Insight Seven: Workforce polarisation in Tasmania: Implications for the future of work and training

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Tasmania, like many economies, is undergoing a process of economic restructuring tied to what is known as the Fourth Industrial Revolution.

Technological mega-trends – including digital disruption, the internet of things, artificial intelligence, automation and robotics – are transforming the nature of work and careers. These changes are happening at the same time as a range of other economic, demographic and social shifts.

A growing concern linked to this revolution is the polarisation of the workforce. There is evidence the workforce is being hollowed out, particularly for young people. A growing proportion of jobs are either high or low skilled, while a declining share require mid-level skills. These mid-level jobs have long been considered "entry-level" positions suitable for school leavers and graduates. Many experts argue the loss of entry-level jobs will reduce opportunities for young people to enter the workforce and limit opportunities for career progression for people in lower-skilled jobs, with long-term consequences.

This workforce polarisation, tied to deep structural issues, highlights the need to provide and prioritise continuous skill development and flexible career pathways. Addressing the issue will also help Tasmania capture and maximise opportunities for increased competitiveness and productivity in the age of the Fourth Industrial Revolution.

Conversely, in the absence of strategic policy intervention, growing polarisation could impede the state’s economic performance and efforts to close the social inequality gap. Workforce polarisation over time has the potential to threaten productivity, social mobility and inclusive growth.

Key findings

- In 2006, the Tasmanian workforce was already polarised; skewed slightly to higher skill occupations (27.4%), however almost half of the workforce (46.7%) required no more than a minimal post-school (Certificate II) qualification.
- In the 10 years to 2016, Tasmania’s workforce polarised further, experiencing a relative decline in both the share of employment and the number of mid-skill (level 3) jobs; those requiring a Certificate III or IV qualifications – often entry level jobs for new or young job seekers.
- While the Tasmanian workforce expanded by around 11,000 new jobs in the decade to 2016, 684 jobs were lost in the skill level 3 occupations.
- Established research warns that workforce polarisation is associated with:
  - Increases in non-standard forms of work
  - Differences in hours of work between skill levels
  - Low wage growth
- Widening inequality
- Increasing levels of over-qualification, education and skill mismatch
- Increasing under-employment
- Reduced opportunities for young people and graduates to enter the labour force
- Limited opportunities for upward career progression from lower-skilled jobs.
- Job polarisation is not uni-causal, uni-dimensional or uni-directional, it can be caused by the combination of several factors:
  - Technological advancements which either replace or complement jobs
  - Rise of the services sector
  - Changes to the social organisation of care
  - Historical industry structure of a region
  - Globalisation, the increasing quest for competitiveness, productivity and the resultant offshoring.

In Tasmania, workforce polarisation exists between and within industry sectors and is accompanied by a shift from full-time to part-time work.

Overview

Widening inequality
Increasing levels of over-qualification, education and skill mismatch
Increasing under-employment
Reduced opportunities for young people and graduates to enter the labour force
Limited opportunities for upward career progression from lower-skilled jobs.

Job polarisation is not uni-causal, uni-dimensional or uni-directional, it can be caused by the combination of several factors:

Technological advancements which either replace or complement jobs
Rise of the services sector
Changes to the social organisation of care
Historical industry structure of a region
Globalisation, the increasing quest for competitiveness, productivity and the resultant offshoring.

In Tasmania, workforce polarisation exists between and within industry sectors and is accompanied by a shift from full-time to part-time work.


• One of the greatest risks of job polarisation for Tasmania is that young job seekers will be unable to secure adequate work in the state and will relocate to pursue job opportunities elsewhere.

• Tasmania’s polarised workforce is likely to result from its historical industry structure, including technology replacing jobs, globalisation and offshoring, current economic policy and the changing social organisation of care in an ageing society.

• There is also a mismatch between educational requirements and educational attainment within the workforce; indicating both over-qualification and under-qualification of employees. This highlights the need to better match education and training to workforce needs while ensuring that Tasmanians develop transferrable and flexible skills that enable them to adapt to change over their lifetimes.

