all of society commitment. The pandemic has hastened existing trends rather than created new trends. We have to 'design' the future for wellness, choice, ease, connection and meaning with the 'new normal' focussed on improved connectedness (in contrast to social distancing) and agile development space ensuring greater happiness and wellbeing. Taming congestion and crowding should be aligned with these*

*aspirations. The strongest message is to reach for a new normal that is a better normal that becomes the new real. (Beck & Hensher, 2021b).*

## 9. Recommendations

### 9.1 Introduction

A number of policy recommendations have been developed based on the findings of the four research project groups as well as considering the potential costs, benefits, risks and barriers to WfH in a post-COVID world (set out in Chapter 2). In general, the role of public policy in relation to WfH should be to:

- Encourage technological innovation, workplace productivity and more fully engage the total available labour force;
- Achieve full employment, to meet both economic and social goals<sup>51</sup>;
- Support the voluntary bargain between employers and employees, whether individually or collectively; and
- While meeting the above three objectives, at the same time ensure that, as a result of moving to more WfH, individual workers or particular groups of workers are not severely disadvantaged or exploited, and that the minimum reasonable working conditions as set out in the *Fair Work Act 2009* and other legislation are met by employers.

Given these broad objectives, the following recommendations are made.

#### **Recommendation 1: Transport network infrastructure investment and public transport**

The move to government-mandated WfH over significant periods of time in 2020 and 2021 has, to some extent, scrambled pre-COVID transport demand projections. The ongoing validity of these pre-COVID projections will depend on the degree to which the reduction in transport demand proves to be transient or permanent. While there are some indications that the demand for public transport may be reduced, that there may be a shift between preferred modes of transportation, or that the time profile of transport demand may change, such outcomes are by no means guaranteed. Predicting transport use has become significantly more uncertain, particularly over a longer-term time horizon when pandemic health concerns (e.g. biosecurity concerns about PT) may subside.

The ITLS research group advised that:

*With reduced commuting activity associated with an expected 1 to 2 days working from home for many occupations and industries, associated with releasing commuting time to spend on other activities including changed levels and patterns on non-commuting travel, it is necessary, indeed essential, to allow for the incidence of working from home in integrated strategic transport and location model systems. (Hensher, Wei and Lui, 2021).*

It follows that governance arrangements for transport planning and investment processes need to be strengthened to address the scope for potentially very costly mistakes, in particular:

- Given the uncertainty around post-COVID private vehicle and PT demand, especially on major routes to capital city CBD's and inner-city areas, stronger 'gateway' review processes should be

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<sup>51</sup> Full employment in Australia is, generally, considered to be achieved at an unemployment rate of 5%. This level of the 'natural rate' of unemployment may change because of the impacts COVID and WfH on labour supply, as more potential workers are able to enter the labour market.

put in place to withhold approval for transport infrastructure projects – irrespective of transport mode – whose benefits do not exceed their costs:

- Passenger and transport demand forecasts should be reviewed by state transport departments and revised to assess the implications of changed trends as a result of changed working practices. This may mean testing the viability of projects under a variety of scenarios to capture the range of uncertainties that exist.
  - If these come to pass, permanent (i.e. structural) post-COVID reductions in PT demand (relative to previous forecasts) will, all else equal, result in relatively lower levels of public benefits from mass-transit projects directed at moving people between suburbs and CBDs. On the other hand, the ITLS research group concluded that the value of time had risen – implying congestion imposes higher social costs, and offsetting at least some of the impact of reduced demand on the optimal level of infrastructure investment.
  - Irrespective of changes in WfH arrangements, it should be recognised that there are substantial differences across states/jurisdictions, reflecting (historical) differences in land-use and transport networks and services, as well as COVID-19 related status and measures. The need for PT investment, including PT in the multi-modal chain, is therefore likely to vary locally and regionally.<sup>52</sup> Overall, determining the implications of voluntary WfH for the future demand for different modes of PT is likely to require significantly more research.
  - Relatedly, if it emerges that there is a permanent impact of WfH on the shape of the transport task, all state and territory governments should reappraise their Origin-Destination (OD) matrices and other categorisations of travel demand prior to any future investments in physical transport infrastructure.
  - Any investments in physical transport infrastructure in the future should include an additional sensitivity test to consider the relative merits of alternative, or parallel investments in digital infrastructure.
- Infrastructure review bodies (such as Infrastructure Australia or its state counterparts) should carefully review the demand forecasts underpinning proposed transport infrastructure investments submitted in the future. This is not to say that public investment in transport infrastructure, or PT in particular, should be reduced. Rather, given the uncertainty around future transport demand and the opportunity cost of public resources, new projects should be reviewed in light of the potential structural changes in the Australian labour market and, as a consequence, transport demand, outlined in this report.

