Reimagining the workforce: community perceptions of careers working with rolling stock

Dr Daniel Ooi and Dr Craig Cormick
Institute for Sustainable Industries and Liveable Cities
Victoria University
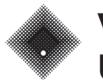
VICTORIA UNIVERSITY | ISILC INSTITUTE OF SUSTAINABLE INDUSTRIES AND LIVEABLE CITIES

VICTORIA State Government | Department of Transport

RAIL MANUFACTURING CRC

Disclaimer: Victoria University advises that the information contained in this publication comprises general statements based on scientific research. The reader is advised and needs to be aware that such information may be incomplete or unable to be used in any specific situation. No reliance or actions must therefore be made on that information without seeking prior expert professional, scientific and technical advice. To the extent permitted by law, Victoria University (including its employees and consultants) exclude all liability to any person for any consequences, including but not limited to all losses, damages, costs, expenses and any other compensation, arising directly or indirectly from using this publication (in part or in whole) and any information or material contained in it. This paper represents the opinions (findings, and conclusions or recommendations) of the authors, and is the product of professional research. It is not meant to represent (reflect) the position or opinions of the Victorian Government or the Rail Manufacturing Cooperative Research Centre.

March 2020

Citation: Ooi, D., and Cormick, C. (2020). *Reimagining the workforce: community perceptions of careers working with rolling stock.* Rail Manufacturing Cooperative Research Centre, Melbourne.

This report is one of a seven reports relating to the 'Reimagining the workforce: building smart, sustainable, safe public transport' research project. The complete suite of reports is as follows:
1. The Victorian rolling stock context. Literature review.
2. Community perceptions of careers working with rolling stock.
3. Organisational context assessment of inclusion and innovation in the Victorian rolling stock sector.
4. Training for a future rolling stock workforce.
5. The economics of rolling stock manufacturing, maintenance and operations for Victoria's public transport sector.
6. Building smart, sustainable and safe public transport. Workshop context paper.
7. Reimagining the workforce for public transport: Interim action plan.

Images: Bigstock Photo Library

Table of contents

Project summary

Reimagining the workforce: building smart, sustainable, safe public transport is a collaborative research project between the Department of Transport (DoT), the Rail Manufacturing Cooperative Research Centre (RMCRC), Victoria University (VU) and industry which commenced on 1 July 2019 and will be completed by 30 June 2020. This research aims to provide a starting point for addressing the current knowledge gaps in the transport industry workforce, with a specific focus on above track rolling stock. Its purpose is to understand what practical steps might be taken to address critical skills shortages currently facing the sector, and what is needed to build a sustainable and resilient future workforce.

The project provides a systemic assessment case study of the Victorian public transport rolling stock sector from three perspectives: economic, organisational and community in the broader context of the public transport system. It undertakes a case study approach examining specific organisations across the rolling stock and public transport system in Victoria and using an "end user-based research methodology", which is transdisciplinary and combines end user and academic knowledge. Findings from these assessments will be used to inform a workshop with industry in 2020 to identify key actions and develop an interim plan to support these actions.

Our key purpose is to understand:
- The current above track, rolling stock workforce context.
- The barriers, needs, opportunities, benefits and existing strengths of organisations and their ability to respond to current recommendations, and achieve a sustainable, inclusive and innovative future workforce.
- The economics of developing and growing capability within transport organisations' workforce as a result of the investment in training (Tiers 2 and 3) and potential economic opportunities for small to medium enterprises (SMEs) at a local level. This is being approached via the benefits and costs of local procurement.
- How the 18–30 old year cohort perceive and understand public transport as a potential employer and their expectations more generally in relation to work.

This research builds upon previous research undertaken by the Australian Rail Association and the RMCRC.

This report details the results of two pieces of research addressing the knowledge gaps in the understanding of the extent to which young people in Australia view careers in rolling stock as attractive, and the extent to which demographic changes among young job seekers, and changes in social and cultural values in relation to work, have changed the landscape for securing the future workforce in rolling stock. These two pieces of research were conducted from September–November 2019, and were an online survey of over 1,000 young Australians aged 18–30, and a qualitative study consisting of 40 face-to-face interviews conducted with young people in Victoria.

Executive summary

The key findings of this report, based on a survey of a representative sample of over 1,000 young Australians (18–30 years old) about their attraction to careers in public transport, are as follows.

The target group for attraction to careers in rolling stock is sizeable

The proportion of young people who indicated 'yes' or 'possibly' when asked if they had a considered a career with rolling stock was significant, however the proportion of the 'possibly' segment to the 'yes' segment indicates significant unrealised potential:

- 48% of young people had considered a career in rail (17% yes, and 31% possibly)
- 33% had considered a career with buses (10% yes, and 23% possibly)
- 37% had considered a career with trams or light rail (12% yes, and 25% possibly).

Demographic groups most attracted to public transport careers

- The demographic groups more likely to have considered a career in public transport were males and those with blue-collar career aspirations. Women and people of non-Anglo cultural backgrounds were less likely to have considered a career in public transport.

Young people's knowledge about career options in public transport

- Knowledge of the options for careers in public transport was largely limited to driver positions, with 'bus driver' and 'train driver' accounting for over 70% of first responses when asked to nominate careers in public transport. There was little consciousness in the general cohort (beyond those studying trades and engineering), about the significant number of jobs in manufacturing and maintenance of trains, buses and trams.
- When asked what information they would like about careers in public transport, females were more interested in further information than males.

Career motivators for young people

- Looking at career motivators, when it was included in the question as an option there was a strong preference for a career that had social purpose or benefited society (79% agreement), with females ranking social benefit as a higher motivator than males. However, in an open-ended question only 15% listed lacking clear benefits to society as a reason they would not apply for a job – perhaps indicating the difference between preference and actual behaviour.
- There was higher interest in a more routine job than an innovative job, although 58% of respondents wanted a job that had a mix of routine and innovation.

Barriers to the participation of women and culturally diverse groups in public transport jobs

- While perceived gender barriers were a particular issue for female respondents – with 'being male dominated', lacking safety and being sexist identified as particular problems – those who came from non-Anglo backgrounds did not perceive there to be cultural barriers to working in public transport at a higher rate than the general public – although 22% did perceive such barriers existed.
- There was a high correlation between those who stated they had considered a career in public transport previously, and those who had higher self-professed knowledge of what was involved in a career in public transport.

Key findings of this report, based on 40 face-to-face interviews with a variety of young people throughout metropolitan and outer-suburban Melbourne, and regional Victoria (Geelong, Ballarat, Shepparton) are as follows.

Young people's perceptions of public transport careers are relatively superficial, and are more positive after being provided with further information

- The lack of consideration of public transport careers by those who had never done so was often superficial, due to unfamiliarity rather than negative attitudes. When questioned about whether their areas of career interest (ranging from pre-apprenticeships to be electricians, diplomas or degrees in information technology (IT), automotive engineering, to community development and urban planning, and fashion) might possibly be linked to rolling stock careers, almost all were open to reconsideration. Wholesale deep-seated opposition to the transport sector as a whole did not appear in the way it did for mining (bad for the environment), nursing (poor working conditions), or labouring (low status).

Given a low level of knowledge and consciousness around public transport careers, parental interest and influence were key motivators, but universities and TAFE courses were not, as those studying engineering and trades did not have rolling stock-related course content.

- Parental interest was key motivator for young people interested in fields potentially related to rolling stock (e.g., train and bus driving, and those studying engineering or trades).
- Parental influence over career selection varied based on social class and cultural background, with blue-collar parents and migrant parents more likely to regard their endorsement of their children's career choices as important.
- Of those studying engineering and trades, they stated a strong presence of the water, mining and car industries, but little (if any) content related to trains, buses or trams.

Young people's focuses when thinking about choosing a career

- Young people focused on their prospective career identity as being shaped by the particular interests or tasks performed (e.g., IT or product designer), rather than the particular employer, sector, or firm in which these tasks were performed.
- Young people want careers that are interesting and socially rewarding, but they also want long-term stability and security.
- For some of the young people interviewed, entrepreneurial values were expressed, with many science, technology, engineering and mathematics (STEM) graduates expressing a desire for opportunities to create a personal business in their field (engineering, IT, economics) in the long-term, instead of wage labour.

Barriers to participation and concerns about safety

- Concerns about safety in the workplace were key drivers for career choice in young women. This included facing sexism or harassment in the workplace, concerns about safety in dealing with dangerous customer situations, and concerns about safety when travelling home alone from remote depots late at night after shifts.
- Interviewees from culturally diverse backgrounds regarded a diverse workplace as a less intimidating place to work compared to one that is not diverse.

Introduction

This document reports on the methodology and results of two pieces of research conducted from September–November 2019, as part of a mixed-methods approach to better understanding how young people perceive working in rail, bus and tram careers. The research, conducted by Dr Daniel Ooi and Dr Craig Cormick, included an online survey of over 1,000 young Australians aged 18–30, and 40 face-to-face interviews conducted with young people in Victoria.

We recommend that this report be read in conjunction with the two reports on the organisational and economic aspects of rolling-stock careers, and the community context section of the literature review *Reimagining the workforce: The Victorian rolling stock context*[1], which discusses the existing body of work related to community perception of careers in rolling stock. This includes the extent to which the Australian and international community view careers in rolling stock as attractive, as well as the extent to which demographic changes among young job seekers, and changes in social and cultural values in relation to work, have changed the landscape for securing the future rolling stock workforce. It also addresses the current understanding of the changing landscape of gender and cultural diversity of contemporary Australia in terms of career attraction, and ways in which understanding this might contribute to securing the future rolling stock workforce. The literature review also includes the significant works on this topic in Australia, including the key Australian Rail Association (2006) report *The Changing Face of Rail*, and the *Attraction and Image Project* (2009–2011) funded by the Cooperative Research Centre (CRC) for Rail Innovation. Selected key points of the review are reproduced below, in which a systematic review of academic and industry literature conducted during July and August 2019 concluded:

- There is little literature on broader community perceptions of careers in rolling stock, and virtually all the existing literature is on rail. Most studies focus on engineering students, however changes to workforce composition and career values in the last decade would suggest it is critical to recruit more broadly.
- It should be noted that these perceptions were gained from employees within the sector and from representatives of member organisations, rather than the general community at large, and may reflect industry perceptions rather than those of the community. A knowledge gap exists in relation to the need to establish whether these views are the same as those of the broader community.
- A knowledge gap exists in our understanding of whether more information about, or experiences of, public transport will necessarily in-and-of-itself improve community attraction to careers in the sector. It has not been determined whether patronage of, and knowledge of, transport services correlates positively or negatively with job attractiveness. The relationship between service patronage, information salience, and perception is not always a straightforward one.
- There is a lack of detailed research as to what forms of knowledge and engagement would be most needed. While it is clear from the literature that there is a need for greater public engagement and promotion about public transport careers, it is not clear what specific kinds of knowledge would be necessary, and how this might be framed. It is necessary to conduct in-depth interviews with potential applicants in order to understand what values, motivations, and cognitive processes lead them to not seek careers in public transport.
- Have there been generational changes in the last ten years, especially with 'digital natives' (those who have never known a pre-internet world) occupying a greater space in the emergent workforce?
- Are there opportunities to improve community perception of public transport careers related to the growing awareness of climate change, and the need for innovative green public transport solutions as part of mitigating this?
- Has there been a response to the changing ethno-cultural profile of Australia's workforce in the past ten years? The high proportion of international students in engineering courses in Australia are an underutilised source of talent (Wallace et al., 2010, p17). This is truer today than ten years ago, and clearly needs to be addressed.
- From the literature, an important research gap is the need to determine the specific structural barriers faced by potential applicants for rolling stock jobs, in addition to factors of attraction previously mentioned, as well as the degree to which perceptions of the decline in manufacturing careers has contributed to individuals not becoming attracted to the sector. Some of these factors are well illustrated in Figure 1 (overleaf) reproduced from The Australian Centre for Social Innovation's report (2017).

