

Centre for People,
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**Work Uncertainties and Futures in the Regions:
Implications for Jobs, Work and Employment**

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Table of Contents

1	Introduction	1
2	Debates	3
2.1	The Future: Work, jobs, employment	3
2.2	The Region	4
2.3	Summary	6
3	The Quality of Work	7
3.1	Good and Bad Jobs.....	7
3.2	Work, Jobs, and Employment	8
3.2.1	The Digitisation of Work.....	8
3.2.2	A Renewed Division of Labour	9
3.2.3	Changing Modes of Employment	10
3.3	Complications	12
3.3.1	Changing Workplaces.....	12
3.3.2	Prospects for New Jobs.....	13
3.4	Implications.....	14
4	The Future of Work in the Regions.....	15
4.1	Regional Labour Markets.....	16
4.1.1	A Platform Economy?	16
4.1.2	Regional Information Technology	17
4.1.3	Regional Careers	18
4.2	Summary	19
5	Conclusion.....	21
6	References	22

1 Introduction

The purpose of this work package is to investigate the core features of an analysis of work, jobs and employment in sub-national regions. This analysis is guided by the proposition is that a region's prosperity and adaptability, as well as capacity to change is influenced and shaped by:

- Economic structures, competitiveness and innovative capabilities of firms, and the relational linkages that define value chains across and beyond a region.
- Workforce skills and entrepreneurial capacities
- Regional governance arrangements and capacities for locally focused policy bodies to deploy resources and develop effective measures in relation to the regional economy (Martin, 2012: 13).

At the same time, there are changes taking place in relation to the patterns and trends in work more generally, and this shift has implications for available jobs and the employment patterns in a region.

The context for the analysis is that patterns of work, jobs and employment are changing, a subject of extensive debate (eg., Acemoglu and Restrepo, 2017; Spencer 2018; Warhurst and Hill 2019). These changes take place in the context of a history of relatively stable sets of employment relations, with a distribution of jobs that reflect these arrangements. This debate has relevance when discussing sub-national regions, particularly in relation to the spatial implications of transition from one set of arrangements to another.

One influential debate is about the future of work (eg., Stanford, 2020). This focus has addressed the remaking of work in the current moment. Three key points can be made. First, one set of themes address the ways in which technological innovation in the form of automation, machine work and artificial intelligence systems are or may shape work (West 2018; Furrer et al. 2018). A related aspect draws attention to the ways that digital technologies are being used in a range of ways to shape work, for example on-line platforms (Frey and Osborne, 2017). Second, there appears to be a major restructuring underway, so that the increase in jobs and employment tends to be in the service and information sectors and no longer in the production and resourcing of material goods (OECD, 2019a and 2019b). Third, there has been a major erosion of employment contracts that rest on a 'standard employment relationship' with the consequent development of precarious forms of employment (Standing, 2014). The challenge is to explain how such developments impact (as challenges and opportunities) on regional labour markets, drawing attention to jobs and employment relations (eg., Stewart and Stanford, 2017).

We use a political economy perspective on regional capacities to address jobs, work and employment. The focus is on the constellation of local employer capabilities, workforce capacities, government policies. Such an investigation includes a consideration of the ways in which different stakeholder groups within a region

pursue and promote specific policies and practices across a region (cf., Martin, 2012). Thus, the work package lays out the core dimensions of an analysis of work, jobs and employment in Australian regions.

2 Debates

Analyses on work, jobs and employment tend to be in relation to sectors rather than regions (eg., OECD, 2019a and Standing, 2014). Such a focus means that discussion about the uncertainties and the ways in which transition may take place lack a spatial dimension, with some exceptions (eg. Ellem, 2016).

2.1 The Future: Work, jobs, employment

Work has changed in recent decades. Industrial and occupational profiles have shifted, particularly due to a decline in manufacturing and machinery operations, and an increase in health, education and household services (see Reserve Bank of Australia 2019; Toner & Douglas 2020). Associated with these changes is an increase in part-time and casual work, and increased female and older person participation rates.

The impact on labour markets is stark, with pressure on the construction and organisation of labour markets. These pressures involve technological impacts on and innovations in relation to the content of work. Put baldly, there is an emphasis on skills, particularly digital skills, and a concurrent process of de-skilling, especially in areas where there is a transition from established and traditional work skills to less skilled work and jobs (OECD, 2019a). These pressures draw attention to what has been termed the 'Future of Work'. In large part this refers to considerations of how the increased digitisation of systems and processes will affect jobs, work and employment in the forthcoming years (ILO, 2018).

These developments and the complications that are involved are addressed by Warhurst and Hill (2019: 1). They list three ways in which digitisation will change work:

- digitally-enabled machines with artificial intelligence (AI);
- the digitalisation of processes enabling enhanced possibilities of processing, storage and communication of information; and,
- the use of digital networks to coordinate economic transactions with algorithms through platforms.

These impacts are broad in their effect, with implications not only for the tasks entailed within work but also how people are employed and as explored in this report, where they are employed. Although, to date, these developments do not seem to have led to increased joblessness (Atkinson and Wu, 2017), but they may be associated with an increase in underemployment.

Such shifts have been termed as part of the 4th Industrial Revolution, a term used to describe the social, economic and physical effects of the introduction of technologies, particularly digital, into these realms (Davies 2015; Skilton & Hovsepian 2017). Industrie 4.0, a subset of the 4th Industrial Revolution, relates to production, thus it is also referred to as the 'smart factory' or 'advanced manufacturing' (eg., Kang *et al.*, 2016). This process involves the application of information and communication technology (ICT) to digitise information and integrate systems at all stages of product

creation and use (including logistics and supply), both inside companies and across company boundaries (Davies 2015: 2-3).