## **Recommendation 2: Industrial relations flexibility**

The Commonwealth Government should consider the suitability of the provisions of the *Fair Work Act 2009* to support voluntary agreements in respect of the extent and nature of working from home and propose changes where necessary.

## **Recommendation 3: Digital infrastructure**

Experience during the lockdowns highlighted the pivotal role of digital infrastructure in establishing access to WfH and other flexible work patterns. As a result, estimates of the potential value of investments in digital infrastructure may need to be adjusted, possibly resulting in a stronger case for investments which strengthen digital networks in the areas where it is most likely to be used.

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<sup>52</sup> For instance, PATREC indicate that in relation to WA, local conditions and the relatively low mode share for public transport, supports investment in public transport, rather than reductions in investment.

- This may not be new infrastructure spending but a diversion from other infrastructure outlays coming out of a review of future transport infrastructure investments.

As households transition to more flexible ways of working and data-intensive activities (e.g. video streaming) are used more heavily, their communications requirements will also change.

- The ACCC should continue to monitor the performance of Australia’s communications industry and report in its annual Communications Market Report on the effectiveness of the measures adopted through the COVID period to ensure the sector maintains efficiency and supports increased data needs at least cost to the Australian community.
- In its ongoing monitoring of the communications industry, the ACCC should also report to the Commonwealth Government on the minimum viable standards of service that would ensure that housing location is not a predeterminant of the ability to WfH.<sup>53</sup>

### **Recommendation 4: WfH Standard Industry Code of Practice**

Without direct government involvement and without limiting firm-level flexibility, employer and employee representatives in occupations where WfH is likely to be common in the post-COVID period should consider developing a standard code of practice that could be voluntarily adopted in cases where that adoption would be less costly than developing bespoke codes by industry or occupation. The code would establish standard WfH conditions in relation to:

- Minimum work hours across standard time periods;
- Dress and appearance standards (for video conferencing);
- Who pays for capital equipment (laptop, screen, printer etc); and
- Who pays for home energy consumption (e.g. air-conditioning).

### **Recommendation 5: Government employment**

The Commonwealth, and State and Territory governments, should review the feasibility of increasing the prevalence of WfH for ‘office-based’ public servants where this offers real gains in productivity. The review should consider:

- Potential net financial savings to the taxpayer;
- Worker and workplace productivity;
- Early career training and mentoring opportunities; and
- Information security issues.

### **Recommendation 6: Ongoing review of WfH**

State transport departments should undertake annual surveys for at least the next two years and report on:

- the extent of the permanent (or structural) adjustment towards working from home by occupation, geographic and socioeconomic characteristics; and
- identify the scale of permanent change to:
  - Commuting and non-commuting demand;

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<sup>53</sup> Under Part 19 of the *Telecommunications Act 1997*, Statutory Infrastructure Providers (SIP) are required to connect premises and provide wholesale services that support minimum broadband speeds (of 25/5 mbps). NBN Co is the default SIP for all parts of Australia, but other carriers may be SIPs in particular areas (such as where they have rolled out infrastructure in new developments). See: <https://www.acma.gov.au/statutory-infrastructure-provider-regime>

- PT demand;
- Planned transport network investment;
- Environmental impacts; and
- Impacts on transport, land use and planning and cities policy.