1. Young, C., Jones, R. N., Heenetigala, K., Ooi, D., Lung, S., and Parry, N. (2020). *Reimagining the workforce: the Victorian rolling stock context*. Rail Manufacturing Cooperative Research Centre, Melbourne.
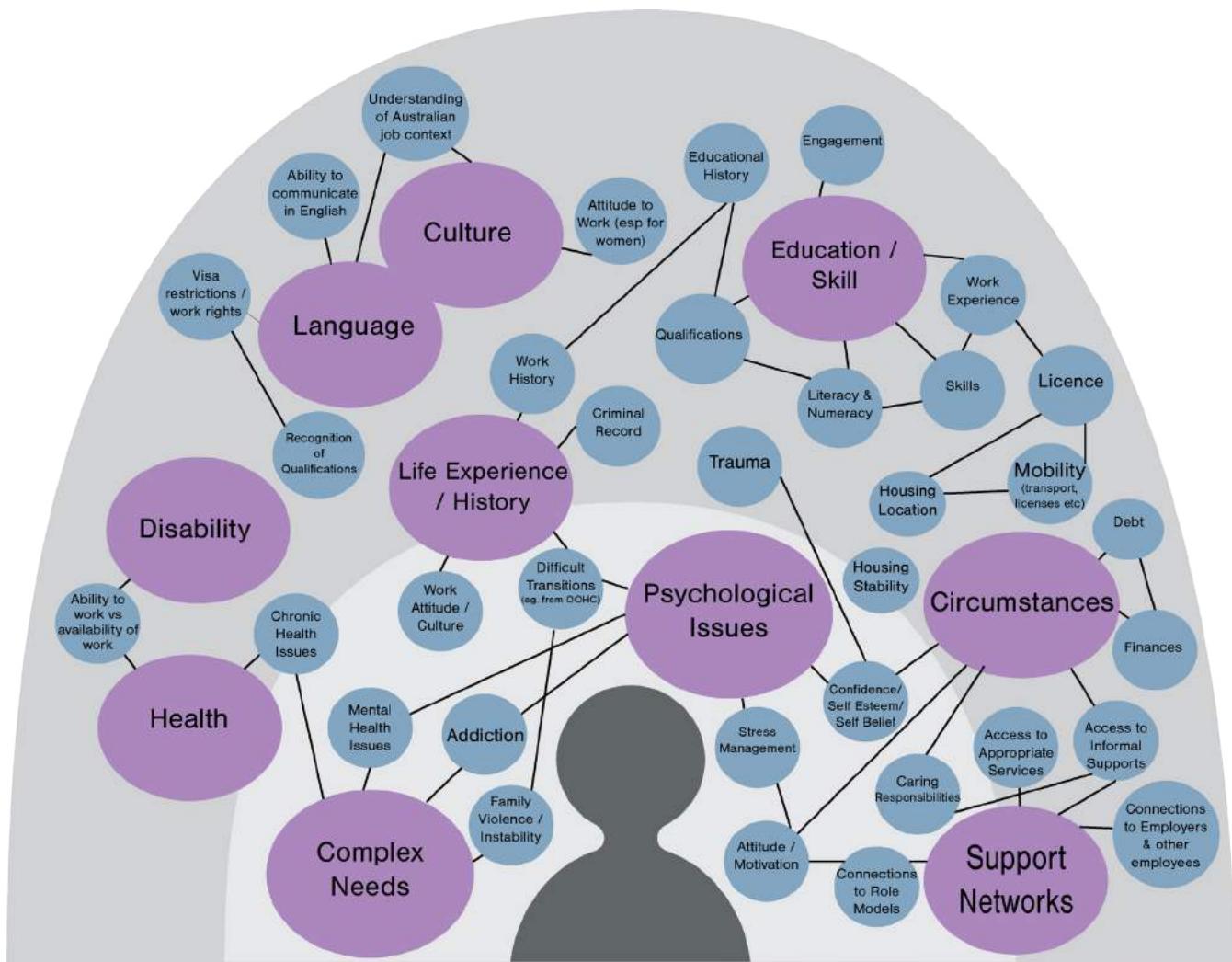
Figure 1: Structural barriers preventing young people gaining employment (reproduced from TACSI report, 2017, p19)

The two elements of this study attempt to establish a baseline to answer to these questions, and to gather an evidentiary basis, in quantitative (with large sample size, representativity, and robustness) and qualitative terms (with illustrative detail and holistic analysis) to address:

■ To what extent does the Australian community view careers in rolling stock as attractive, and what aspects of these careers present a barrier to attraction for various segments of the community?

■ To what extent have demographic changes amongst young job seekers, and changes in social and cultural values in relation to work, changed the landscape for securing the future rolling stock workforce?

■ How can we understand the changing landscape of gender and cultural diversity of contemporary Australia in terms of career attraction, in ways that might contribute to securing the future rolling stock workforce?

Methodology

Survey and interview formulation and data collection

The survey and interviews were focused on understanding, in terms of attraction, how young people in the 18–30 age group perceived careers in rolling stock. The survey covered a broad range of variables in a representative way, with proportionate representation of young people with white and blue-collar aspirations, with equal representations of gender and a broad range of cultural and geographic backgrounds. In contrast, the interviews targeted a selection of young people to gain illustrative qualitative data to complement the quantitative data from the survey.

The two major elements were:

(1) A survey of community attitudes towards public transport careers based on a representative sample of 1,000 young people to generate quantitative data from a statistically significant sample from which generalisations could be made. This also provided baseline numerical data on attraction to the sector to use as a yardstick for future progress of the sector.

(2) Semi-structured interviews with 40 young people in Victoria to holistically understand their perceptions of rolling stock careers in terms of life experiences, ambitions, values, and relationships between parts of the life (career, education, family, culture). Their responses generated qualitative data, which drew connections between parts of their lives and helped illustrate the reasons they gave the answers they did in the survey.

An iterative process was used to develop the questions for the survey and interviews (Figure 2).
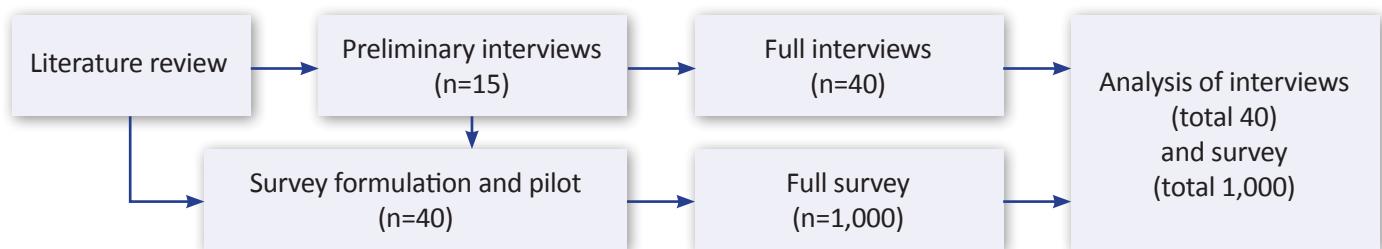
Figure 2: Iterative process used in the survey and interviews

A small number of interviews were conducted, and the findings used to inform the survey questions. A pilot of the survey sample (40 of the 1,000) was run between 9–11 October 2019. The initial results were then reviewed and the full survey was launched. The final slate of questions and further methodological details are included as Appendix 1.

Interview questions for the semi-structured interviews were generated from research gaps in the literature review (Appendix 2). The aim of the interviews was to gain a holistic understanding of how various factors in the young people's lives fitted with their perception of careers in rolling stock, including the ways in which their circumstances, values, knowledge, culture, and aspirations shaped their openness to these careers. The aim was not to generalise, as in the large random sample of 1,000 in the survey, but to gain a finer resolution of the relation between parts of the participant's lives, as well as a general process of sense-making, thus drawing on the relative strengths of quantitative (survey) and qualitative (interview) data collection, without overlapping. Table 1 (overleaf) displays the relationship between the types of data collected from the survey and interviews.

Table 1: Quantitative and qualitative data and their usage in this study

	Type of data	
	Quantitative	**Qualitative**
Collection strategy	Online survey	Recorded interviews
Sample size	n=1,000	n=40
Properties	Representative, robust	Detailed, holistic
Sampling strategy	Representative of population	Representative of different types of people, but not a proportional representation of the population
Strength of insight	Can be generalised, as sample is large and representative Provides a numerical baseline against which to measure future progress	Can illuminate meanings, motivations, and relationships between factors.
Type of analysis	Descriptive and inferential statistics	Content/thematic analysis
Output	Counts and statistics	Relations between parts, narratives

The interviewees were all young people aged 18–30, with a balanced representation of gender, a mix of blue-collar and white-collar career aspirations, and a mixture of inner-Melbourne, outer-Melbourne, and regional Victoria geographical origins. The interview population targeted was socially and culturally diverse, including a variety of cultural background (including Australians of Chinese, Indian, Middle-Eastern and African background).

Further methodological details about ethics, data collection and analysis can be found in Appendices 1 and 2.

Survey results

Survey sample

The survey participants were 1,011 people between the ages of 18 and 30, drawn from an online youth panel of over 100,000 members, with a gender division of 52% female and 47% male. The full breakdown by gender and state/territory can be seen in Table 1, alongside 2019 population projection from the Australian Bureau of Statistics (ABS) to serve as a comparison.

Table 1: Gender and state/territory distribution of survey participants

	Total	NSW	VIC	QLD	WA	SA	TAS	ACT	NT	Missing data
Female	526	180	151	72	76	28	10	8	0	1
Male	475	149	139	66	61	41	7	7	0	5
Other	10	2	1	1	2	2	1	1	0	0
Total	1011	331	291	139	139	71	18	16	0	6
Percentage	100.0%	32.7%	28.8%	13.7%	13.7%	7.0%	1.8%	1.6%	0.0%	0.1%
ABS comparison*	100.0%	31.9%	26.0%	20.1%	10.3%	6.9%	2.1%	1.7%	0.9%	0.0%

*Source: March 2019 Australian Bureau of Statistics population estimates modelled from 2016 Census, release 3101.0, https://www.abs.gov.au/AUSSTATS/abs@.nsf/mf/3101.0

Age distribution is displayed in Figure 2. Across the ages there was a slightly lower representation of 22 and 23-year-olds. State representation was in proportion to populations of those state and territories. Most respondents were frequent users of public transport, and only 8% stated that they never used public transport, with a further 20% using it less than once a month.
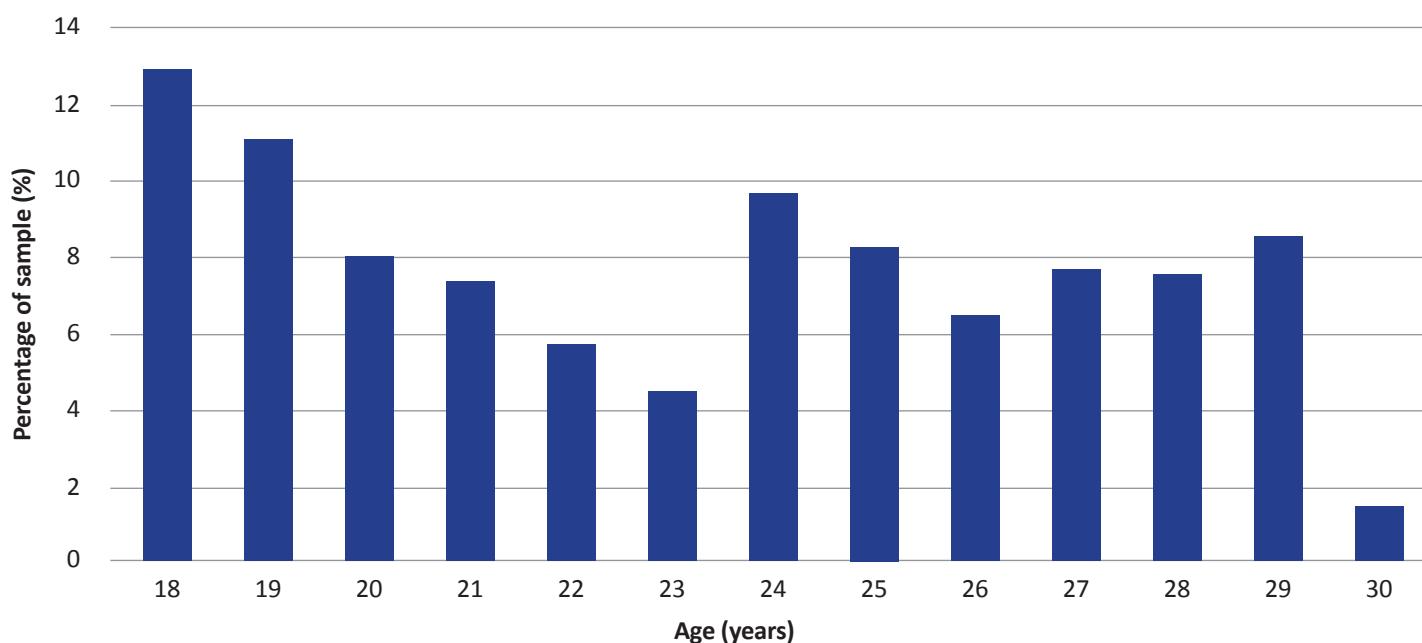

Figure 2: Age distribution of survey participants

Baseline perceptions of careers in rolling stock

The data displayed in Figures 3 and 4 provide a quantitative baseline of the proportion of young people who are potentially open to attraction to careers in rolling stock. Furthermore, such a baseline provides the opportunity to measure change in future.

The proportion of young people who indicated 'yes' or 'possibly' when asked if they had a considered a career with rolling stock was significant, however the proportion of the 'possibly' segment to the 'yes' segment indicates significant unrealised potential. Note that:

- 48% of young people had considered a career in rail (only 17% replied yes, but a much larger proportion of 31% indicated possibly)
- 33% had considered a career with buses (only 10% replied yes, but a much larger proportion of 23% indicated possibly)
- 37% had considered a career with trams or light rail (only 12% replied yes, but a much larger proportion of 25% indicated possibly).