To explore the ways in which these processes may play out where we work, it is necessary to be clear about the analytic specificity of work, jobs and employment. The challenge is that most analyses focus on one or the other without drawing out the implications for analysis of such distinctions and hence blur the different dimensions of engagement in labour markets (eg., Paus & Ford, 2018). This Such a distinction matters when looking at the spatial question of where we work.

The task is to draw a distinction between work, jobs and employment so that the relevance of digital impact on the one had can be specified and place of work, on the other. Warhurst and Hill (2019: 2) draw these distinctions in considering the future of work, noting “new digital technologies can impact both work and employment, and policy measures need to address both”.

Hence:

Job refers to a position, a specific occupation, whereby a person undertakes a piece of work for an agreed price. It applies to any work in an organisation and comprises a set of functionally related tasks and implies a role in some sort of work environment. In the definitions included here, work and employment are aspects of jobs.

Work refers to the tasks and activities to realise a goal, providing a service, making something, enabling an output. As defined by the ILO (2013, p. 2): ‘Work comprises any activity performed by persons of any sex and age to produce goods or to provide services for use by others or for own use’.

Employment refers to a relationship whereby a person is either an employer or an employee, defined by a wage relationship. These arrangements draw attention to hours of work, levels of payment and forms they may take, arrangements involving health care, occasionally housing. As defined by the ILO (n.d., p. 1): ‘Employment comprises all persons of working age who during a specified brief period, such as one week or one day, were in the following categories: a) paid employment (whether at work or with a job but not at work); or b) self-employment (whether at work or with an enterprise but not at work)’.

These definitions align with commonly used in research on labour markets (e.g. Dubin 1958; Kaufman 2004). The question is how do these dimensions of the workforce play out spatially, in this case in sub-national regions?

2.2 The Region

The starting point for the analysis is the identification of the spatial context in which the relations that define work, jobs and employment are worked out. There is substantial literature that considers the way that economic transitions change the spatial distribution of employment and prosperity (see Harvey 2006; Polèse & Shearmur 2006; Smith 2010). Therefore, economic transitions and the associated

changes to the spatial logic of production draw attention to the ways in which regions are constructed and evolve over time.

It is not always clear what is meant by 'region'; hence, definition is critical for analysis (see Amin, 2004 and Allen and Cochrane, 2007). There are two considerations here. First, institutional arrangements and the policy discourse in relation to 'region' matter. In Australia, for example, there is a discourse about urban and region, whereas more accurately there could be a policy discourse about rural and urban (metropolitan) with a consideration about the institutional arrangements that may apply (for one of the few reflections on this dilemma, see Beer *et al.*, 2003: 14 – 56). More generally, there are also definitional matters in relation to national, provincial and local government arrangements. Second, both territorial and relational arrangements figure in debates about the 'region' (Goodwin, 2012). While territory refers to space and spatiality, the relational dimension addresses themes of connectivity (Goodwin, 2012: 1182). This distinction and the focus on connectivity addresses the boundary problem of networks and connections (for a caution, see Massey, 2004:3).

The analytic challenge is that the terms 'regional' and 'region' are used in various and analytically opaque ways (see Denham, 2020). 'Regional' often refers to location, outside metropolitan areas, often equated with 'rural' and referencing a range of functions and outcomes, such as economic strategy, social consequences and so forth. The RAI for example defines regional Australia as 'all of the towns, small cities and areas that lie beyond the major capital cities (Sydney, Melbourne, Brisbane, Perth, Adelaide and Canberra)' (RAI 2017). A more precise concept is that of 'region', which is also subject to analytic discussion and deliberation. Nonetheless, the most obvious level for the demarcation of regions for analytical purposes is by political boundaries, such as Local Government Areas (eg., RAI n.d.), or in regional analyses the use of statistical geographies such as the Australian Statistical Geography Standard (ABS 2011) or the Nomenclature of Units for Territorial Statistics system of the European Union (Eurostat 2016). In practice, these standards enable analysis of clearly defined areas, but the spatial delineations and their impact on the analyses are rarely questioned (Paasi & Metzger 2017). Nonetheless, how and where boundaries are set influences the outcomes and policy prescriptions of central governments (Hudson 2007), yet the impact is not considered in most instances.

A concurrent confusion arises from the way the term 'communities' is defined and used in reference to regions, occasionally with an assumed correspondence between region and community. The core point is that communities are not spatially congruent (Fairbrother and Tyler, 2018, chapters 2 - 5). Definitions vary, referencing place as a locality, to the ways that social groups are defined by networks and to the ways that populations may have shared senses of belonging (Fairbrother and Tyler, 2018: 19-23). When considering community as locality, there is often a dissonance between place and the composition and boundaries of labour markets, the patterns of movement in and out of communities and the ways these factors impinge on jobs and employment in any particular place. These insights are evident in the conceptualising space as a result of relationships and networks (Paasi & Metzger 2017), and that it is "always in process, as never a closed system" (Massey 2005: 11; see also Hudson 2007). As a result, policy and economic development interventions

need to respond to “a fundamentally new conception of the region as unstable, complex, relational, porous and openly networked” (Collits & Rowe 2015: 78). Thus, the degree of freedom and capacity for worker and household decision-making about their work situation and possible futures in their residential locations is tied to market access, quality of communications infrastructure and transport networks (Hall and Pain 2012).