### **Recommendation 7: Productivity**

The Commonwealth Government should assess the economic impacts of the mandatory shift to WfH during the COVID period (2020 and 2021) on Australia’s productivity performance, including:

The likely trends in WfH in the post-COVID environment and those trends likely impacts on Australia’s productivity levels.<sup>54</sup>

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<sup>54</sup> The Productivity Commission released a research paper Working from Home on 16 September 2021. Accessed here: <https://www.pc.gov.au/research/completed/working-from-home>

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# Appendix A Summary of findings, by research stream

**Table A- 1 Capacity to Work from Home, by research project group**

Research stream	Capacity, by Industry	Capacity, by Occupation	Regional analysis
<b>ITLS</b>	<ul style="list-style-type: none"> <li>Average days WfH, by industry (at Wave 3):-</li> <li>Information, Media and Telecommunications (6.1 days).</li> <li>Finance and Insurance services (5.9 days).</li> <li>Health Care and Social Assistance (1.1 days).</li> <li>Accommodation and Food services (0.8 days).</li> </ul>	<ul style="list-style-type: none"> <li>In its Wave 3 survey (August-October 2020), 29% of respondents indicated that all their work could be done from home, and a further 33% indicated that some of their work could be done from home.</li> </ul>	<ul style="list-style-type: none"> <li>In research focussed on Greater Sydney Metropolitan Area:-</li> <li>75% of Managers and 68% of Professionals were either directed or given the choice to WFH.</li> <li>0% of Labourers and Machine Operator and Drivers were offered the opportunity to WfH.</li> </ul>
<b>UniSA</b>	<ul style="list-style-type: none"> <li>Greatest capacity to WfH: Information Media and Telecommunications (95%), Financial and Insurance Services (90%).</li> <li>Lowest capacity to WfH: Health Care and Social Assistance (34%), Accommodation and Food Services (32%).</li> </ul>	<ul style="list-style-type: none"> <li>Greatest capacity to WfH - white collar jobs (Professionals (74%), Managers (70%)).</li> <li>Lowest capacity to WfH - blue collar jobs (Labourers (25%), Machinery Operators and Drivers (26%)).</li> <li>More white-collar employees would like to continue working from home into the future.</li> </ul>	<ul style="list-style-type: none"> <li>ACT (57%), New South Wales (43%) and Victoria (42%) are above the nation average (41%) in terms of proportion of labour force that could work from home.</li> <li>Past, present and future uptake are all higher for employees working in the CBD by roughly 20-30%, when compared to employees working outside the CBD.</li> </ul>
<b>PATREC</b>	<ul style="list-style-type: none"> <li>WfH arrangements were most prevalent in the Information, Media &amp; Telecom (only 17% had to be done in workplace)</li> <li>Transport, Postal and Warehousing was least prevalent (85% had to be done in the workplace)</li> </ul>	<ul style="list-style-type: none"> <li>Professionals (42.5%) and Managers (40.8%) were most able to work within a hybrid employment structure where work was split between the office and home</li> <li>76% of Machinery Operators and Drivers had to work on site</li> </ul>	<ul style="list-style-type: none"> <li>PATREC research was focussed Western Australia.</li> </ul>