There are clearly significant opportunities for engagement with a large sector of young people.

There were higher 'yes' responses from those with blue-collar education aspirations (n=356 of the sample of 1,011), with 26% of blue-collar respondents stating they had considered a career in rail.

The two groups who expressed the lowest consideration of a career in all three forms of transport were women (62% for rail, 78% for buses, and 73% for tram and light rail), and those from non-English speaking backgrounds (51% for rail, 67% for buses, and 69% for tram and light rail). Females also indicated significantly lower rates of comparison for possibly considering a career in public transport (27% for rail, 15% for buses, and 20% for tram and light rail). Of particular note is that for buses, this is almost half that of males, which represents a much larger discrepancy than for train and tram. One possible reason for this discrepancy emerges from the interview data (pp. 25–38), which is the concern for personal safety due to the solitary and sometimes late-night nature of driving.

Responses by state for the same baseline questions are shown in Figure 4. When analysed by state, South Australian respondents were shown to have been significantly most likely to indicate having thought about a career in rail (21%), bus (15%) or tram (15%) than their counterparts elsewhere. This significant statistic warrants further investigation. The states in which respondents were least likely to have considered a career in public transport were Western Australia and Queensland.

Of interest, the spreads of responses against 'possibly' tended to be more extreme across the different locations than for 'Yes' or 'Not at all' responses, with those in NSW, Victoria and Tasmania more likely to possibly consider a career in public transport than other states or territories. This may represent slightly greater opportunities for engagement, with a larger number of people undecided (34% for those states vs 31% nationally).

CAREER IN RAIL

CAREER IN BUS

CAREER IN TRAM/LIGHT RAIL

Legend: Total, Blue collar, Male, Female, NESB
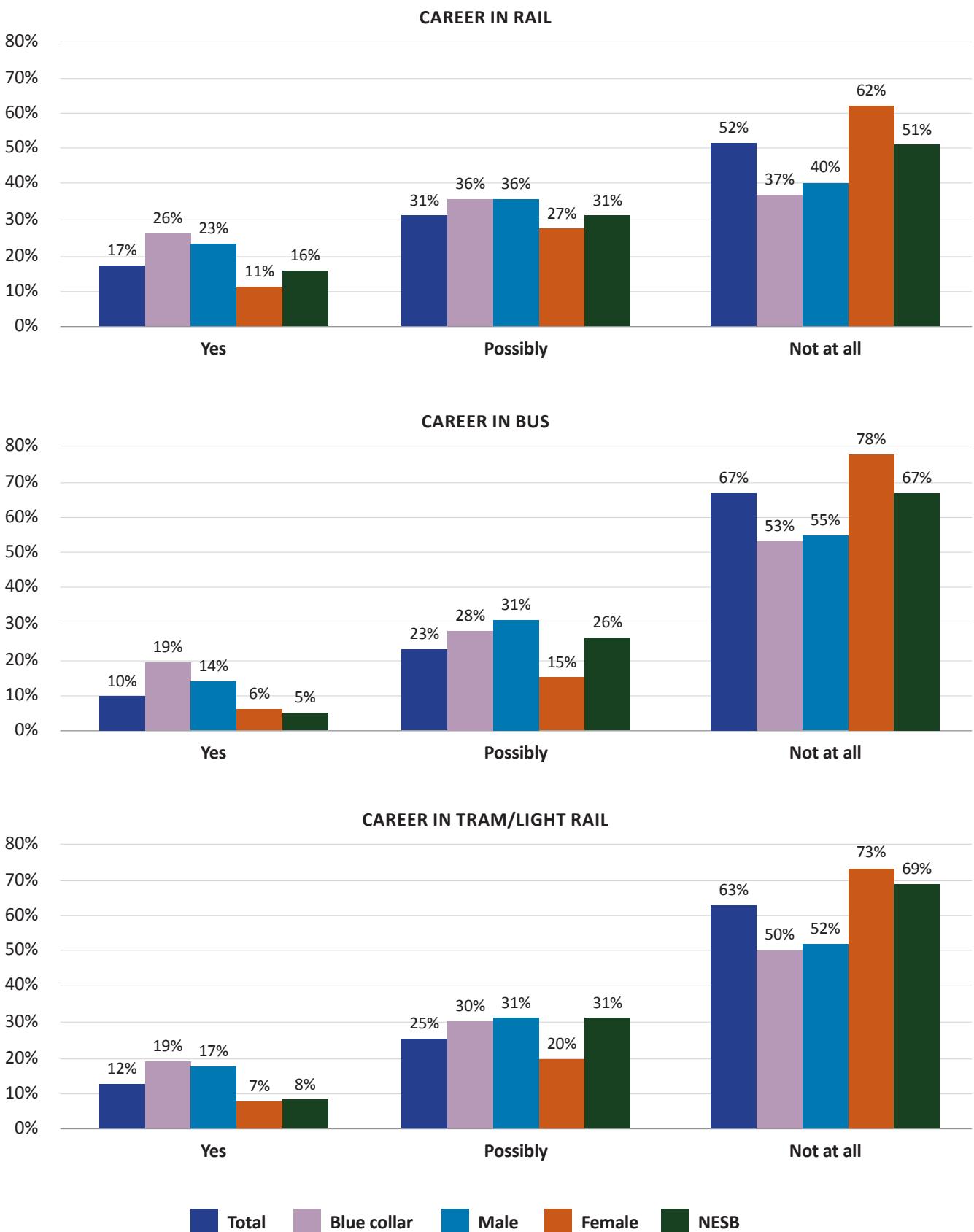
Figure 3: Percentage of respondents who had considered careers in rail, bus, tram and light rail

Data source: Responses to survey question 21: 'Have you ever thought about a career in the following public transport industries?' for (a) rail, (b) bus, and (c) tram/light rail. NESB n=153, blue collar n=356.

CAREER IN RAIL

	Yes	Possibly	Not at all
NSW	18%	34%	48%
VIC/TAS	16%	34%	50%
QLD	17%	32%	51%
WA	15%	25%	60%
SA	21%	20%	59%

CAREER IN BUS

	Yes	Possibly	Not at all
NSW	9%	27%	64%
VIC/TAS	10%	26%	64%
QLD	11%	15%	74%
WA	9%	20%	71%
SA	15%	11%	73%

CAREER IN TRAM/LIGHT RAIL

|	Yes	Possibly	Not at all
NSW	12%	29%	59%
VIC/TAS	14%	29%	57%
QLD	10%	17%	73%
WA	9%	19%	73%
SA	15%	18%	66%

Legend: NSW, VIC/TAS, QLD, WA, SA
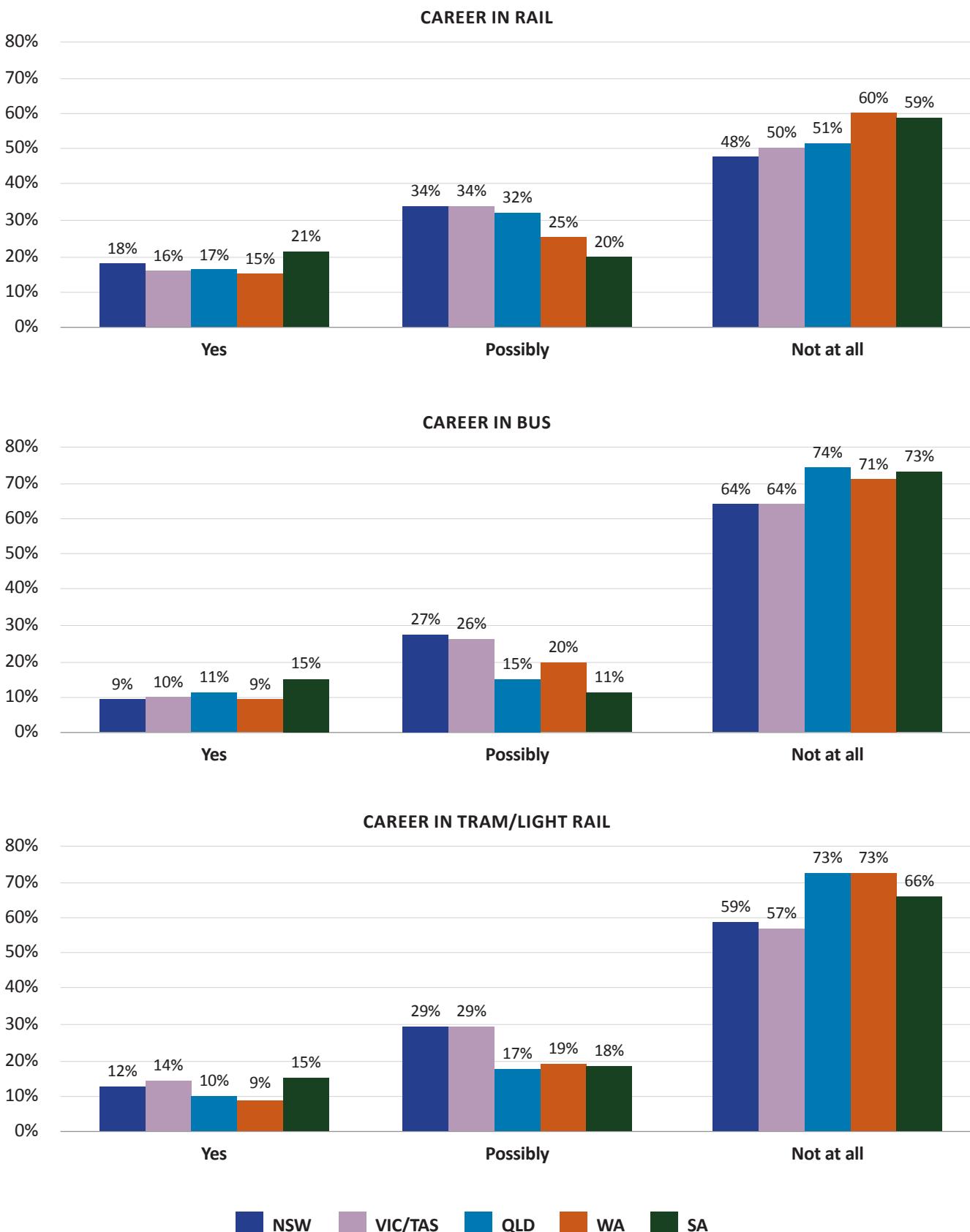
Figure 4: Percentage of respondents who had considered careers by location

Data source: Responses to survey question 21: 'Have you ever thought about a career in the following public transport industries?' for (a) rail, (b) bus, and (c) tram/light rail.

Young people's first thoughts on hearing 'public transport careers'

Career awareness of the different jobs available in public transport was largely limited to driving jobs – with bus drivers, drivers (unspecified), train drivers and tram drivers accounting for the majority of first, second and third responses to the question of what job roles people thought of when asked about transport jobs. Overall, 70% of first answers were for a driver position.