The side of the analysis is the global aspect of technological innovation. One argument is that the digital revolution has brought the world of work together (an agglomeration of practices), ‘the world is flat’ (Freidman 2005). This proposition, however, has been widely rebutted (Broad and Cavanagh 2006; Florida 2005; Scott 2006a; Simmie 2010). As Sassen (2001: 16) presciently observed:

The widely accepted notion that density and agglomeration will become obsolete because global telecommunications advances allow for maximum population and resource dispersal is poorly conceived. It is ... precisely because of the territorial dispersal facilitated by telecommunication that agglomeration of certain centralizing activities has sharply increased.

A result of this concentration of activity is that spatial inequity has become a more prominent concern, related to recent election results in Europe and the US (Rodríguez-Pose 2018).

This concentration of technological practices is also evident in Australia. Prior to the 1970s, there was little variation in participation rates across the country, but as the changes to industry and occupations have flowed through the Australian economy in subsequent decades the variation has increased. There is also increasing spatial concentration in the location of high-skilled workers at one end of the scale, and unemployment rates at the other, with metropolitan areas advancing ahead of regional Australia (Bell & Keating 2018). Technological improvements are not the only cause of the concentration of employment and prosperity, but the implication is that the future of work can be expected to have spatial impacts.

2.3 Summary

The focus on regions as localities and the porosity associated with them means that the impacts of work innovations (for example, via technology or business modelling) are not straightforward. Hence, it is curious that the regional effects of the future of work have received little attention in the literature (Bissell & Del Casino 2017). To explore these themes, the report presents an analysis of the ways in which work may be changing. The report proceeds in three stages. First, the benchmark for the analysis in terms of worse or better work is presented. Second, we specify the ways in which the changing patterns and tasks of work are defined by jobs and employment conditions. Third, we locate these developments in relation to the regions and the ways in which the socio-economic features in these places are in a process of transition.

3 The Quality of Work

With changes in work, it is likely that the regional impacts will be varied and unclear. Nonetheless, the implication of the above analysis is that the work done in the regions, as elsewhere, is likely to change over time. In turn, the focus on such developments raises questions about the quality of work that is becoming available in the regions. This consideration provides a benchmark for the analysis in terms of worse or better work; such an analytic yardstick enables assessments in terms of decent work (UNFCCC, 2016) and just transitions for those involved (Stevis & Fellis, 2015, 2016; Snell, 2018). To explore this aspect, the focus is on jobs, as the occupational form for undertaking work.

3.1 Good and Bad Jobs

The notion of good and bad jobs is central to consideration of the quality of work. Eichhorst *et al.* (2016: 8) provide five aspects of good jobs. They:

- are free of major characteristics of precariousness, such as a lack of stability and a high risk of job loss, a lack of safety measures and an absence of minimal standards of employment protection;
- enable working persons to exert some control on matters such as the place and the timing of work and the tasks to be accomplished, and these jobs place appropriately high demands on the working person, without overtaxing their resources and capabilities and without harming their health;
- provide fair employment in terms of earnings and of employers' commitment towards guaranteeing job security;
- offer opportunities for skill training, learning and promotion prospects within a life course perspective, thereby sustaining work ability and stimulating individual development; and,
- prevent social isolation and any form of discrimination and violence.
- aim at reconciling work and extra-work demands by implementing appropriate rules in day-to-day practices.

The touchstone for this type of analysis is the working environment at a firm level. The implication is that it is the employer that has the capability to organise work in ways that result in better or worse work. In this respect, standards and related forms of regulation may be shaped by governments and trade unions. As noted by many, as unions lose their leverage within many workplaces and some sectors, there has been a long-term decline in security and employment conditions. As Autor (2010) further posits, the de-unionisation of the workforce has contributed to the polarisation of labour markets; employers have sought non-unionised workers, challenging unionised workplaces. Hence, whether jobs are good or bad is also contextual rather than absolute, depending on cultural and social norms, choices on offer, and an individuals' level of education (Findlay *et al.* 2013). Thus, it is important to question what is a good job in a regional context?

3.2 Work, Jobs, and Employment

The changes underway in the world of work are profound. They involve technological innovation, disruptive business models, and environmental challenges (on the latter, see Montl *et al.*, 2018). Of note the changes are not all of piece; different developments, locally, nationally and globally impact on work: digital developments and work; the way that work has become specialised and the changes taking place in relation to employment. This enquiry is underpinned by a consideration of the interconnections between work, jobs and employment (eg., Stewart and Stanford, 2017).

3.2.1 The Digitisation of Work

One prominent theme in the debates about the future of work is the proposition that digitisation is a replacement for work as we know it. The argument is that digitisation is a replacement for work that is routine and repetitive in nature and a complement for higher order work. It will make knowledge more productive. The questions are what does this mean for an emerging division of labour, in this case across the world (see Berg *et al.*, 2018), and what are the implications for the quality of work in regions.

Known as the routinisation thesis of employment polarisation, it proposes that middle-skill jobs, such as bank telling and repetitive manufacturing employment, will decline in job numbers while there is an increase in both knowledge work and low-skill in-place jobs, such as cleaning, food preparation and personal care (Autor 2010; Autor *et al.* 2003). As Autor (2014: 1) - one of the routinisation hypothesis's prominent scholars – argues:

... tasks that have proved most vexing to automate are those demanding flexibility, judgment, and common sense—skills that we understand only tacitly—for example, developing a hypothesis or organizing a closet. In these tasks, computers are often less sophisticated than preschool age children. The interplay between machine and human comparative advantage allows computers to substitute for workers in performing routine, codifiable tasks while amplifying the comparative advantage of workers in supplying problem solving skills, adaptability, and creativity.