• The findings provide further evidence that the demand for labour is the greatest challenge for the Tasmanian economy rather than the supply of educated and skilled labour.

• Overall the findings highlight the complex relationship between job creation and economic growth in a contemporary service-based economy; While the greatest jobs growth is projected to be in low skill, service-based occupations, over-time innovative export orientated sectors have the potential to increase the proportion of high skill employment in Tasmania. In the absence of innovation and investment in globally competitive traded sectors, increasing the supply of educated and skilled labour may not automatically result in increased employment and economic growth.

Policy implications

Increasing workforce polarisation in Tasmania since 2006 highlights how the demand for labour is changing. This carries with it significant implications for both education and training and economic development policy. Increasing job polarisation, associated under-employment and workers not fully utilising their skills and training indicates spare capacity in the labour market. Such trends highlight the need to create more knowledge-intensive, high skill employment while providing flexible training options to ensure workers can adapt to the rapidly changing labour market. Workforce polarisation poses a number of challenges to the economy and society, particularly for young job seekers who, without good job prospects, may be forced to seek opportunities elsewhere.

Importantly, there needs to be a shift in the policy rationale which automatically links economic growth and job creation. The reality for restructuring economies associated with the Fourth Industrial Revolution is that wealth creation is generated by increasing competitiveness and productivity in traded sectors such as agriculture, manufacturing, and mining, often by replacing labour with capital. Therefore, these traded sectors may be reducing jobs while concurrently becoming more productive and making a greater contribution to economic output, although this is not evident in the broader manufacturing sector as yet.

Method and data

This report outlines the polarisation of Tasmania’s workforce and relies on the occupational classification systems approach that allocates jobs into a hierarchy according to skill level and skill specialisation. In Australia, the Australia New Zealand Standard Classification of Occupations (ANZSCO) identifies the level of skill that is typically required to perform the tasks associated with a particular occupation and provides an indication of the minimum level of education and/or experience required by an individual to perform the tasks. The skill levels are ranked from one to five.

The analysis of job polarisation is extended to include the highest level of educational attainment of workers as an indication of workers’ skills to identify whether the relationship between the supply of skills (educational attainment) and demand for skills (occupations) has an impact on the composition of the workforce. This analysis utilises Australian Bureau of Statistics Census of Population and Housing data for 2006 (pre GFC) and 2016 (post GFC), similar economic periods in Tasmania.

- Skill Level 1 is commensurate with a Bachelor Degree or higher qualification
- Skill Level 2 is commensurate with an Advanced Diploma or Diploma
- Skill Level 3 is commensurate with a Certificate IV or III (including at least 2 years on-the-job training)
- Skill Level 4 is commensurate with a Certificate II or III
- Skill Level 5 is commensurate with a Certificate I or secondary education
Tasmania’s polarised workforce

Disproportionate employment growth in high and low skilled jobs is an increasingly pervasive feature of advanced economies. This is particularly true of many regional economies where economic diversification and workforce polarisation presents considerable challenges for policy makers.

Tasmania’s workforce is polarised and becoming increasingly so, where the share of employment in high-skill jobs and low-skill jobs increases relative to the share of employment in middle (intermediate) skill jobs.

Workforce polarisation in Tasmania is occurring due to economic restructuring; the shift away from traditional industries including agriculture, forestry and fishing and manufacturing to services industries such as care, education and tourism, and the associated role of advancements in technology and the quest for greater competitiveness and productivity in a global economy.

An analysis of occupational skill distribution between 2006 and 2016 for Tasmania (pre and post the Global Financial Crisis) reveals evidence of heightened job polarisation over the decade. There has also been a marked shift to less-than-full-time employment, particularly for Tasmanians in lower skill level jobs. While Tasmanian industries experience high levels of under-qualification of workers (consistent with an ageing workforce), high levels of over-qualification are also evident. Critically, the share of the workforce with higher level qualifications in Tasmania appears to be growing at a faster rate than the share of jobs that require higher level qualifications. These within-skill group shifts to over-qualification and less-than-full-time employment exacerbate the potential implications of an already polarised workforce.