Other transport jobs, such as Engineers, Administrators, Mechanics and Maintenance each received less than 5% of responses, indicating a significant lack of consciousness about these positions. A significant number of respondents also considered taxi and Uber drivers as public transport jobs, rating them higher than Administration or Maintenance positions. Of note, most respondents were unable to list five different jobs, and only listed three. Those who stated that they had considered a career in public transport still overwhelmingly provided variations of driver as the main job they thought of.
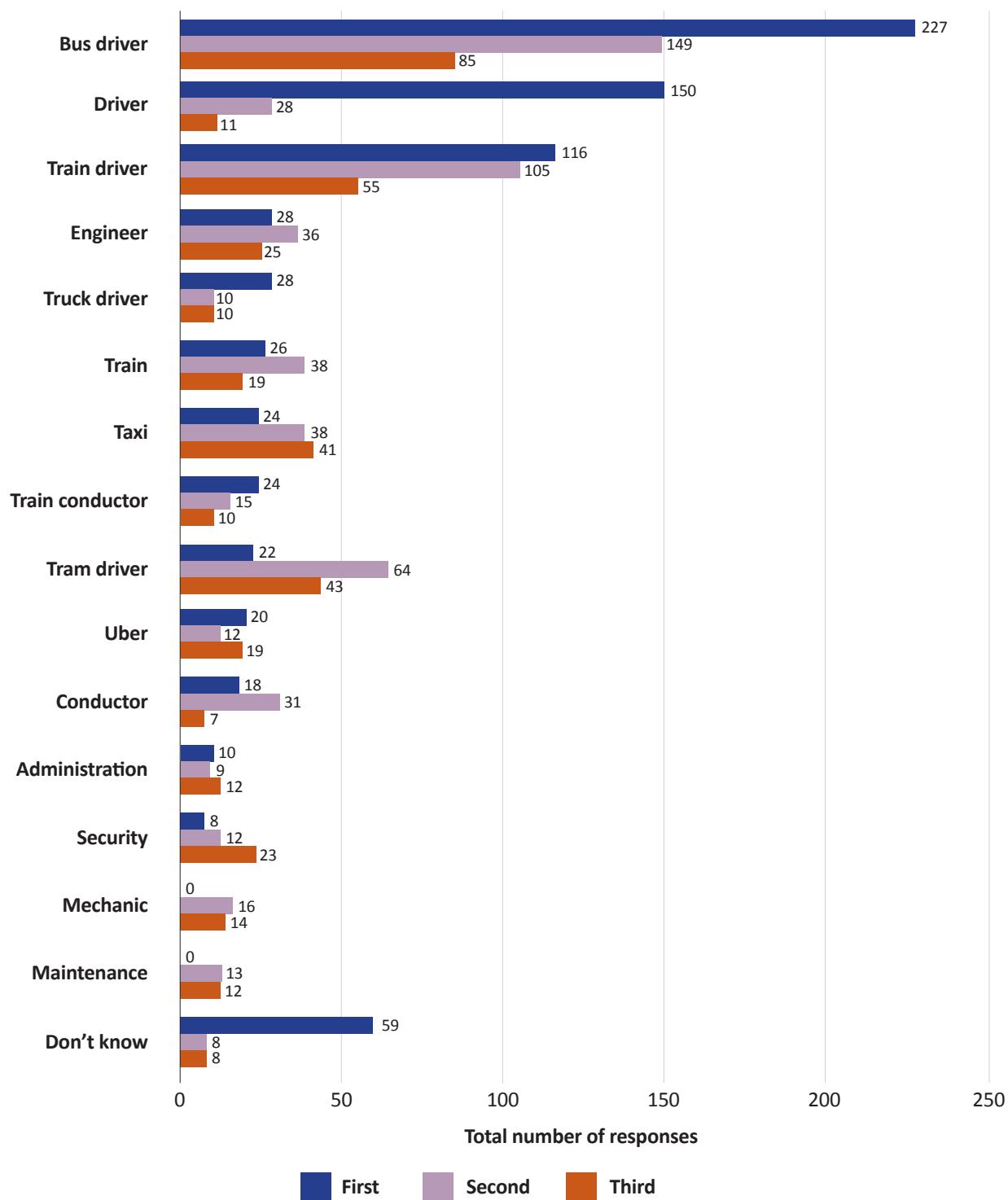
Figure 5: Respondents' top three careers in transport

Data source: Top three responses given to survey question 22: 'Can you please list the top five job roles you thought of when asked about transport jobs?'

Young people's thoughts about careers in public transport

When asked about how knowledgeable they felt about what was involved in a career in the public transport industry, males (31%) stated they were more/highly knowledgeable, compared to females (12%). 18% of female respondents stated that they really didn't know anything and 18% stated they knew less than most (Figure 6). An aspect of this variation may be due to the 'Dunning-Kruger' effect (optimism bias), whereby people believe that they are smarter and more capable than they really are, being more prevalent in males than females (Chamorro-Premuzic, 2004).
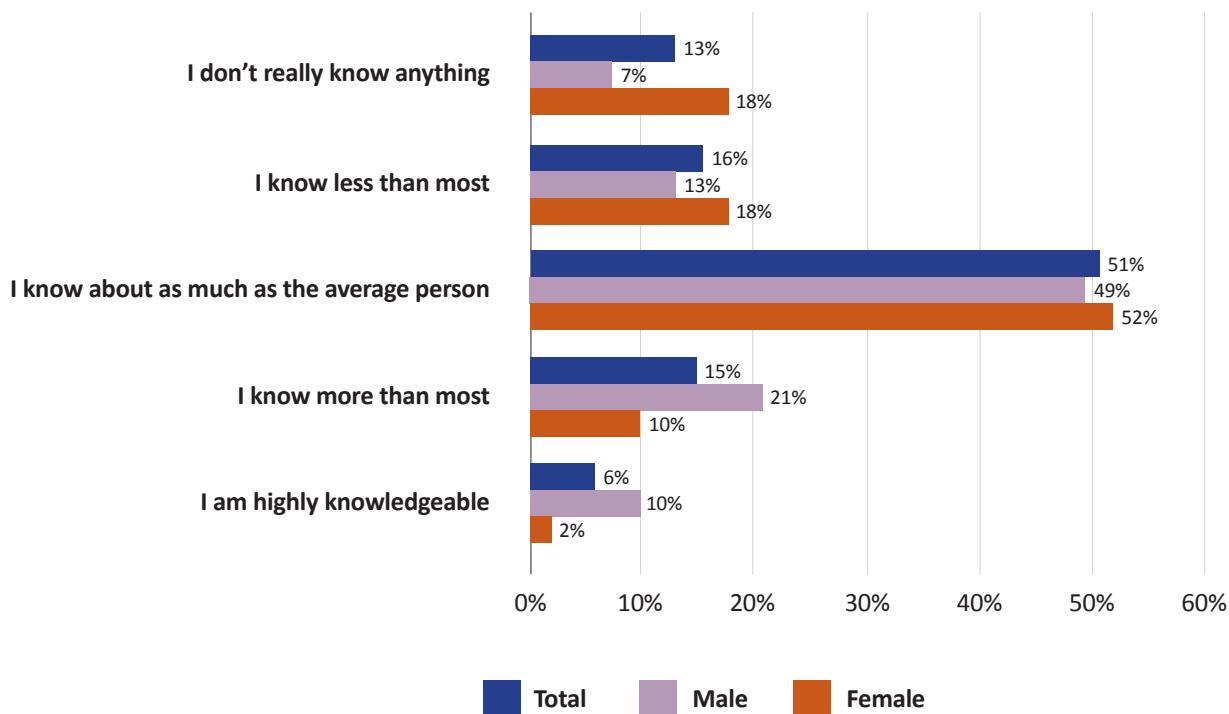
Figure 6: Self-reported knowledge of transport careers by gender

Data source: Responses to survey question 25: 'How knowledgeable do you think you are about what is involved in a career in the public transport industry?'

A similar gendered difference was identified when young people were asked how well they thought they would perform in a public transport job, with 60% of males believing they would perform above average, compared to 44% of females. This may indicate that females have lower self-efficacy beliefs (confidence) about working in transport jobs than males, due to the process of socialisation and gender roles. Close to half of all respondents stated that they knew about as much as the average person, with very little gender difference (49% male and 51% female).

It should be noted, however, that knowledge of the public transport industry by respondents (as reflected in Q22), was very limited, as the only career most people could name was a driver.

Those who stated that they had thought of a career in public transport tended to state they were more knowledgeable than most. For example, of those who stated that they had thought of a career in rail, 18% felt they were 'highly knowledgeable' (the highest rating) compared to the overall average of 6%, while 32% felt they 'knew more than most' (the second-highest rating), compared to the overall average of 15%.

What young people would like to know about careers in public transport

The responses to this question were evenly distributed across the four key response options (formulated after arising in the earlier interviews): career path and job security; aligned with personal goals and aspirations; hearing from other young people working in the industry; and the different jobs available (Figure 7).

Notably, female responses were significantly more favourable to being provided with more information for each of the statements. Only 11% of the total sample surveyed indicated that they did not want any of these forms of information to consider a career in public transport, and this proportion is notably small. This provides significant evidence that there is an active audience for information on careers in public transport.

When asked the question what would stop them applying for a job, the biggest responses were 'lack of job security' (46%), 'limited job roles' (40%), 'lack of diversity and inclusiveness' (33%), 'having an old-fashioned workplace culture' (32%), and 'lack of career advancement' (30%). Group comparisons of these five responses between those who had thought about public transport careers and those who hadn't revealed no group differences.
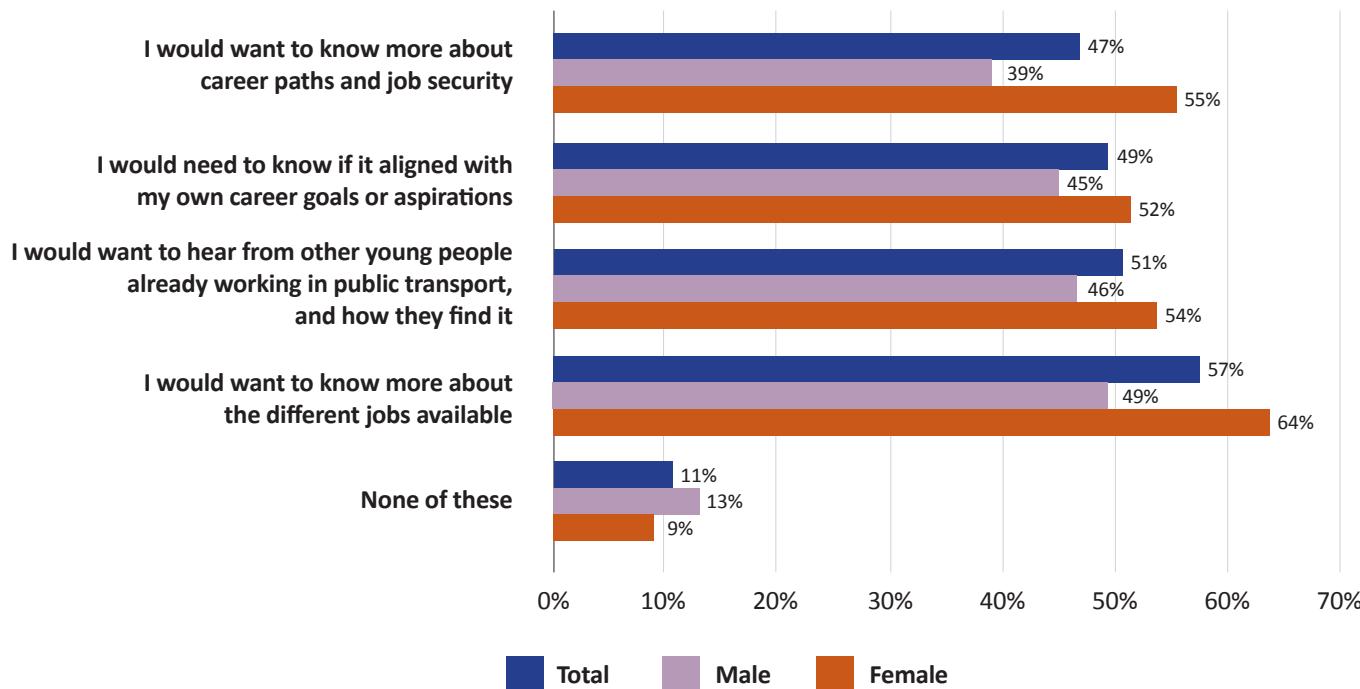
Figure 7: Information needed to consider a career in public transport

Data source: Responses to survey question 26: 'What other information about careers in public transport would you need if you were to make a more informed decision?'

Young people and career innovation

In terms of the level of innovation in a career, the majority of respondents stated that they would prefer a career with a mix of routine and innovation, though it is notable that more than twice as many people stated they would prefer a 'routine' career (22%) over an 'innovative' career (9%), despite a slight preference for 'Highly routine' (7%) over 'Highly innovative' (4%) (Figure 8).

There were only slight differences in responses based on how long a person had been in work, with the only significant difference being those who had been in work between 1–3 years were more likely to prefer a routine job (25%), compared with those who had been in work for more than three years (18%), or had never worked a steady job (21%).