Recent research has provided additional explanations for the increased polarisation of the workforce, including the changing economic structures of advanced economies as a result of off-shoring and globalisation (eg., on platform work, see Berg *et al.*, 2018: 16 – 21; on increased demand for carers as a result of ageing populations, see Denny 2019). The decline of manufacturing employment has been seen as an important factor in polarisation in the United States, particularly for male workers (Autor 2010). The impact on manufacturing is also expected to be skill dependent, with increased demand for technical and ICT capabilities, while manual labour declines (Davies 2015).

Levy and Murnane (2005, p. 12) consider the prevalence of the computer in the workplace as central to the widening gap in the labour market:

As computers have helped channel economic growth, two quite different types of jobs have increased in number, jobs that pay very different wages. Jobs held by the working poor— janitors, cafeteria workers, security guards— have grown in relative importance. But the greater job growth has taken place in the upper part of the pay distribution— managers, doctors, lawyers, engineers, teachers, technicians. Three facts about these latter jobs stand out: they pay well, they require extensive skills, and most people in these jobs rely on computers to increase their productivity. This hollowing-out of the occupational structure— more janitors and more managers— is heavily influenced by the computerization of work.

While it is not clear how extensive such developments are, it does raise questions about the texture and future of work in most workplaces, covering primary resources, manufacturing and services.

3.2.2 A Renewed Division of Labour

The changes in work taking place indicate that a recomposition and recasting of the division of labour regionally, nationally and globally may be under way. Broadly, the division of labour refers to the performance of work tasks ranging from undertaking the same or similar tasks to the specialisation of tasks. Importantly, the division of labour as argued by many refers to the specialisation of purpose spatially (eg., Scott 2008; Storper 2018). As a result of these changes to employment, Scott (2013, p. 385) observes that:

... a new division of labour is rapidly taking shape. This alternative structure is represented, on the one hand, by highly qualified symbolic analysts and, on the other hand, by a low-wage service underclass, or what we might call in more polemical terms 'a new servile class'. Moreover, the character of this structure as a division is accentuated by the ever-widening gap between the two groups of workers in terms of their incomes and life chances as well as their forms of work.

Globally, it has been argued that a new division of labour has appeared, with high paid specialists in metropolitan centres and cheap, low skilled elsewhere (Marin, 2006).

The challenge now is to understand what is happening in regional labour markets with the on-going processes of technological innovation and the impact on work tasks. It may now be the case that with digitalisation of work that skilled occupations become more accessible in different forms of employment, at any time and in any place, and thus in regions. If a renewed regional division of labour is in the process of evolving, then this enquiry suggests a reformulation of the division of labour that characterises regional labour markets.

The starting point is to show how the occupational division of labour and thus the increased specialisation of work is connected to changes to careers, employment and jobs. At this point no consideration is given to how such changes may play out in relation to regions. More generally, recent changes in work practices and employment relations impact on work experience and career planning. Grabher

(2002) observed the emergence of projects as a standard work practice, with teams of consultants and contractors constituted to reflect the range of skills and experiences to complete the tasks involved.

Work tends toward specialisation as workers develop skills and are employed in jobs defined by digitally defined work tasks. Specialisations in work are associated with spatially concentrated development both for single entities as well as clusters of industry in a location (Smith 2010). The concentration of workers enables larger instruments and finer divisions of labour, as well as access to larger market areas to be sustained (Harvey 2006; Lösch 1940 [1954]).

To illustrate, there has been an increase in the number of independent contractors in Australia, comprising 9 per cent of the workforce in 2016 (Whiteford & Heron 2018). Over time, this was seen to lead to networks, where shared experiences engendered trust and recurring collaborations. These arrangements, along with the strongly associated outsourcing and competition for projects previously undertaken by employees of organisations, has formed part of the change in the ways people experience work and consider and plan their careers.

Specialisation may be recognised by the divisions of labour that define work done. Bryson (2018, p. 145) describes three distinctions within the divisions of labour: first, a technical division where the subdivision of complex tasks into smaller tasks that require less capabilities to perform; second, a social division where specialised tasks that require unique skills and capabilities; and third a spatial division of when “specialist tasks can be identified and labour located in one place substituted for labour located in another place”. The spatial division of labour can be seen as an explanation for the concentration of higher order employment, in terms of skills and income, in larger centres, which is further promoted through improvements in transport and communications infrastructure (Harvey 2006; Smith N 2010).

It is important to note that the reference to spatiality assumes a process whereby the creation of jobs will be in relation to the size of the population or economic centre, rather than in the more dispersed places signified by regions, a continuation of consolidation processes over the past century (BITRE 2014). Indeed, the implication is that the infrastructural shifts underway are part of this process. If so, these developments could be assumed to impact on regional workforces in negative ways.

3.2.3 Changing Modes of Employment

A further dimension to this process focuses on employment in relation to jobs and work changes. Closely associated with the Future of Work thesis is the increase in platform work, facilitated by communications technologies (Bernhardt 2016; Smith 2016;). A key element of these forms of employment relationships is that the providers of services are not employed directly by the overarching company, and thus standard benefits of employment such as tenure, leave entitlements and minimum wages are avoided (Warhurst, Mathieu & Wright 2017). As a further result, risks and costs of adaptation are shifted from the firm to the worker (Eichhorst 2017).

Warhurst and Hill (2019: 9-10) connect digitisation to precarity:

... the digitalisation of work rests on the emergence of platform companies and the migration of work to these platforms. Platforms are digital networks that coordinate economic transactions – usually matching the demand for and supply of resources through algorithms. The use of platforms for the delivery of an increasing range of goods and services is one of the most pervasive and visible forms of digitalisation and has significant implications for the way work is organised, managed and regulated ... The potential outcome of this digitalisation of work is not the end of human paid work but the death of employment as jobs are replaced by contracts to undertake micro-work tasks by gig workers and freelancers.