**Table A- 2 Prevalence of WfH during COVID, by research project group**

Research stream	Findings
<b>ITLS</b>	<ul style="list-style-type: none"> <li>▪ In Wave 1, the frequency of working declined, from 58% pre-COVID to 38% during COVID.</li> <li>▪ Number of people working zero days from home dropped from 70% pre-COVID to 40% at Wave 1.</li> <li>▪ The pre-COVID average WfH per week was 0.86 days; 2.4 days during Wave 1; 1.7 by Wave 2.</li> <li>▪ Workers WfH 5-days per week almost quadrupled from 7% pre-COVID to 30% at Wave 1.</li> <li>▪ WfH was more prevalent among higher incomes and/or those middle-aged.</li> <li>▪ Regional areas were less able to WfH (46%) versus metropolitan areas (32%).</li> <li>▪ Days WfH at Wave 2:-</li> <li>▪ Manager (4.3 days), Professional (2.7 days); Technician &amp; Trade (1.5 days); Community &amp; Personal services (0.1 days).</li> </ul>
<b>UniSA</b>	<ul style="list-style-type: none"> <li>▪ 17% of job tasks were done remotely before the pandemic, and 31% at the peak of the pandemic.</li> <li>▪ White-collar occupations (4.2 days) WfH significantly more than blue-collar occupations (1.5 days).</li> </ul>
<b>PATREC</b>	<ul style="list-style-type: none"> <li>▪ Average number of days per week (7-day week) respondents worked from home only (i.e. no commute trip made) increased from pre-COVID (2.71) to ‘past week’ (3.09), a 14% increase in WFH practices.</li> <li>▪ WfH increased and commuting decreased compared to the pre-COVID-19 period, particularly for ‘flexible’ occupations and industries.</li> <li>▪ Industries most amenable to WfH were Electricity, Gas, Water and Waste Services; Information, Media and Telecommunications; Wholesale Trade; Financial and Insurance Services; Professional, Scientific and Technical Services.</li> <li>▪ Occupations that had the highest prevalence of WfH (Managers and Professionals) also had the lowest commute rate (3.86 commute days per week). Those in the frontline occupations had the highest commute rate (4.11 commute days per week).</li> <li>▪ Roughly 50% of Managers and Professionals transitioned to complete or partial WfH arrangements.</li> </ul>

**Table A- 3 Employer and employee preferences, by research project group**

Research stream	Employer preferences	Employee preferences
<b>ITLS</b>	<ul style="list-style-type: none"> <li>▪ 50% said work cannot be done from home.</li> <li>▪ 19% prefer those who currently WfH to return to the office full-time.</li> <li>▪ 14% support WfH as often as the employee likes.</li> <li>▪ 14% support balance of WfH and in office.</li> <li>▪ 23% of employers indicate that productivity has increased a little (17%) or a lot (5%), with 53% suggesting no change.</li> </ul>	<ul style="list-style-type: none"> <li>▪ 31% said work cannot be done from home.</li> <li>▪ 11% prefer those who currently WfH to return to the office full-time.</li> <li>▪ 34% support WfH as often as the employee likes.</li> <li>▪ 23% support balance of WfH and in office.</li> <li>▪ 39% of employees indicate that productivity has increased a little (26%) or a lot (11%), with 29% suggesting no change.</li> <li>▪ 30% report a little less productivity, and 4% report much less.</li> </ul>
<b>UniSA</b>	<ul style="list-style-type: none"> <li>▪ Not every business can pivot to working from home practices.</li> <li>▪ There needs to be a critical mass to enact long-term changes.</li> <li>▪ Working from home was not seen to have an impact on productivity.</li> <li>▪ Work is not just about productivity it is about working with others (co-workers and clients).</li> <li>▪ The best and most likely strategy will be to embrace the “hybrid workplace”, that is a combination of WfH and working in the office.</li> <li>▪ Over 50% of both employees and managers agree that WfH will not have an impact on the ability to achieve job objectives and outputs, most likely due to the increased flexibility afforded by remote working, and the ability to work longer hours if necessary.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Nearly 90% of staff would like to continue to WfH at least 2 days a week.</li> <li>▪ Some staff have mentioned that they have much better work/life balance and fewer commute times have been cited regularly.</li> <li>▪ Some staff mentioned increased costs of WfH, which were covered while the allowance of \$40/month was provided (now removed).</li> <li>▪ 50% of the employees reported a significant decline in both quantity and quality, 25% reported a significant increase, and the remaining 25% reported no significant difference in productivity.</li> </ul>
<b>PATREC</b>	<ul style="list-style-type: none"> <li>▪ WA’s first lockdown saw a major shift to WFH practices, and a need by businesses to equip and support staff to do so.</li> <li>▪ There has been a significant acceleration of WFH practice with almost all businesses now practicing a hybrid WFH model.</li> <li>▪ Work from home was more suited to certain types of tasks, rather than being distinguished by occupation or industry type.</li> <li>▪ More critical, was the need for regular work-based social connection to build the workplace culture of the organisation.</li> <li>▪ Performance has not suffered as a result of WFH and has built confidence that WFH is effective.</li> <li>▪</li> </ul>	<ul style="list-style-type: none"> <li>▪ Hybrid workers reported a higher level of scheduling autonomy and vigour.</li> <li>▪ Employees working primarily at the workplace benefit from higher levels of colleague support than hybrid or home workers.</li> <li>▪ No significant differences were revealed in participant’s general wellbeing.</li> <li>▪ Hybrid workers experienced lower loneliness than those working primarily from the workplace.</li> <li>▪ Productivity was predicted by colleague support and a moderate workload.</li> </ul>