Over the 10-year period to 2016, Tasmania’s already polarised workforce became more so, with a reduction in the number and share of mid-level jobs. This was offset by increases in the share of the workforce employed in the two highest skill level occupations, increasing to over a third of the workforce (38.8%). While the lowest skill level occupations experienced little change, with just under half the workforce (46.3%), requiring no more than a Certificate II qualification.

In 2016, three in five workers employed in high-level occupations (requiring a tertiary qualification) were appropriately qualified for the job, while 14.4% held either a Certificate I or did not have a post-school qualification, indicating a high level of under-qualification. A considerable proportion of under-qualification in Tasmania is likely to be associated with an older workforce in which workers gain training, skills and experience throughout their careers rather than gaining formal qualifications. It can also be explained by a considerable proportion of young Tasmanians not completing school or pursuing further education. Regardless, ongoing participation in appropriate, formal education and training can improve skill acquisition and career opportunities and increase productivity at both the enterprise and economy level. This analysis is concerned with the relationship between education, skills and employment but it is also important to acknowledge that education provides a broader range of intrinsic benefits to individuals and their communities.

A majority of workers (58.4%) employed in skill level 2 jobs (requiring qualifications equivalent to a Diploma or Advanced Diploma) were under-qualified. Meanwhile, nearly half (47.3%) of workers in the second lowest skill level job category (requiring Certificate I or II qualifications) were over-qualified, holding a Certificate III or IV or higher. This suggests a crowding-out of lower skilled workers resulting from a lack of demand for mid-skilled workers. In addition, 4.9% of workers in the lowest skill level occupation category held a tertiary qualification where no post-school qualifications were required for their employment.

While there are more Tasmanians in employment in 2016 than in 2006, fewer were employed full-time; the extent of job polarisation 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. This predicament has substantial economic and social implications for Tasmanians and policy makers. Whether this is a temporary situation or whether polarisation will increase into the future, remains to be seen.

Why does polarisation of the workforce matter?

Polarisation of the workforce is concerning for several reasons. Primarily, job polarisation has the potential to threaten productivity gains, social mobility and inclusive growth.

Workforce polarisation is associated with:

• Increases in non-standard forms of work
• Differences in hours of work between skill levels
• Low wage growth
• Widening inequality
• Increasing levels of over-qualification, education and skill mismatch
• Increasing under-employment
• Reduced opportunities for young people and graduates to enter the labour force
• Limited opportunities for upward career progression from lower-skilled jobs.

Other issues include the impact on retirement savings and overall health and well-being.
What causes workforce polarisation?

Evidence suggests that job polarisation is not uni-causal, uni-dimensional or uni-directional. It’s caused by a combination of factors and is complicated. However, advancements in technology are a primary driver of polarisation of the workforce; jobs replaced by automation and AI (Routine Biased Technological Change – RBTC) and higher skill jobs enhanced and complemented by technology (Skill Biased Technological Change – SBTC). This extends to the accompanying economic restructuring and globalisation, including pressures to improve productivity, increase competitiveness and the resultant ‘offshoring’. Another perspective is the rise of the services sector and the care economy resulting from changes to the social organisation of care, particularly in ageing populations. Further, the historical industry structure of a region, the share of traditional industries and the process of economic diversification is associated with job polarisation. Other influences include changes in household consumption and consumer preferences, the age structure of the respective populations, the level and type of immigration and the welfare system.
Is Tasmania’s workforce becoming polarised?

In 2006, Tasmania’s and Australia’s workforces were already polarised, hollowed out in the middle skill occupations, yet skewed slightly to the higher skilled occupations. Tasmania’s workforce was less professionalised than the Australian workforce (26.2% compared with 29.3%) and nearly half (46.7%) of the occupational distribution was in lower-skill (level 4 or 5) jobs. By 2016, both workforces had professionalised further with an increasing proportion of the occupational distribution made up of skill level 1 jobs, 27.4% for Tasmania and 31.6% for Australia (Figure 1). However, almost half of Tasmania’s workforce (46.3%) remained employed in the low-skill occupations.