Standing (2014) refers to the growing number of workers on short-term and casual contracts, frequently changing roles depending on work available, and spending much of their labour efforts on finding or training for new jobs as the 'precariat'.

Work at the lower-paid and lower-skilled end of the spectrum has also become less certain, with increased part-time and casual work in recent decades (Cassidy & Parsons 2017; Rafferty & Yu 2010). Earlier analysis of total hours worked indicated that this rise in part-time work has meant that even though "the number of low-skill jobs has continued to rise, especially low-skill sales and service jobs, there has been virtually no growth in the total volume of low- skill work" (Wooden 2000, p. 197). Workers who have found new jobs after losing secure jobs in manufacturing are likely to be in precarious forms of employment (Briggs 2019; Kurmelovs 2020)

One implication is that there will be a polarisation in the location of workers across the economy (metropolitan and regional) with negative impacts in the regions. In a conclusion based on employment trends in Tasmania, Denny (2019, p. 22) found:

Increasing job polarisation, under-employment and people working below their level of educational attainment indicates spare capacity in the labour market. Further, the current trends of workforce polarisation suggest that demand for labour and skills is a greater issue than the supply of skills. While there are more Tasmanians in employment in 2016 than in 2006, the extent of job polarisation and under-employment evident suggests that having a job does not necessarily mean that a person has a stable and reliable income nor that they are using their level of education effectively.

These trends are frequently encapsulated as the 'gig economy' or the Uberisation of work, referring to the global ride-share service company (Warhurst *et al.* 2017).

Moreover, there is evidence that such forms of polarisation are emerging in Australia:

Between 1966 and 2011 the shares of employment in low- and high-paid jobs increased respectively by 2.2 and 17.0 percentage points, and the share of employment in middle pay jobs decreased by 19.2 percentage points (Coelli & Borland 2016, p. 23).

However, Coelli and Borland (2016) also conclude that in more recent years the sharp divergence in wage income has occurred in relation to shifts in occupational structures, particularly for males.

Overall, changes to the ways in which people work and are employed can be seen to have contributed to the concentration of knowledge-dependent and well-paid jobs in larger cities (Scott 2008). Two points are often made to assert this proposition. First, the shift of much work to projects and team-based activities indicates that there is a need to be where networks can be formed to source work development teams and be part of pools of specialised capabilities that can be drawn on as required (Grabher 2002). The second is that as career trajectories become less certain and linear, it is likely that the potentials are an increasingly important aspect of people's decisions regarding their places of residence and work, and the assumption is that this is a pull factor to city locations (Glaeser 2011; Storper 2018).

The question is whether the implied spatial analysis can be sustained. It may be the case that the developments underway provide a renewed opportunity for workers to locate in and to regions rather than in the larger metropolitan settings. The paradox may be that the digitisation of work opens up opportunities within regions rather than closing them down.

3.3 Complications

As with most trend analyses it is necessary to consider the content of the changes underway. It may be the case that the apparent trends are not as clear-cut as they initially suggest. In this case the qualification that we explore relates to the question of spatiality. Two aspects are considered: first the changes that may be taking place in relation to workplaces and second the new jobs that may be emerging in relation to work changes.

3.3.1 Changing Workplaces

What we mean by 'workplace' is now shifting, in part away from a physical space where a workforce necessarily works in concert with each other. Improvements to communications and information technologies, including digitisation of workplaces, has been a factor in allowing increased workplace flexibility and working from home (Banister 2005; Lyons 2014; Mokhtarian 2002; Zhu 2012, 2013). There is also evidence that consulting businesses can successfully locate in metropolitan hinterlands provided they have access to high-quality communications networks and airports, for connections to distant markets (Hall & Pain 2012). Thus, more metropolitan and out-of-region workers have been able to reside in regional areas through working at home through the use digital means: the outcomes of Industrie 4.0 can be expected to increase the number of workers who can work remotely.

It is of note that the types of jobs that are suitable for working remotely are generally in the knowledge sector. As these types of jobs, as well as the education and training institutions that service this sector, it is more likely that metropolitan residents' regional relocations will be facilitated than regional people accessing metropolitan employment. Also, whether increased metropolitan workers in regional cities and towns has positive employment outcomes within regions has been questioned (Denham 2017), although it is likely that there are increased jobs related to household expenditure as result (Lavesson 2015). In the context of this report, the question this raises is whether changes to the regional-resident workforce enabled by increasing digitisation is providing good jobs.

3.3.2 Prospects for New Jobs

With changes in work, new jobs may be identified by prospective employers. If so this process is likely to be complex and on-going. To date, much of the concern has been around the broad question of job losses and gains. There has been little consideration of the spatial distribution of these processes.

Developments in technologies and increased production efficiencies have regularly been the basis for forecasting widespread job losses and high levels of unemployment (see Warhurst & Hill 2019). There have also been numerous projections of potential job losses in sub-national regions of Australia (e.g. Oxford Economics 2019; RAI 2018; Taylor *et al.* 2019) However, these claims regularly ignore the capacity for new forms of work to be created. For example, the World Economic Forum (2016) observed that jobs such as app developer, social media manager and drone operator had not existed in 2006. Gruen (2017: 5) explains the trade-offs:

How does the advance of technology affect the overall number of jobs in the economy? An insightful way to understand this is as a race between two technological forces: automation on the one hand, and the creation of new useful complex (non-routine) tasks on the other. These are both ongoing, dynamic processes.