**Table A- 4 Transport demand and concerns about travel, by research project group**

Research stream	Travel demand and concerns	Cost and time savings
ITLS	<ul style="list-style-type: none"> <li>▪ Trips per week declined from 24 per week pre-COVID to 11 per week in Wave 1, before stabilising at around 15 by Waves 2 and 3 (except for Victoria).</li> <li>▪ Train travel was 92% below pre-COVID levels and bus travel 78% lower.</li> <li>▪ Pre-COVID, 5% were extremely concerned about public transport hygiene. During Wave 1, over 50% were extremely concerned. By Wave 3, under 30%.</li> <li>▪ Over 50% were moderately or extremely concerned about crowding on public transport.</li> <li>▪</li> </ul>	<ul style="list-style-type: none"> <li>▪ In terms of annual cost savings:</li> <li>▪ the weighted average of car and PT monetary costs declined from \$2,105 to \$461, or by 78%.</li> <li>▪ the weighted average of car and PT time costs declined from \$5,841 to \$2,686, or by 54%.</li> <li>▪ taken together, total generalised costs declined from \$7,946 to \$3,147 or by 60%.</li> <li>▪ Estimated annual cost reduction for car commuters in the GSMA: \$1.970 billion for monetary costs; \$2.894 billion for time cost; and \$4.864 billion in total generalised cost.</li> <li>▪ In terms of time savings: of the average 1 hour per week saved from avoided commuting, almost half the time (47%) is allocated to leisure, 29% allocated to paid work and 23% to unpaid work.</li> </ul>
PATREC	<ul style="list-style-type: none"> <li>▪ Daily traffic volumes across the Perth CBD dropped by 40% (first lockdown) and by 60% (second lockdown).</li> <li>▪ Public transport patronage in Perth dropped by 80% (first lockdown) and by 40% (second lockdown).</li> <li>▪ The Wave 1 study in Perth found:</li> <li>▪ The average number of commute days per week decreased from pre-COVID-19 (4.31 days) to 'last week' (3.96 days).</li> <li>▪ Across the week, the busiest commuting day is Wednesday, and AM peak commuting, compared to other times of the day.</li> <li>▪ 2.9% of respondents worked from home only in the "past week" and 21.3% travelled to work at least one weekend day</li> <li>▪ Main mode of transport on typical commuting day – car driving increased from pre-COVID (70.6%) to "last week" (72.9%) and public transport decreased from 19.3% to 17.3%; walking increased from 1.9% to 3%</li> <li>▪ Choice of commuting mode – 61% of respondents choose the fastest mode, with only 1.1% reporting fear of contamination.</li> <li>▪ Impacts of compulsory mask-wearing on use of public transport - 52% of respondents were not deterred at all, 30% to a limited extent, and 18% to a large extent.</li> </ul>	<ul style="list-style-type: none"> <li>▪</li> </ul>

Research stream	Travel demand and concerns	Cost and time savings
	<ul style="list-style-type: none"> <li>▪ Number of monthly online deliveries for households increased from 1 to 1.15 (groceries), and 1.97 to 2.26 (other).</li> </ul>	