However, the Australian workforce professionalised at a faster rate than Tasmania’s; the share of skill level 1 jobs increasing by 2.4 percentage points compared with 1.2 percentage points. Australia’s larger increase in share of skill level 1 jobs saw a corresponding decrease in the share of skill level 3 and 5 jobs, whereas Tasmania’s gain in skill level 1 jobs was offset by a decline in skill level 3 jobs (Figure 2). In essence, this means that the Australian workforce is still undergoing professionalisation, whereas the Tasmanian workforce is polarising towards the high and low skill occupations.

Over the decade, the Tasmanian workforce expanded by around 11,000 additional jobs. The greatest increase in jobs, in both relative and absolute terms, was experienced by increases in the number of skill level 1 occupations (5,400 additional jobs, equivalent to a 10.3% increase) and skill level 2 occupations (2,000 additional jobs, a 9.1% increase). This is compared with a 5.4% and 3.8% increase in skill level 4 and 5 jobs respectively (2,900 and 1,500 new jobs), effectively closing the gap between the proportion of higher and lower skill occupations by two percentage points. However, intermediate skill jobs (level 3) experienced both a relative decline in the share of employment (-1.2 percentage points) and absolute decline; 684 jobs were lost, equivalent to a decline of 2.1% in the number of jobs, contributing to hollowing out the workforce further.
Figure 3: Change in the workforce by occupational skill level, number and share, Tasmania, 2006 to 2016

Figure 4: Highest level of educational attainment of the workforce, Tasmania, 2006 and 2016
As is evident in Figure 3, over the 10-year period to 2016, Tasmania’s workforce polarised further with a reduction in the number and share of mid-level (skill level 3) jobs. This was offset by increases in the share of the workforce employed in the two highest skill level occupations, while the share employed in skill level 4 jobs was stable.

Over the same period from 2006 to 2016, the workforce experienced considerable upskilling (Figure 4). While this improves the potential for the professionalisation of the workforce and more productive economy, the increased skills uptake has not yet resulted in an equivalent increase in demand for higher skilled jobs.

The proportion of the workforce with a tertiary qualification increased, while the proportion of the workforce holding only Certificate I or secondary school qualifications declined, from nearly half of the workforce (49.6%) to 39.1%.

Despite the decline in demand for skill level 3 occupations, the workforce with Certificate IV or III qualifications (equivalent to the educational requirement for skill level 3 occupations) increased to more than a quarter of the workforce; 25.5%.

The disparity in the change of supply of skills and demand for skills from 2006 to 2016 is evident in Figure 5. While the share of the workforce with tertiary qualifications (required for skill level 1 occupations) increased by 5.4 percentage points (skill supply), the share of skill level 1 jobs only increased by 1.2 percentage points (skill demand). Similarly, for skill level 2 and skill level 3 jobs, the proportion of the workforce with equivalent qualifications increased by a greater rate than the share of jobs – supply was greater than demand.

While there has been an upskilling of the workforce, considerable levels of over-qualification and under-qualification are evident.
Table 1 shows the proportion of workers in occupation skill levels by their educational attainment.

The highlighted cells show the percentage of the workforce where qualifications match skill requirements, while the cells to the left of the highlighted cell indicate which was over-qualified and the cells to the right show which was under-qualified.

In 2016, three in five (63.0%) workers employed in skill level 1 occupations were qualified for the job and held a tertiary qualification, 14.4% held a Certificate I or did not have a post-school qualification, indicating a high level of under-qualification. The majority of workers employed in skill level 2 jobs were under-qualified (58.4%). Nearly half (47.3%) of workers in skill level 4 occupation held a Certificate IV or III or higher, and were over-qualified. This provides evidence of the impact of job polarisation.