However, Gruen also notes that there is a decline in physical and cognitive routine jobs, and increases in physical and cognitive non-routine jobs, recalling the polarisation hypothesis of Autor (2010; see also Autor, Levy & Murnane 2003).

Earlier predictions of major job losses do not account for the new forms of work that digitisation may create (see Hill and Warhurst 2019: 8-9), only considering what is likely to be lost. Autor (2014: 1) provides further basis for determining the likely impact on jobs of increased digitisation:

... tasks that have proved most vexing to automate are those demanding flexibility, judgment, and common sense—skills that we understand only tacitly—for example, developing a hypothesis or organizing a closet. In these tasks, computers are often less sophisticated than preschool age children. The interplay between machine and human comparative advantage allows computers to substitute for workers in performing routine, codifiable tasks while amplifying the comparative advantage of workers in supplying problem solving skills, adaptability, and creativity.

Therefore, it is unclear as to whether the new jobs created will outweigh those that are lost as the 4th industrial revolution works through our systems of production.

It is almost certain that the kinds of jobs that will be created will be different to those that are lost, which will continue to impact upon the composition of the regional workforce (see Toner & Douglas 2020). Moreover, it remains unclear where such jobs will be located. The types of changes underway leave the question of place more open than was initially supposed.

3.4 Implications

At a general level, employers and governments are in the process of utilising the opportunities provided to reconstitute work via technological innovation, the utilisation of various business models and the availability of workforces with a range of variable skill sets. In this context, labour markets are likely to be recomposed and reorganised. A consideration of trends in jobs, work and employment within sub-national regions requires an examination of the core features of this relationship.

The way that these changes impinge on regions is likely to be multi-faceted. It is necessary to consider the drivers for jobs and the increase in the number of available jobs for regional residents; the ways that as transition occurs career structures are reconstituted and elaborated; the changing employment patterns and in this context the on-going massive expansion nationally of part-time, temporary and insecure employment; and finally the consequences that such developments have for job and social security. With such an analysis, it then may be possible to present informed arguments for decent work and a regional transition as regional labour markets are reorganized and reconstituted.

While there has been the increase in freelancing and contract employment (Cassidy & Parsons 2017) across the economy, the key insight is that polarisation is leading to poorer employment outcomes for medium- and low-skilled workers. These effects have a spatial dimension, related to regional industry compositions and dynamics. As much as there will be individuals whose fortunes decline as a result of changes to jobs, work and employment, there will also be opportunities within regions.

4 The Future of Work in the Regions

The future of work in the regions offers both challenges and opportunities to those who live and work there today. Such futures are likely to require regional actors and development agencies to understand the networks and value chains that make up regional labour markets. Decisions regarding production locations and outputs are already being made in remote locations in many instances, a result of out-of-region ownership and opportunities for greater profits in alternate locations. As Web 2.0 collects and consolidates data, it is also possible that more analysis and reporting will be outsourced to out-of-region locations, further blurring the definitions of regional economies. Such developments require an understanding of the networks involved.

The global value chain conceptualisation of contemporary systems of production are informed by network theories and understandings of globalisation (Dicken *et al.* 2001; Gereffi & Fernandez-Stark 2016; Gereffi & Korzeniewicz 1994). Networks, trade and information flows occur across regions, and within and across firms and organisations. Often this is a situation that arises from decisions to offshore and outsource, with higher order functions located in developed economies and major cities (Massini & Miozzo 2012). As of 2013, approximately 60 per cent of global trade was in intermediate inputs to production, with increasingly disaggregated or 'fine sliced' production chains (UNCTAD 2013, p. 122).

It is becoming more difficult to distinguish what is a regional industry and value add as elements of production, management and research are undertaken in different locations and not necessarily valued across space within firms (see Reich 1991). As Henderson *et al.* (2002: 13-14) note:

Production networks... have become both organisationally more complex and also increasingly global in their geographical extent. Such networks not only integrate firms (and parts of firms) into structures which blur traditional organisational boundaries, through the development of diverse forms of equity and non-equity relationships, but also integrate national economies (or parts of such economies) in ways which have enormous implications for such economies' well-being.

At a national scale, Stiglitz *et al.* (2010) provides an example that in Ireland national income declined while GDP increased, a result "of an increasing share of profits that are repatriated by foreign investors" (Stiglitz *et al.* 2010: 29). As a regional example, the impact of digitisation and thus the future of work can be seen on the increasing amount of remote work in the mining industry, with machines operated by workers located in major cities. It is not only the head offices and advanced producer services that are located in metropolitan areas, which created questions regarding the location of value add, it is now the machinery operators (Ellem 2016).

The regions are thus the focus of the changes underway in relation to work, jobs and employment. It is clear that labour markets in the regions are undergoing a challenge to their futures, involving where work is located, the quality and content of jobs and the texture of employment for the residents in these regions. Of note, any

consideration of these trends must take into account the porosity of the economies of regions; they are part of a global relations and all that implies.

4.1 Regional Labour Markets

With regard to the regions, it is necessary to review the possible impacts of such developments on regional labour markets. How we as a society choose to apply and implement such technological innovation, if at all, will be decisive for the ways in which the relationships between jobs, work and employment evolve.

The prevailing analysis suggests that future of regional work is likely to be heavily influenced by the increased economic competition that results from the lower costs of trade facilitated by improved telecommunications. The rise of the gig economy and the concentration of economic activity in major metropolitan areas can both be seen as at least partial results of increased competition, through platforms that directly broker between demand and supply, and through enabling greater market reach. It is also likely that regional economic development agencies will need to consider the career opportunities more: the subsequent jobs and training opportunities as well as what is on offer now (eg., for different aspects, see Berg *et al.*, 2018; Frey & Osborne, 2017; Stewart & Stanford, 2017).