The top five categories for work experience listed by the sample cohort were sales and real estate (29%), hospitality (24%), education (11%) and administration (11%).
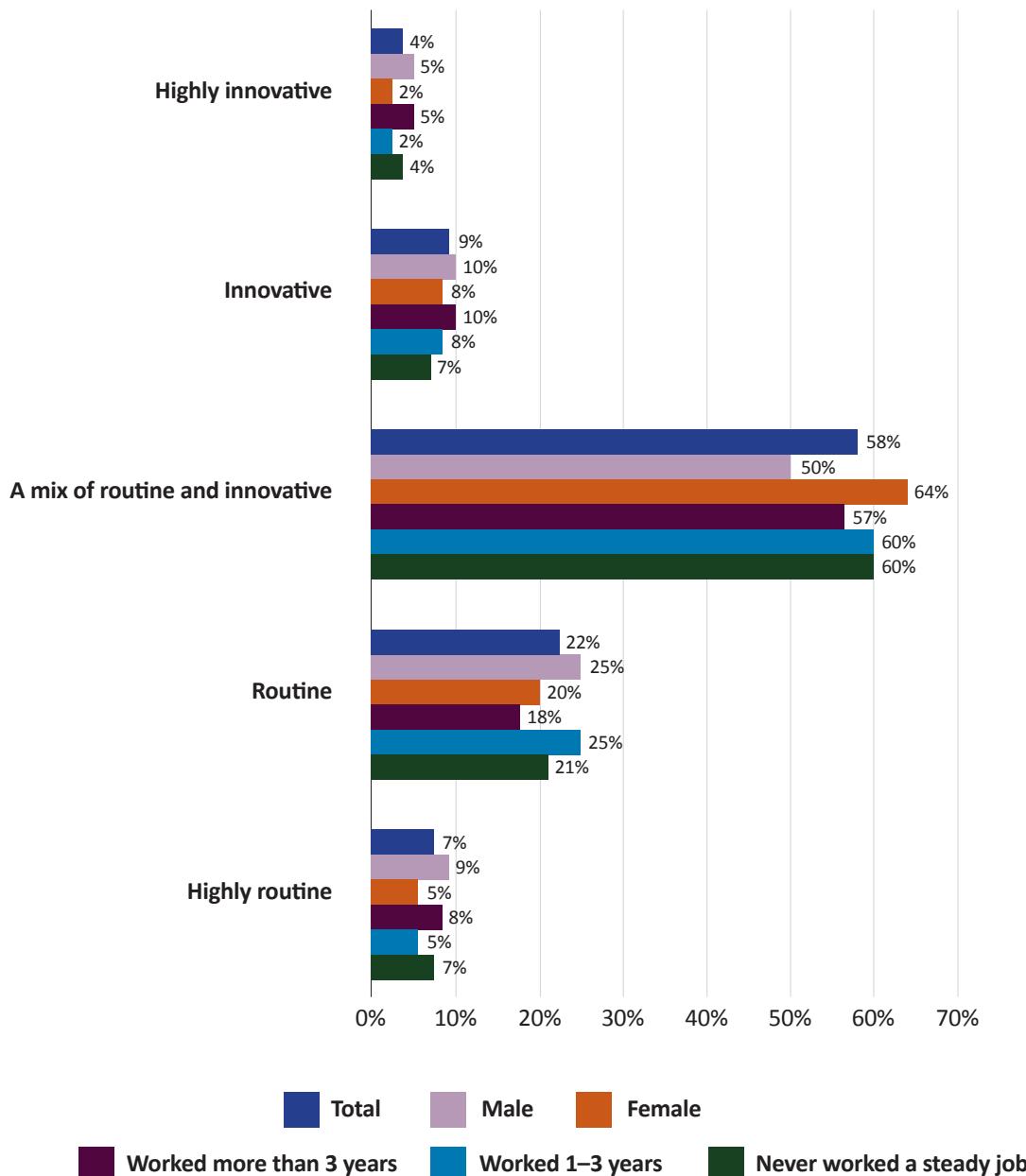
Figure 8: Respondents self-reported preference for innovation in a career

Data source: Responses to survey question 10: 'Would you prefer to apply for a job where the work was more routine or more innovative?'

Transport careers and innovation

When asked how innovative they perceived public transport as a workplace, there were slightly higher response rates for 'highly innovative' and 'somewhat innovative' compared to 'highly traditional' and 'somewhat traditional'. This indicates that a significant proportion of young people view the sector as innovative, or at least 'somewhat innovative'. Partitioning out those who had responded in earlier questions that they wished to work in STEM-related fields (n=292), revealed a higher response rate rating for 'somewhat innovative' in public transport careers than the general cohort.

In South Australia, the state with a significantly higher rate of young people indicating they have considered careers in public transport, it is notable that a lower proportion of respondents perceived transport careers as either innovative or traditional, with a significantly higher proportion finding them neither (Figure 9).
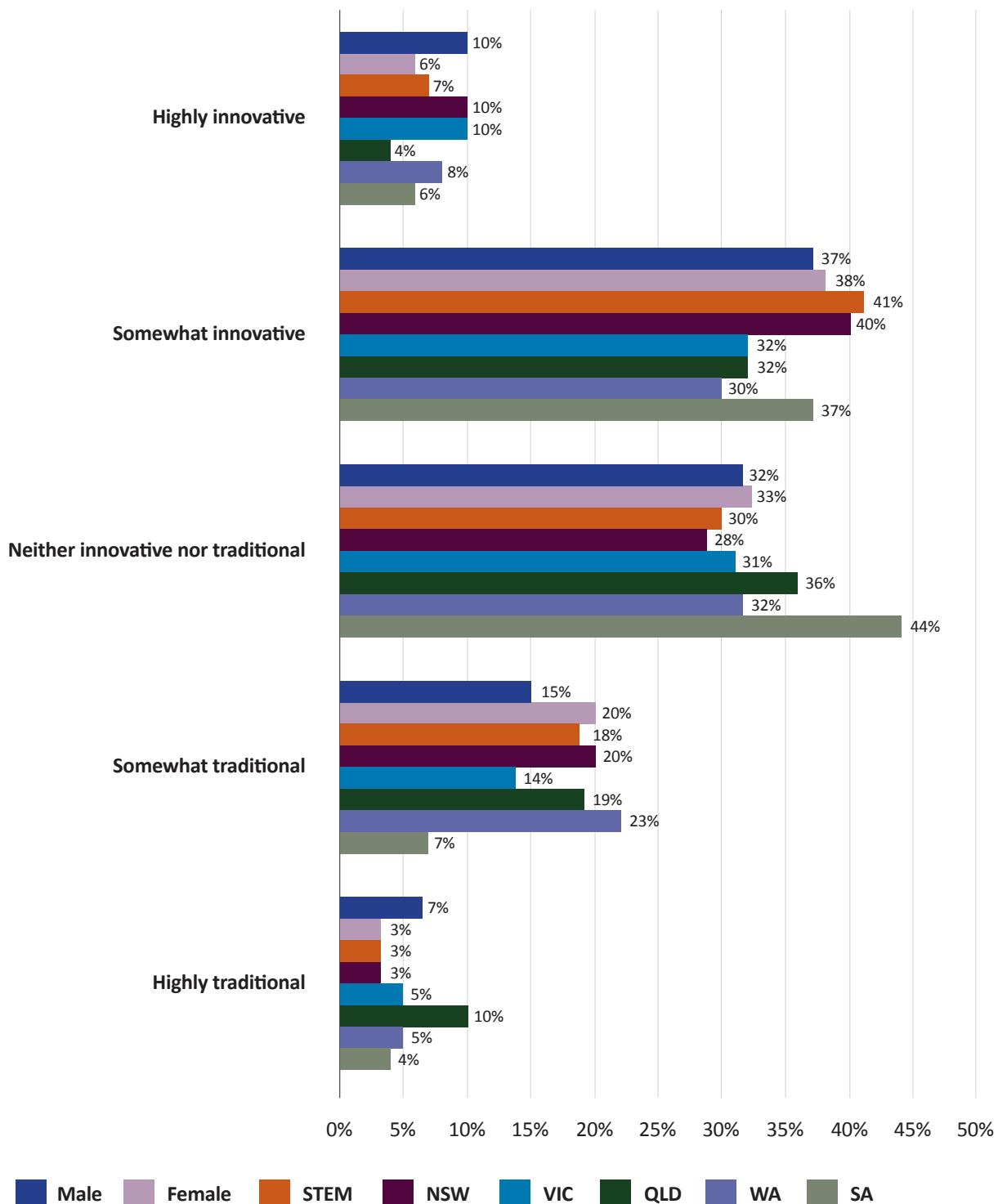
Figure 9: Respondents beliefs that public transport was an innovative career to work in by gender, state, and STEM aspirations

Data source: Responses to survey question 24: 'Do you perceive the public transport sector as an innovative or a traditional place to work?'

Young people's motivations for career choices

When asked specifically if they would prefer to apply for a job with certain work traits, 88% said that they agreed/strongly agreed that they would prefer a job that offered the possibility for continuing job security, 84% preferred a job that was inclusive of them, and 79% preferred a job that had clear benefits for society. In terms of the last property, a job with clear benefits for society (Figure 10), females ranked social benefit as a higher motivator than males, who tended to rate learning new skills, being involved in technological innovation or getting hands-on as equally important motivators. Figure 11 displays the most highly ranked properties when respondents were asked to trade off, only ranking their top three career properties from a list.

Flexible working conditions were also a much larger motivator for female respondents (19%) compared to males (12%), and stability of the industry rated highly for males and females (15% and 17%). Of interest comparatively, when asked directly in another question to nominate what would stop them applying for a job in public transport, only 15% stated the lack of clear benefits to society.
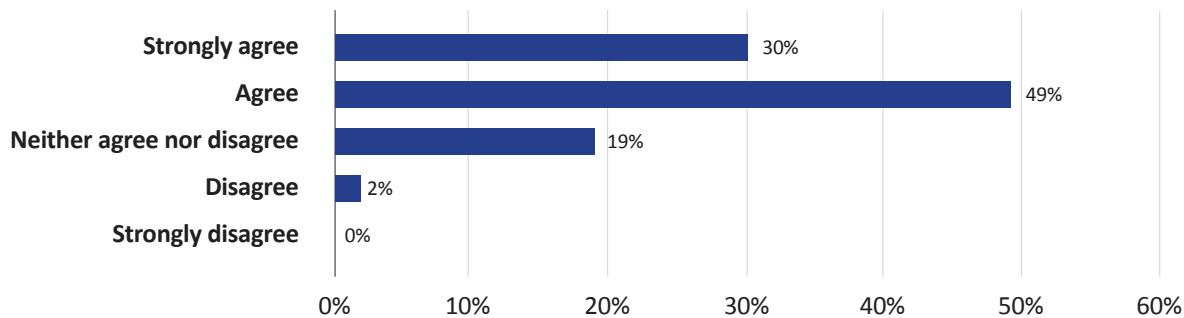
Figure 10: Respondents preferences for a job that benefits society

Data source: Responses to survey question 11: 'I would prefer to apply for a job that had clear benefits for society'.
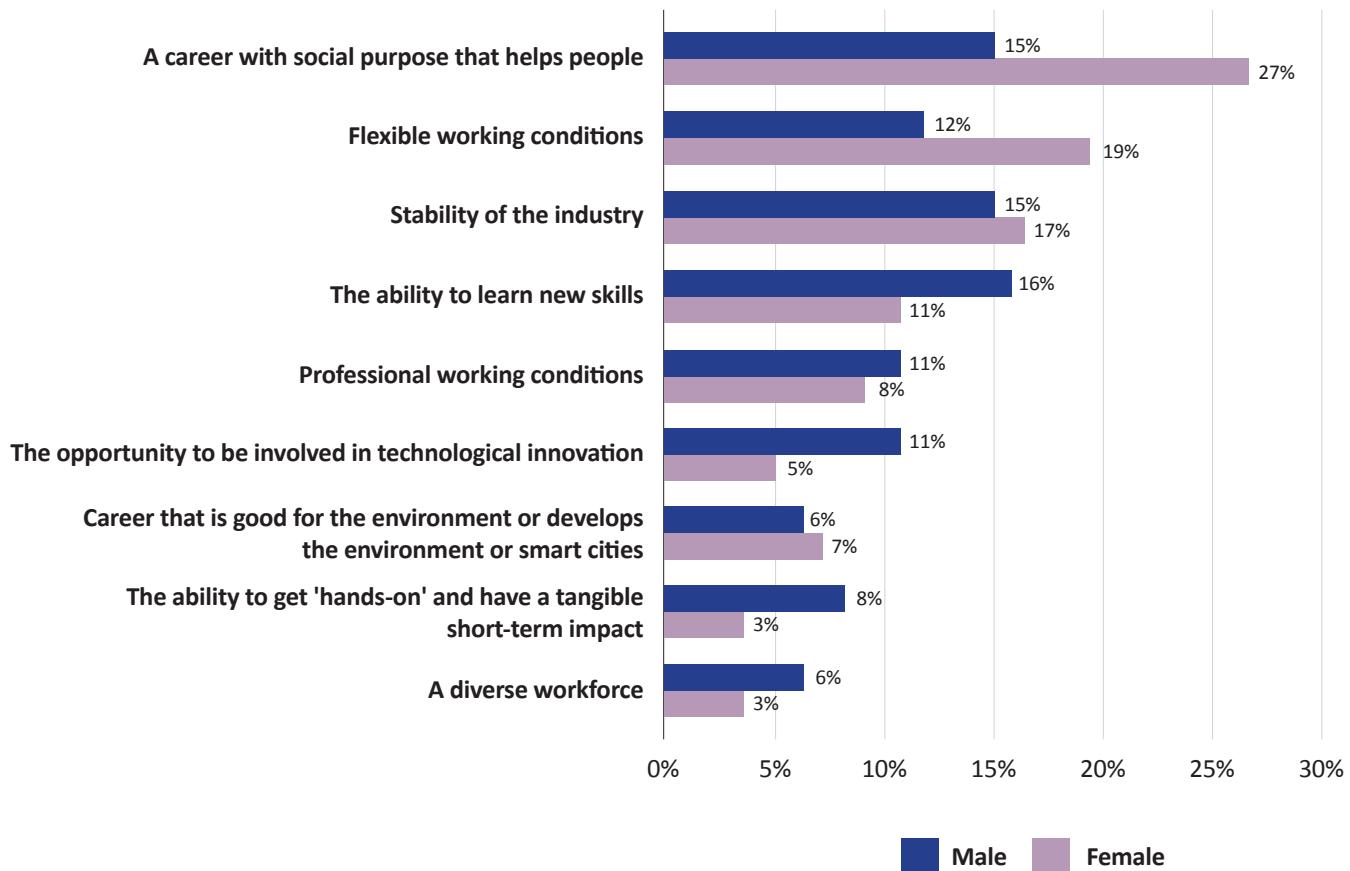
Figure 11: Respondents top factors motivating career selection

Data source: Responses to survey question 9: 'Which of the following would you consider the highest motivator for a job or career?'