## Appendix B ITLS Data description, by survey wave

	Wave 1	Wave 2	Wave 3	Wave 4
<b>Total Sample</b>	1074	1457	956	2019
<b>Number of workers</b>	714	916	742	1149
<b>Female</b>	52%	58%	58%	59%
<b>Age</b>	46.3 ( $\sigma = 17.5$ )	48.2 ( $\sigma = 16.2$ )	48.2 ( $\sigma = 16.2$ )	48.3 ( $\sigma = 17.6$ )
<b>Median Income</b>	Household = \$92,826 ( $\sigma =$ \$58,896)	Household = \$92,891 ( $\sigma =$ \$59,320)	Personal = \$62,551 ( $\sigma =$ \$46,964)	Personal= \$61,410 ( $\sigma =$ \$47,500)
<b>Have children<sup>55</sup></b>	32%	35%	35%	32%
<b>Number of children</b>	1.8 ( $\sigma = 0.8$ )	1.7 ( $\sigma = 0.9$ )	1.8 ( $\sigma = 0.8$ )	1.79
<b>Occupation for those working:</b>				
<b>Manager</b>	1%	2%	14%	16%
<b>Professional</b>	38%	35%	28%	27%
<b>Technician &amp; Trade</b>	5%	6%	6%	5%
<b>Community &amp; Personal Services</b>	8%	10%	10%	10%
<b>Clerical and Administration</b>	17%	17%	22%	20%
<b>Sales</b>	23%	22%	11%	10%
<b>Machine Operators / Drivers</b>	2%	2%	4%	5%
<b>Labourers</b>	5%	5%	7%	6%
<b>State</b>				
<b>New South Wales</b>	22%	32%	31%	44%
<b>Aust. Capital Territory</b>	2%	2%	1%	1%
<b>Victoria</b>	28%	24%	24%	2%
<b>Queensland</b>	22%	18%	22%	43%
<b>South Australia</b>	11%	11%	9%	4%

<sup>55</sup> Our survey reports whether a household has children or not, whereas the ABS only provides a definition of a family and includes households without children in that composition.

Western Australia	11%	10%	10%	4%
Northern Territory	1%	1%	1%	0%
Tasmania	2%	3%	1%	1%
	Wave 1	Wave 2	Wave 3	Wave 4
Total Sample	1074	1457	956	2019
Female	52%	58%	58%	59%
Age	46.3 ( $\sigma = 17.5$ )	48.2 ( $\sigma = 16.2$ )	48.2 ( $\sigma = 16.2$ )	48.3 ( $\sigma = 17.6$ )
Median Income	Household = \$92,826 ( $\sigma = \$58,896$ )	Household = \$92,891 ( $\sigma = \$59,320$ )	Personal = \$62,551 ( $\sigma = \$46,964$ )	Personal = \$61,410 ( $\sigma = \$47,500$ )
Have children <sup>56</sup>	32%	35%	35%	32%
Number of children	1.8 ( $\sigma = 0.8$ )	1.7 ( $\sigma = 0.9$ )	1.8 ( $\sigma = 0.8$ )	1.79
Occupation for those working:				
Manager	1%	2%	14%	16%
Professional	38%	35%	28%	27%
Technician & Trade	5%	6%	6%	5%
Community & Personal Services	8%	10%	10%	10%
Clerical and Administration	17%	17%	22%	20%
Sales	23%	22%	11%	10%
Machine Operators / Drivers	2%	2%	4%	5%
Labourers	5%	5%	7%	6%
State:				
New South Wales	22%	32%	31%	44%
Aust. Capital Territory	2%	2%	1%	1%
Victoria	28%	24%	24%	2%
Queensland	22%	18%	22%	43%
South Australia	11%	11%	9%	4%

<sup>56</sup> Our survey reports whether a household has children or not, whereas the ABS only provides a definition of a family and includes households without children in that composition.

<b>Western Australia</b>	11%	10%	10%	4%
<b>Northern Territory</b>	1%	1%	1%	0%
<b>Tasmania</b>	2%	3%	1%	1%