It should be noted that increasing regional productivity may not increase employment (eg., Ellem, 2016). This should not be a surprise to regional development agencies, given the similar trends in agriculture since the market deregulation of the 1980s (Bowler 2014; Productivity Commission 2005). Also, while digitisation and telecommunications may offer regional residents a greater range of goods and services, such as in telehealth, it is likely to be at the expense of regional employment as more services can be effectively offered by metropolitan-based specialists. This argument is developed further in Section 4.1.2.

While persuasive, a focus on labour markets in the regions provides a caution. As noted the digitalisation of work, within the context of the changes taking place and initiated by capital via employers, supported by governments, may severely impact on regions. Nonetheless, some of the capacities provided by the changes underway may open up possible development within the regions, as indicated below.

4.1.1 A Platform Economy?

One of the prominent effects of digitisation is the rise of platforms that connect workers with people requiring services directly. For the spatial impacts of platforms for connecting people with service providers is that it is non-territorial as the inputs to production are not embedded within localities (Storper 1997), and thus service providers can be expected to organise in response to the locations of demand. Therefore, it is to be expected that as barriers to entry for service providers are minimized, such as taxi-licenses (on-time transportation) and the need for a shopfront or workshop, then supply will closely follow demand.

The digitalization of service may create a reciprocal benefit for work in the regions. Spatially, this suggests that employment in these types of service industries will be attracted to larger populations and where people earn higher incomes. This recalls

Scott's (2013, p. 385) observation of a new and highly delineated labour market of "highly qualified symbolic analysts" and a "new servile class". Alternatively, it is also possible that the reduced barriers to entry and increased employment flexibility afforded by platform technologies may mean that regional areas benefit from a wider array of services being provided. It may also be the case that some of these services are both located and emerge within regions, as illustrated by on-time transportation of food goods (eg., HiveXchange - <https://hivexchange.com.au/hivexpress/>).

4.1.2 Regional Information Technology

Telecommunication innovations increase the market reach of service providers. The introduction of cross-ocean wire services in the 19th century has been seen as one explanation for the rapid growth of major cities at that time, as people sought to gain advantage from transcontinental information flows (Hobsbawm 2010). The notion that improvements to telecommunications, as well as transport improvements, have continued to profit larger cities is related to the benefits of being located at a hub, due to access to larger markets provided. Access to larger markets also enables finer divisions of labour, and thus greater productivity (Smith 2010). It can be seen as a circular process, as the increased specialisations require greater market reach to be sustainable, which then leads to the need for even greater market reach, which can be seen to be facilitated by increased digitisation and improvement in telecommunications (see 'the spatial fix', Harvey 2006).

Such circular processes can work in reverse. Embedded data collection systems in production sites – farms for example – will enable more remote and specialised analysis and inputs to production. On the one hand, such developments further concentrating economic activity in locations with access to the deep and highly qualified and specialised workforces. On the other hand, it is possible that such capacities could be encouraged within regions, although this may require challenging the established assumptions about where best to locate qualified and specialised workforces, with an understanding of the importance of agglomeration and clustering of associated organisations and industries. It would require government intervention and support for the decentralisation and physical dispersion of workforces and the ready accessibility of technological capabilities, resources so as to operate in real time.

The prospects of the use of the NBN to deliver remote health services provides an illustration of the concentrative effects of telecommunications. While telehealth may provide a method for delivering health services to remote communities currently without service (Dods *et al.* 2012), it may also lead to a reduction of in-person consultations in other regional areas as internet-facilitated consultations become more cost effective. This is similar to the 'Amazon effect', where widely distributed bookshops have been replaced by concentrated workers in packing and distribution centres, with sales facilitated by telecommunications (see Millar 2019 for Australian context). These centres require workforces, not necessarily located in large urban and metropolitan settings but in locations with access to transport and logistics networks.

4.1.3 Regional Careers

With the shifts in work, jobs and employment, it is unclear what a career in the regions might mean. An important change in recent years is the rate of change in people's work, not just where they are employed but also changes in the industries and occupations they are employed in. Toner and Douglas (2020) provide evidence of the shift in the demographic, industrial and occupational structure of the regional workforce, indicating that regional workers are changing jobs or moving in and out of employment, facilitated by regional training providers (Denham & Fairbrother 2020).

The changing patterns of employment impact on workers and their households. Of note, there is a history of long term employment of family members in manufacturing and agriculture. Car manufacturing has been particularly associated with family-wide employment (Haigh 2013), a possible consequence of suburbs being developed around the central factories (Badcock 1989; Berry 1999). For example:

Ford has been car making in Geelong almost beyond living memory but for the Travers that family heritage totals a world-record 319 years ... Their total service record over four generations since 1926 has been officially recognised by headquarters in Detroit as a family effort which may only be matched by the Henry Ford dynasty itself (AMWU 2008).

The tendency for people to change jobs more frequently and to have multiple careers within their working life may be a factor in people's decisions regarding changing their place of residence to access employment. McKenzie (2016b, p. 8) provides evidence of this involving professionals working in Victoria:

In both cases, the issue of limited career opportunities is related to city size. Many respondents compare their city to Melbourne, yet Melbourne is vastly larger in size and can therefore offer a range of career choices which are inevitably more limited in smaller cities like Bendigo and Ballarat.