The lack of demand for skill level 3 jobs pushes people with Certificate III and IV qualifications into lower skilled jobs, effectively creating a crowding out effect, while 4.9% of workers in skill level 5 occupations held a tertiary qualification where no post-school qualifications were required in the job they were employed in.

### Table 1: Workforce by occupation skill level and educational attainment, 2016.

<table>
<thead>
<tr>
<th>Skill level of occupation</th>
<th>Highest level of educational attainment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bachelor Degree and over</td>
</tr>
<tr>
<td>Skill level 1</td>
<td>63.0</td>
</tr>
<tr>
<td>Skill level 2</td>
<td>21.6</td>
</tr>
<tr>
<td>Skill level 3</td>
<td>5.1</td>
</tr>
<tr>
<td>Skill level 4</td>
<td>9.1</td>
</tr>
<tr>
<td>Skill level 5</td>
<td>4.9</td>
</tr>
</tbody>
</table>
The rise of part-time employment

Not only has there been a considerable shift in the share of the workforce across skill levels, there has been a substantial change in the share of labour force attachment within skill levels. The share of the workforce employed full-time dropped from 64.6% in 2006 to 59.8% in 2016, meaning two in five (40.2%) of the workforce were employed part-time. For all skill levels, the share of the workforce employed full-time declined. The greatest change was experienced in the skill level 4 workforce, dropping 5.9 percentage points to 54.0% followed by skill level 5 (5.6 percentage points lower to 36.5%) and the skill level 2 workforce (5.3 percentage points lower to 71.5%).

In terms of the share of the total workforce, all skill levels experienced a reduced share of full-time employees, with a marked shift to an increased share of part-time employees, particularly for the skill level 1 (1.4 percentage point increase) and skill level 2 (0.7 percentage point increase) workforces. Therefore, the increasing professionalisation of the Tasmanian workforce shown in Figure 6 has been accompanied by a corresponding growth in part-time employment, which may, or may not, be by choice.

Figure 6: Change in share of employment by labour force status, 2006 to 2016.
Occupational change in Tasmania – which jobs are coming or going?

When considered by occupation, the Tasmanian labour market has changed substantially since 2006 (Figure 7). Workers in professional occupations made up the largest share of the total workforce in 2006 (17.6%) and 2016 (19.0%) followed by technicians and trade workers and clerical and administrative workers. While these three occupational groups remained the top three in 2016, only professionals increased the number and share of their workforce while the clerical and administrative workers declined in absolute numbers and their share of the workforce, consistent with RBTC.

In the decade there has been a large increase in the number of community and personal service worker jobs (30.8%) and as a share of the total workforce (2.4 percentage points), reflecting job creation in the services sector largely resulting from changes in the social organisation of care, including child and disability care, and an ageing population. The only other occupational category to experience an increase in the number of jobs and share of the workforce was professionals (13.6% and 1.2 percentage points respectively), largely health professionals such as registered nurses and medical practitioners.

While the number of managers, technicians and trade workers and sales workers increased over the decade, their respective share of the total workforce decreased. In addition to clerical and administrative workers, the number of jobs and the share of the machinery operators and drivers and labourers’ workforces also declined between 2006 and 2016 (Figure 7).

For all occupational categories (Figure 8), only the community and personal services workers increased their share of full-time and part-time employment (0.4 percentage points and 2.0 percentage points of the total workforce respectively). Professionals employed full-time reduced their share of the workforce by 0.1 percentage points, which was offset by a 1.3 percentage point increase for professionals employed part-time. Managers, technicians and trade workers, sales workers, machinery operators and drivers and labourers increased their respective share of the workforce employment part-time, the total share was offset by larger declines in the share employed full-time. Clerical and administrative workers experienced a decline in the share of full-time and part-time workers.
The implications of job polarisation

Polarisation affects not only individuals but also the broader economy. The number of jobs at each skill level is determined by the complex dynamics of the labour market. This report has highlighted how employment growth in the low-skill occupations has occurred despite the substantial increase in educational attainment. While there is a broad consensus that improving levels of educational attainment will benefit individuals and the wider community this research also highlights the reality that increasing qualifications alone won’t automatically be translated into higher levels of skilled employment.