Examining the influence of a parent's occupation on career choice, there was a general high positive influence, higher for males (53% combined top categories) than females (39% combined top categories). Those with career aspirations in white-collar professions, while having a fairly high response rate to 'highly positive influence' (20%), had a notably lower response to 'somewhat positive' (15%), and the highest response was to 'neither positive nor negative' (54%). There was not a noticeable difference when comparing those identifying as from an Anglo background with a non-Anglo cultural background, although this may be an aggregation effect from combining a diverse range of cultural backgrounds – each with different values.

Barriers cited by young people when applying for a career

When asked about career aspirations, the fields with the highest number of respondents were 'Health and Community services' (20%, with a significant gender difference between females [30%] and males [9%]), followed by 'Education and Training' (13%), 'Accounting and financial services (12%), 'Science' (11%), 'Information and communications' (10%), 'Advertising and media' (9%), Administration (8%), 'Sales and real estate' (7%), 'Engineering' (6%), and 'Automotive, transport and logistics' (4%).

Figure 12 displays the results when respondents were asked to rank the top three attributes that would most likely stop them applying for a job. The top responses for females were 'not welcoming for women' (59%), 'lack of job security' (47%), and 'lack of diversity and inclusion' (38%). For males, the top three were 'lack of job security' (46%), 'limited job roles' (40%) and 'lack of career advancement' (35%). When asked directly, 65% said they would not consider applying for a job that lacked career advancement opportunities, and 34% said they would not consider applying for a job that they perceived to be of low status or low prestige. Of note, in comparison there was not a major difference between males (37%) and females (31%).
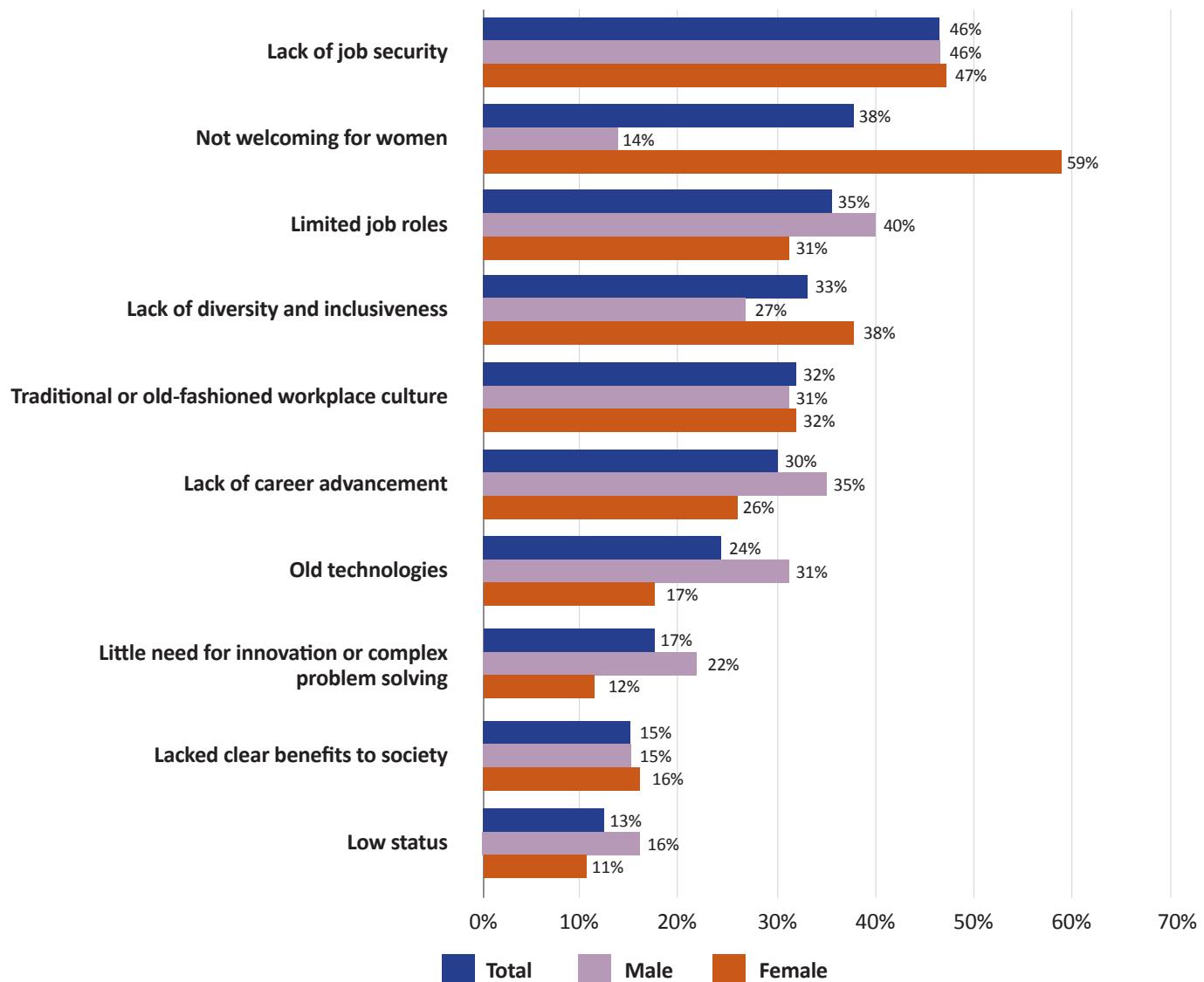
Figure 12: Respondents (by gender) perception of job characteristics that would stop them applying for a job

Data source: Responses to survey question 20: 'Which three of the following job characteristics would most likely stop you applying for that type of job.'

Perceived barriers to the participation of women in public transport careers

A significant number of respondents perceived there to be barriers to the participation of women in transport jobs (Figure 13). There is a very sharp distinction here between how males and females perceive the issue of barriers to women in public transport careers, with significantly more females (46%) perceiving there to be gender barriers than males (35%).
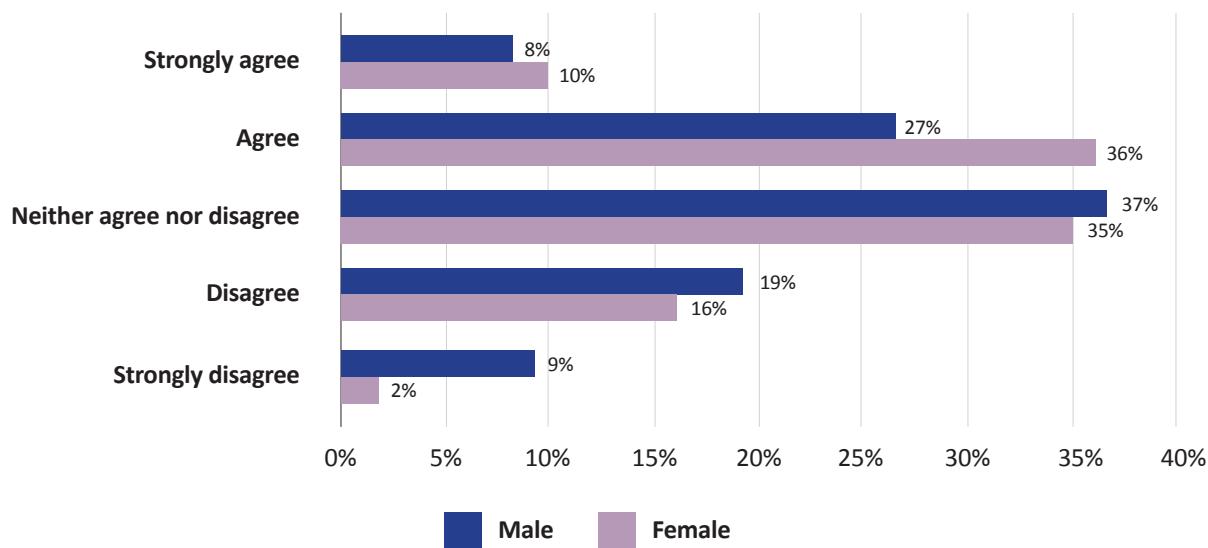
Figure 13: Respondents reporting the perception of barriers to women in public transport jobs

Data source: Responses to survey questions 28 and 29: 'Do you perceive there to be barriers to the participation of women in public transport jobs?' (Figure 13), and 'If so, what are these?' (Figure 14).

If respondents perceived there to be barriers to the participation of women, they were then asked to elaborate on their answers in a free-response box. The most common responses are displayed in Figure 14, with the keywords displayed in a word cloud (Figure 15, overleaf).
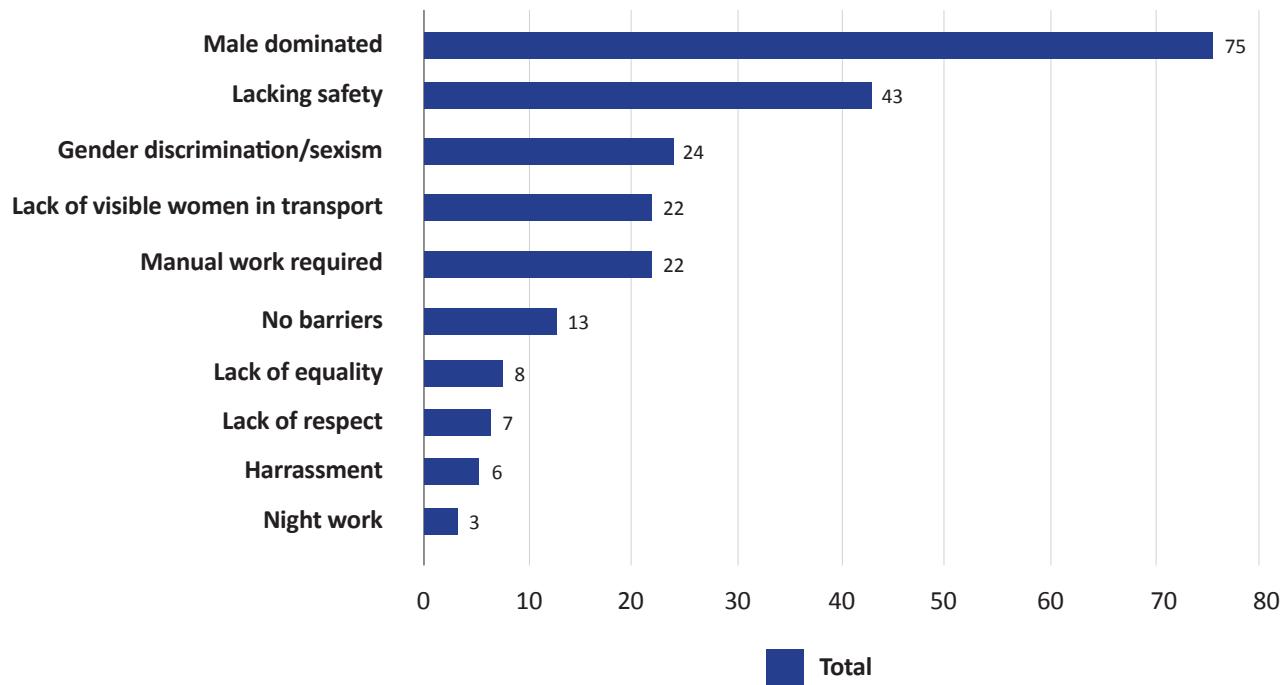
Figure 14: Specific barriers to the participation of women perceived by respondents

Data source: Responses to survey questions 28 and 29: 'Do you perceive there to be barriers to the participation of women in public transport jobs?' (see Figure 13), and 'If so, what are these?' (Figure 14).

Figure 15: Word cloud of most frequent responses to free response question about the major barriers to the participation of women in public transport jobs

Perceived barriers to the participation of people from culturally and linguistically diverse (CALD) backgrounds in public transport jobs

The number of respondents who perceived there to be barriers to people from CALD backgrounds in public transport jobs is displayed in Figure 16, overleaf. Almost 20% of respondents identified as having a cultural background other than Australian, with about 15% from a non-English speaking background (in the ABC 2016 Census, about 20% stated they spoke a language other than English at home).

33% of people who do not identify as having an Australian cultural background perceived there to be barriers to people of CALD backgrounds working in public transport jobs. Removing those who were from other Anglo countries (England and New Zealand) led a drop in agreement to 22%, below the national average.

Of note, there was stronger disagreement amongst non-Anglo heritage respondents that there were cultural barriers to working in public transport jobs than there were those who agreed that such barriers existed ('Disagree': 33% All, 30% Other than Australian, and 31% non-English speaking Background [NESB], compared to 'Agree': 27% All, 33% Other than Australian and 23% NESB). When those who felt there were specific barriers to those with CALD backgrounds working in public transport, racial discrimination was the single largest response, followed by language barriers, and white male domination of the sector (Figure 17, overleaf).