To elucidate, people may consider their longer-term career and employment prospects within a location, considering not only the work on offer at present, but also what opportunities may be present in a location in the mid-term future (Glaeser 2011; Storper 2018).

For regions, more frequent job and career changes has two implications. The first is that access to training and education institutions becomes increasingly important, as they enable people to shift horizontally (career shifts) as well as vertically (promotions) through local employment markets. Notions of life-long learning, as well as the increased reliance on skills, particularly in the digital realm, further indicate the importance of training and education (Davies 2015; Gekera *et al.* 2019). To some extent this is mitigated by access to online education and training, however these programs have been more successful when combined with face-to-face delivery (Denham & Fairbrother 2020).

The second implication is that decisions regarding regional jobs are also likely to take into consideration subsequent job prospects, particularly if residential relocation is involved. This consequence is in addition to the impact of two-earner households

over recent decades, where larger centres are advantaged due to the need for both household members to find employment. As McKenzie and Koutsivos (2017) reported, Ballarat's IBM workers were concerned with subsequent work opportunities when making decisions about relocating to the city, as IBM is the only major IT employer in the city.

Thus, it is important to view regional employment arrangements as an interaction between industry and the community, mediated by training providers (Fairbrother and Denham 2020), as all three are required to build regional careers now and into the future. The focus on careers also brings to the fore a focus on regional industry development, with governments working to collocate similar industries and public sector functions to promote the possibilities of regional careers. In this respect, the presence of three public insurance agencies in the centre of Geelong - the Commonwealth's National Disability Insurance Agency with the Victorian State government Workcover and TAC accident insurance agency - may provide an insightful case study into regional career building.

One outcome, especially for regional labour markets, is a pressure on training and learning bodies, whereby residents acquire and apply the skills required by the emerging forms of work. This suggests that there may be a need for TAFE training and for employers to respond to the changing nature of work. Gekara *et al.* (2019) reported low level of digital skills in the workforce and in the non-IT sector specific training provided in the TAFE system. Employers were reported as not looking for anything more than basic skills in job advertisements, and there was limited inclusion of digital training within curricula. Such deficits impact negatively on the future prospects for those who live and work in regions.

4.2 Summary

The future of work in the regions is likely to play out in complex and somewhat contradictory ways. On the one hand, the broad patterns of change indicate that there are pressures toward jobs in the larger urban and the metropolitan centres. On the other hand, the very shifts in the ways that work is done opens up possibilities for a recomposition of labour markets in the regions. These cross-cutting pressures are likely to play out in the ways that labour markets in the regions are composed and reorganized.

Labour markets in regions face uncertain futures. In general, the value chains and associated networks of production and service that define the texture of the labour markets in regions range from networks of relations within a region to elongated value chains across the world. Nonetheless, there remains the possibility that some of the changes underway can be located within and developed from regions. Such possibilities are reinforced by the telecommunication and related innovations. A condition for such a step may involve governments and employers, often with a different mind-set to that often evident at present.

These possibilities draw attention to the life courses of those who live and work in the regions. As noted above, the regions face considerable challenges in maintaining life styles and standards of living, especially in the periods of intense transition, following closure of industry and the decline in financial and related services. These shifts

often force harsh decisions on the population in the region, to stay or go. The impact is not only on waged workers, and the impacted self-employed, but also on their households. To address these challenges, it is necessary to create those situations where those who live and work in the region have choices about their futures. This circumstance draws attention to importance of having the opportunity to acquire skills, re-skill and prepare for different ways of working. In this respect, governments may be called upon to provide the enabling facilities and provisions that allow for career change, facilities and support that is not especially evident in the current moment.

5 Conclusion

Changes to jobs, work and employment over recent decades have been extensive, including increasing part-time and casual work, an increase in independent contractors and with more changes in jobs and careers. These changes are related to the shift from agricultural and manufacturing economic bases and providers of employment to the services and knowledge-based economy. As argued by many, these developments provide an explanation for the impact of digitisation in facilitating these changes, in particularly forecasting the polarisation of the workforce (Autor, 2014). While persuasive, it remains unclear how these changes actually play out in the regions.

The overarching point is that the capacity to work in knowledge-based industries, and thus levels of education and training, may have become a central determinant of people's quality of work and employment. For both high- and low-skilled workers the implication is that jobs and the work undertaken may have become less secure and consistent, and more competitive and contested. These developments raise questions about the exercise of power in workplaces and in relation to employment conditions. Of note it would appear that a key development is the privilege afforded to workers with specialised knowledge and capacities, while the decline in unions and flexible workplace agreements further underwrites the precarity of low-skilled workers. These transitions must be located within a geographic context, as the transitions described change the distribution of opportunity and advantage within Australia and its regions.

One outcome may be increasing inequity. For people with good jobs in regional areas, the future of work for other people is likely to provide them with access to a greater range of specialised and personalised goods and services. For the other sections of regional communities, their skills and experience may be found wanting as industrial transition takes place. And, it is the idea of transition that becomes important when considering how the future of work may impinge on those who live and work in the regions.

The types of jobs, work and employment on offer is changing and will continue to do so. The increasing number of workers in the gig economy indicates that the quality of work is declining, but for highly skilled and specialised workers opportunities it may be increasing. For regional areas, a pertinent aspect of these changes is the effect on the spatial distribution of good jobs, opportunities and careers. In this respect, it is important to understand that as a society there are choices about the future. Policy decisions that promote distribution and equity over efficiency can be made. If policies directly address the spatial distribution of institutions, employment, education and training it may be possible to provide alternate futures for regional Australia. The challenge is that these policies are likely to be long-term in effect, and reflect the resources, institutions and capacities of the regions.

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