Polarisation has the potential to exacerbate inequality and reduce opportunities for labour market mobility, particularly for young people. The number and share of entry level jobs is declining, as are opportunities for low to mid-qualified individuals to enter the workforce while the chance of progression is increasingly difficult.

While over-qualification is detrimental to individuals, society and the economy, so too is under-employment. Due to structural changes in the labour market, having a job does not necessarily mean having a stable and reliable income. Under-employment indicates there is spare capacity in the workforce, coupled with people working below their level of educational attainment. This scenario is extending into high-skill areas of the labour market. The inability to secure quality work has detrimental flow-on effects, which accumulate disadvantage for individuals and society.
Sectoral impacts

Our previous research highlighted that while the Tasmanian workforce grew 4.8% from 2006 to 2016, the growth wasn’t experienced across all industries with the composition of the workforce changing considerably.

Since 2006, the manufacturing sector dropped from the top five providers of employment in Tasmania, overtaken by three sectors: education and training; public administration and safety; and accommodation and food services (Figure 9). While the health care and social assistance sector overtook retail as the largest source of jobs in Tasmania. Despite a reduction in the size of the workforce, investment in infrastructure (such as irrigation), productivity enhancing practices and technology saw the agriculture, forestry and fishing sector overtake manufacturing as the greatest contributor to the Tasmanian economy in the 2015/16 financial year, accounting for 10.3% of GSP (up 0.5 of a per cent since 2005/06). Manufacturing fell from first to third position in terms of contribution to the economy, falling from 11.5% of GSP in 2005/06 to 8.3% in 2015/16. The health care and social assistance sector increased its economic contribution and size of its workforce, becoming the second greatest contributor to GSP. Further, by 2016 more workers were employed part-time rather than full-time, particularly in service-based sectors. These include three of the top five employing sectors in Tasmania: health care and social assistance; retail trade; and accommodation and food services. The greatest job gains were experienced by women employed part-time in the services-based sectors of health care and social assistance and education and training. The greatest job losses were experienced by men employed full-time in the male-dominated, manufacturing sector.
Routine biased technological change (RBTC), globalisation and offshoring have reduced the number of intermediate skilled jobs, routine and non-cognitive jobs in the manufacturing and administration sectors, such as machinery operators, process workers and administrative and clerical workers, in Tasmania. While jobs requiring human input and interpersonal skills increased over the period. These jobs are largely found in the care and services sector, however are low-skilled such as aged, disability and other care and hospitality workers.

Based on state-wide data there is little evidence of skill-biased technological change (SBTC) in the changed occupational distribution in Tasmania. That is, an increase in cognitive, yet non-routine jobs whereby technology amplifies human comparative advantages of problem-solving, creativity and interpersonal skills requiring higher levels of educational attainment, and professionalisation of the workforce, such as that in the professional, scientific and technical services sector. The professionalisation of the workforce is more likely to be associated with the ageing population and the increasing demand for health and care professionals, further associated with the roll-out of the NDIS in Australia and the changed regulatory environment of the early childhood education and care (ECEC) sector.

This research highlights how a complex combination of structural factors have contributed to increasing workforce polarisation in Tasmania. Tasmania’s ageing population and high levels of disability contributed to the economy’s transition, as has the emphasis on growing the tourism sector, all of which are dominated by low-skill, low pay and largely less-than-full-time occupations.
Institute Insights

Insight One:
Tasmania’s workforce (November 2017)

Insight Two:
Tasmania’s workforce by industry sector (December 2017)

Insight Three:
A blueprint for improving housing outcomes in Tasmania (February 2018)

Insight Four:
Planning for the future of aged care (June 2018)

Insight Five:
A snapshot of Media Literacy in Australian Schools (September 2018)

Insight Six:
Positive signs, but how can we make it last? Tasmania’s changing population dynamics (December 2018)

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