People from different cultural, language and Indigenous backgrounds represent a far-reaching diversity, so any broad findings would need to be confirmed with more research into particular cultural groups.
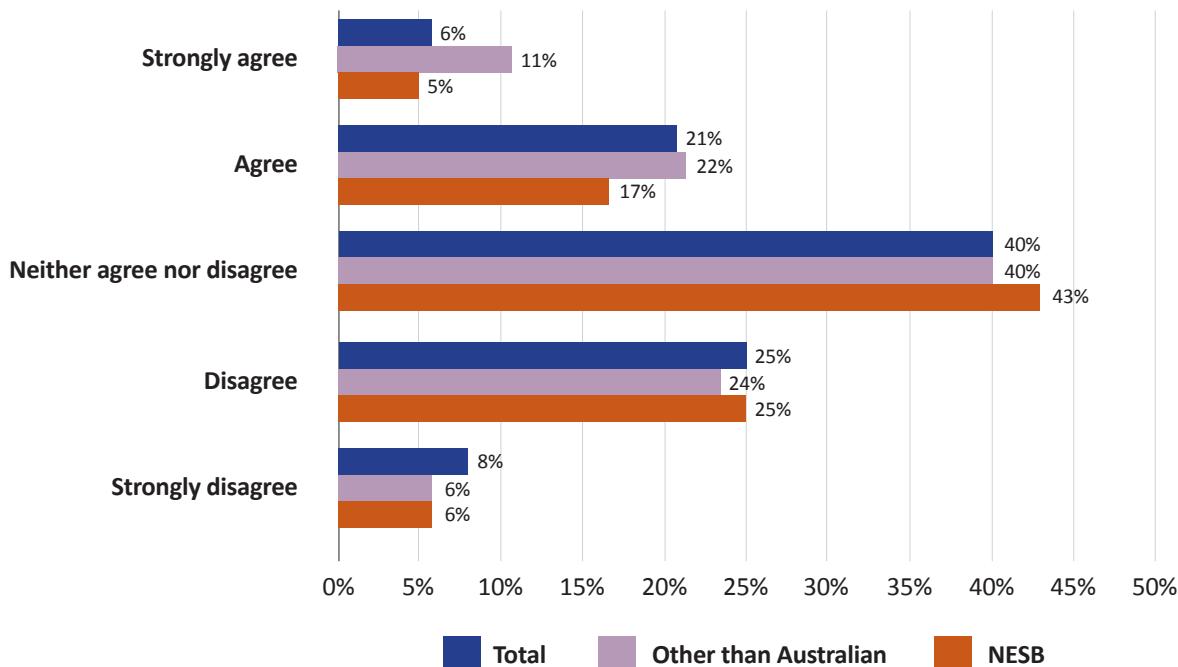
Figure 16: Proportion of respondents who believe there are significant barriers to participation of people of CALD backgrounds in public transport jobs

Data source: Responses to survey question 30: 'Do you perceive there to be barriers to the participation of people of CALD backgrounds in public transport jobs?' 'Other than Australian' category (n=181), and the 'NESB' category (n=153).
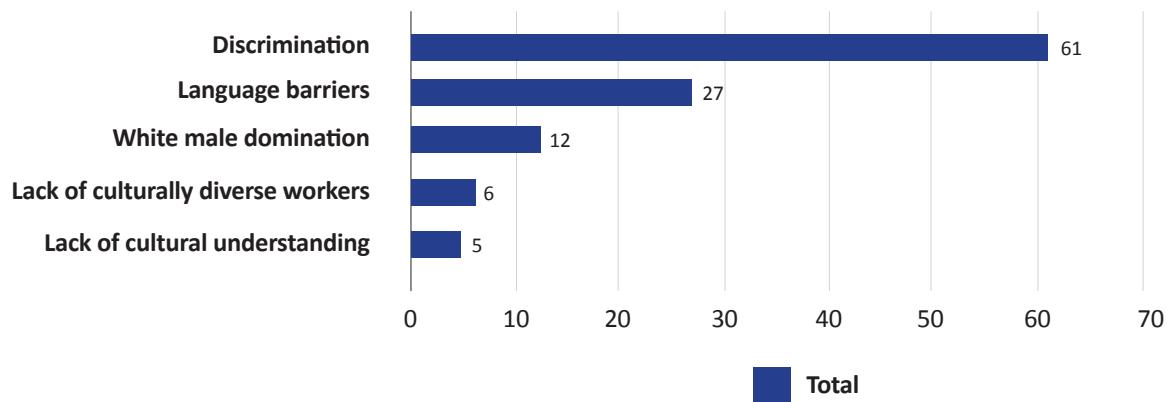
Figure 14: Perceived specific barriers to the participation of people of CALD backgrounds to careers in public transport

Data source: Responses to survey question 31, following the question about perceived barriers to participation of people of CALD backgrounds: 'If so, what are these?'

Interview results

Overview of interviews

A total of 40 interviews were conducted with young people aged 18–30. The interviewees were balanced in gender (18 females and 22 males), and were mixed in terms of work aspirations (white-collar and blue-collar), with a majority currently students at university or TAFE/polytechnic. The interviewees were drawn from metropolitan Melbourne, outer-Melbourne, and regional Victoria (Geelong, Ballarat, and Shepparton). Ethno-cultural backgrounds represented were diverse and included Anglo, Chinese, Indian, Lebanese, Italian, Vietnamese, Filipino and Sudanese.

Based on the aggregated transcripts of the interviews, with interviewer contributions removed, a word cloud was generated from the most frequent responses, using WordItOut software (Figure 18).
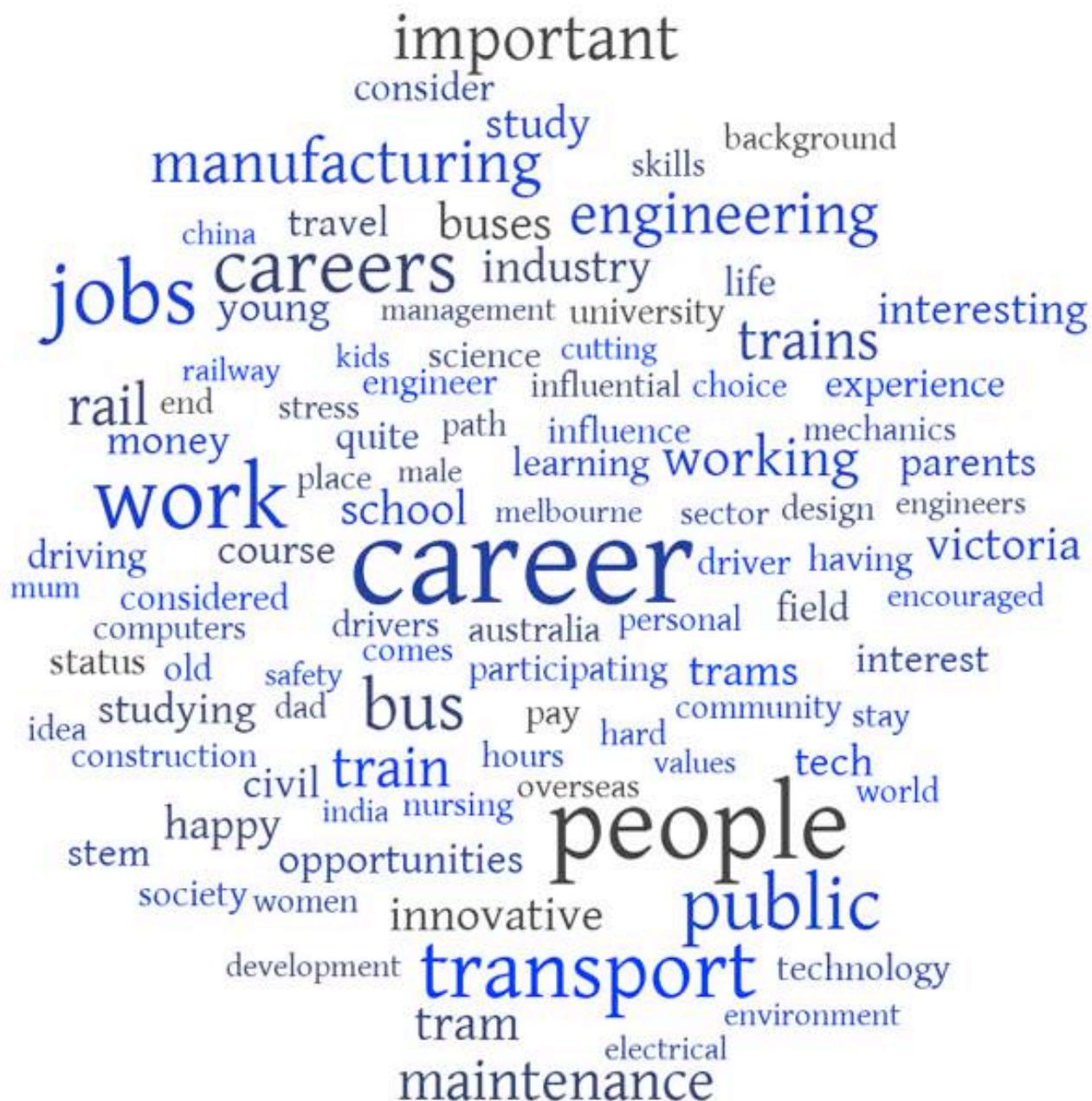
Figure 18: Content analysis of word frequencies in the transcripts of the 40 interviews combined

Emergent themes

The major emergent themes from the content analysis of transcripts of the 40 interviews are shown in Figure 19.

Key theme 1: Perceptions of careers in rolling stock

Perceptions are operations-centric

Sometimes, but not always seen as traditional

Sources of knowledge

Key theme 2: Attraction to careers in transport

Some young people are choosing between widely different careers

Attraction to job rather than employer

Pathways

Key theme 7: Responses to learning about transport careers

Positive response to finding out potential for transport careers

Need explicit links between skills and interests, and employer

Careers in rolling stock

Key theme 3: Desirable career values for young people

Job security

Interesting

Entrepreneurship

Key theme 6: Other barriers to participation

Cultural background

Disability and health needs

Key theme 4: Parental influence

Important to shaping career choices

Culturally dependent

Key theme 5: Perceived barriers to the participation for women in transport

Concerns about safety

Lack of women in appropriate level of STEM education

Figure 19: Emergent themes from content analysis of the interviews

Theme 1: Knowledge of rolling stock careers – wrong perception of types of careers

Key theme 1: Perceptions of careers in rolling stock

| Sub-theme 1: Perceptions are operations-centric | Sub-theme 2: Traditional | Sub-theme 3: Sources of knowledge |
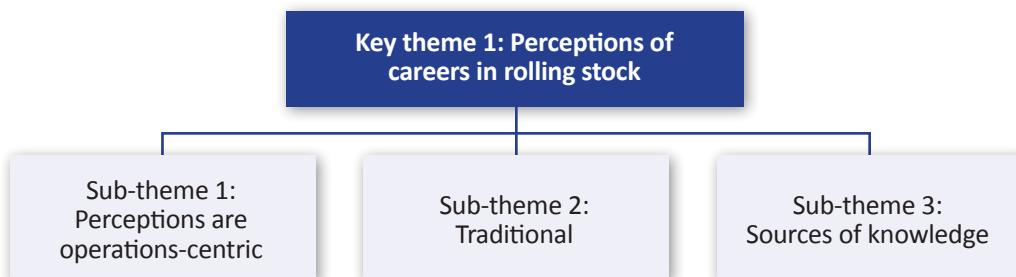
Figure 20: Key theme 1 and sub-themes – perceptions of careers in rolling stock

Sub-theme 1: Perceptions are operations-centric, and overlook manufacturing and maintenance roles

Analysis of the interviews concurred with the findings of the survey (Figure 6), that there is little knowledge of the diversity of rolling stock careers among young people. When asked to name careers in public transport, most interviewees cited public-facing operations roles, namely train and bus drivers.

Train and bus *driving* roles were generally seen as:

- Fairly routine
- Not challenging
- Did not involve much social interaction with colleagues.

However, these same factors could also be appealing to young people, for example:

Interviewee #27: I like the consistency because it's like, I think it's like a 9-to-5 job or I assume it is. Or like, you have half days. There's not really much interaction with anyone. You just sit in the driver's seat. (Male, 24, studying pre-apprenticeship to be an electrician at TAFE.)

For some interviewees, there was a negative stigma attached to bus driving, where it was seen as lacking in ambition:

Interviewee #29: I think if maybe it had been more of a job opportunity in school and you actually got to know about it and learn about a bit more rather than people saying, it's like the old like a garbage man. If you don't do well, you're going to end up like them. I think it's got a bit of stigma behind it that needs to be broken. (Female, 19, finishing VCE at TAFE, wanted to be an engineer earlier in life, but now not sure.)

Others did not have much specific knowledge at all:

Interviewee #13: I've heard ... I have like a friend of a friend that's I think starting to be like a train driver and I've heard that it's good pay. I don't know anyone that works as a PSO or anything like that. What do I think of it? I don't really think of it, I guess. I do know they have like little signs on the V/Line about where it's made or like what the ... Bombardier or something it's called. But I don't know where they're made and then I do know when there's like a press release and they show the new train or the new trams usually and they show and, you know, it looks nice. I think it's in Bendigo or something? I don't really know where ... (Male, 25, studying at university.)

There is little conception about the specific job roles involved, or whether manufacturing occurred as job production, batch production or assembly line production.

Several young people who were studying or interested in careers in IT, and others who were doing apprenticeships as electricians, were interviewed. None of those interviewed from these groups had previously thought that their chosen career paths might cross with transport, but when pointed out to them the possible jobs that might link to trains, buses and trams utilising their skills, they were excited about the possibilities:

Interviewer: Have you ever thought that a career in rail, bus or trams might include computer-related job roles in the future, because obviously there's a programming and management of systems?

Interviewee #16: Right. Probably not a lot, but I probably have looked at it a little bit. There would be jobs that exist for sure, but I haven't really thought about it. (Male, 19, doing associate degree in computer science at RMIT.)

Sub-Theme 2: Traditional

Interviewees were asked to describe their perceptions of what a public transport manufacturing or maintenance site looked like. Typical responses included the impression that these involved:

■ A factory setting

■ Involved heavy machinery

■ Blue-collar and involving manual labour.

Reconciling this with the impressions identified as innovative (see Figure 9 on page 19) is complicated, although not necessarily contradictory, because it could be that multiple and complex pictures of the transport sector emerge. On the one hand, many respondents mentioned high-tech trains and trams, but on the other hand, as they had no idea of where or how they were manufactured, resorted to the more traditional and familiar perceptions of rail workshops. However, these impressions were superficial, and when questioned with prompts about the role of technology, many respondents changed their perceptions:

> **Interviewee #27:** I think the first thing that comes to my head is working in a factory and doing it hard – it's like sweating, hard. Manual labour. People in blue overalls and stuff. Pretty much like that's the first image that comes to my head.
>
> **Interviewer:** So, you don't view it as high-tech?
>
> **Interviewee #27:** Yeah, right, I was going to say when you think more about it like ... yeah, it's like a lot of it's on a manufacturing belt, like the robotics side of it. It's like the computers doing like the same job and stuff, and then you just like put it all together at the end. Yeah, there's like 20 dudes just hanging out and just building. (Male, 24, studying a pre-apprenticeship to be an electrician at outer-suburban Melbourne TAFE.)

Similarly:

> **Interviewee #36:** So I know there used to be a place in Ballarat called Alstom or something like that. I just imagine a big foundry and sort of style workshop designing trains. So, like a lot of metal work and stuff like that going on in there, but I don't really know if any of it is automated now or – I imagine a lot of labour intensive inside a big workshop. (Male, 20, from the Bellarine Peninsula, studying construction at university.)

When asked to compare the Australian context with overseas, several interviewees raised impressions of more high-tech transport manufacturing in France, Germany, Japan and China:

> **Interviewee #12:** When you think of high-tech and you think of trains and that sort of thing you think overseas, you don't tend to think Australia. You tend to think like Japan, where you've got like the super-fast trains, Shinkansens or something, or China. (Male, 20, studying engineering at university.)

For some interviewees, this impression was formed from general perceptions, and for others, it was shaped by experiences as a customer, and the perception that a commuter system that runs on time must have more innovative careers (an assumption which is not justified). Upon being asked whether they perceived the Australian industry as more innovative than overseas, one interviewee stated:

> **Interviewee #22:** It's not innovative. Because if I had to guess, China and Japan would rate first because the amount of people using public transportation in Japan and China is much, much bigger than the number of people using it here, and they deliver it quicker.
>
> **Interviewer:** Okay. And how confident are you in that, in that statement?
>
> **Interviewee #22:** I'm very confident because that, that's not obviously my personal opinion, but the world opinion is the same. They're fast, they're reliable, and they don't take much time. I have waited for trains that get delayed by 45 minutes even here. But in China the most they can be delayed is by 30 seconds to one minute, not more than that. (Male, 19, studying Engineering in Melbourne.)

Furthermore, some of the interviewees stated that high-profile high-tech projects would make the industry a more exciting place to work, for example:

> **Interviewee #13:** I'd be absolutely for high-speed trains and stuff and think that would be more enticing than sort of working for a dated industry. (Male, 25, studying at university.)

Sub-theme 3: Where do perceptions of rolling stock careers come from?

An emergent sub-theme that occurred frequently in the interviews was a discussion of where perceptions of rolling stock careers came from. Three sources were frequently mentioned:

- The importance of word-of-mouth, mainly from relatives, but also from friends, who worked in the industry, in shaping perceptions of public transport careers.
- The lack of information on train, bus and tram in university and TAFE courses (also schools), particularly in engineering courses, which focused heavily on examples related to water and sewerage, mining and cars.
- The representations (or lack thereof) of transport careers in popular media.

Another important theme that emerged was the lack of specific knowledge. While many interviewees had reported seeing the 'Made in Melbourne' stickers on trains and trams, there was little knowledge of how this related to careers, especially in rural areas.

> **Interviewee #34:** Talking to people in like the regional areas as well. Like, getting people out there, start talking to high schools, stuff like that, saying, 'Yes, you can go into trains if you wanted to.' Just from my experience growing up regional, I know a lot of people don't see enough opportunities in trades and just go to uni, so that's another way like to be doing it. Just advertisement definitely but also working conditions. (Female, 20, from Wangaratta, but studies at metropolitan university and stays on campus on college, commuting home every two weeks.)

When asked to reflect on the sources of information as well as word-of-mouth and the education system, some interviewees raised television and movies as a possible source where their impressions of rail and bus were formed:

> **Interviewer:** What do you picture a rail manufacturing workshop looks like?
>
> **Interviewee #35:** A big warehouse. Somewhere in, you know, out of suburbs probably.
>
> **Interviewer:** Okay. Is it blue collar or white collar primarily?
>
> **Interviewee #35:** Probably blue collar in my perception. I think I have like it's just movies and TV. Like TV shows, like 1950s ideas of what manufacturing is. Like in Thomas the Tank Engine [laughs]. (Female, 25 studying a second degree in speech pathology at university after completing a science degree.)

Lack of course content related to rail, bus and tram in engineering and trades courses was also a recurring theme. Interviewees often state that they would didn't know much about public transport manufacture and/or maintenance, even though their degrees were in mechanical, electrical or other engineering. For example:

> **Interviewer:** But why don't you want to manufacture buses? Why don't you want to maintain buses if there are jobs available? And what would interest you in doing so?
>
> **Interviewee #15:** Well, coming to mind like I know that [higher education institution] offers internships within those manufacturing businesses. So just … probably like the contractors could be changed. I think a guaranteed job would be good, I think that would be, that would be one of the main things, but the most important thing is like the, the current work I have gives me like flexible time to do full-time study. But if I actually want to like work in a manufacturing place now I don't think so they would give me enough space for me.
>
> **Interviewer:** So you don't think that it's an easy transition from what you're studying to buses?
>
> **Interviewee #15:** Like, compulsory subjects we have to do. But the thing is maybe the level of learning by myself is not like up to standard of going into the thing, at the moment. (Male, 21, from Box Hill, studying automotive engineering at a higher education institute.)

Theme 2: How young people make decisions about careers

An emerging theme resulting from the analysis of the interviews was how young people make decisions about careers. Interviewees were asked about what careers they had considered pursuing in the last few years, and to reflect on the processes and values with which they weighed up potential options. Some of these findings are displayed in Figure 21.

```
┌─────────────────────────────────┐
│   Key theme 2: Factors underlying│
│        career decisions          │
└─────────────────────────────────┘
         │          │          │
┌──────────────┐ ┌──────────────┐ ┌──────────────┐
│ Sub-theme 1: │ │ Sub-theme 2: │ │ Sub-theme 3: │
│ Multiple and │ │ Attraction   │ │  Pathways    │
│ complex      │ │ to job rather│ │              │
│ careers      │ │ than employer│ │              │
│ considered   │ │              │ │              │
└──────────────┘ └──────────────┘ └──────────────┘
```
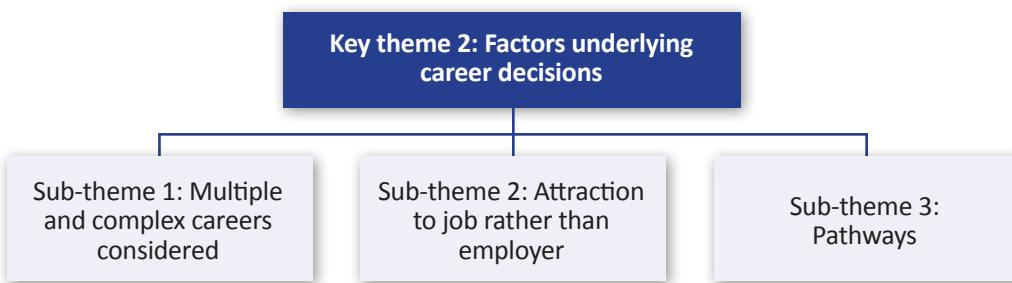
Figure 21: Key theme 2 and sub-themes – deciding between careers

Sub-theme 1: Young people consider multiple and complex careers

One of the major sub-themes that emerged is that young people, while they might be interested in pursuing a certain line of work, have recently considered and weighed up between a wide range of careers. This is a dynamic process, with continual reflection, experimenting with work experience, part-time work and trying courses in different areas. Amongst the interviewees, there was a large cohort who were undecided and/or pursuing multiple fields simultaneously. They may have interests (working with people, IT), but were open to applying these skills to a wide range of fields. This provides significant opportunities for engagement. Some examples of this are:

Interviewee #9: Growing up I wanted to be an actress, but I also wanted to be a musician and I wanted to be a teacher, but I kind of just like – when I got to legal studies I really just felt really passionate about. (Female, 19, studying to be a lawyer.)

Interviewee #21: So, because I was a refugee, I lived in a refugee camp, so when I was in South Sudan we didn't have a lot. When I got out of a refugee camp as well I got quite a lot of help with the UN, which eventually got me to Australia. At school, everybody wants to choose different things … first I wanted to be an electrical engineer. But later I was falling a little behind in school. So in Year 11 and 12 I didn't meet the criteria to do physics. Because I was doing a more basic maths, and you needed specialist maths. So, I actually was going to do that, but I got a casual job doing sales and marketing, and that was good. And then when I moved to Melbourne, I thought to myself what I want to do is help people. I don't want to be a manager, so I actually want to help people like the way I got help. And then, when I looked at universities I found for community development, and thought it might me to help people. (Male, 21, lives in Western Suburbs of Melbourne and is in second year of university.)

There were many experiences of trying out careers, and then changing to different careers or training paths. Examples included one young woman finishing a degree in biomedicine then moving to speech therapy, a young man trying nursing for a semester then moving into engineering, and a young man starting a degree in sports therapy then leaving to do a pre-apprenticeship to be an electrician. This indicated broad opportunities for engagement for the public transport sector.

Educational experiences, in high school and in university, can often be key points in which young people reconsider their pathway. In engineering, a number of students had switched fields between civil, mechanical, and electrical. For example:

Interviewee #22: Maybe, you know, last year, when you're doing your first year it is common classes and you sit with electrical engineers and mechanical engineer students. That mechanical engineering student might not be really interested in public transportation, or they might not want to grow in that area, at that point they may want to work for Boeing, and that's completely fine. It's just what appeals to everyone. But day-to-day, we start to look at everything differently. When I first landed in Australia I felt okay, good public transport, but as day-by-day passed, I realised that this could be improved. Obviously, that's my mind or idea and that's something that other engineers might not have taken into consideration, but for me that was important and made me start to think about how I might work to help improvement in transportation. (Male, 19, studying a Bachelor of Civil Engineering, from outer South-East Melbourne, whose family was Afghani but had arrived in Australia from New York City.)

Sub-theme 2: Attraction to job rather than employer

A sub-theme that evolved from many of the interviews, was that at this stage in life, most of young people considered the actual job tasks more important than the brand reputation of the employer or sector. Examples of interests in jobs (rather than sectors) that were identified during the interviews were:

- **IT:** some interviewees heavily identified with working with computers, but were not committed to working in any particular sector (e.g., corporate, transport, government, schools, NGOs).
- **Electricians:** similar to IT people, many had ideas about their role, but no commitment to any particular sector.
- **Social scientists:** those with social sciences training (politics, sociology, community development, and psychology) were not committed to working in any particular sector but were open to corporate, government, transport, etc.
- **Automotive trades:** wanted to work with vehicles, and due to the curriculum in their courses, were headed for working with cars, but were open to working with buses.

Sub-theme 3: Pathways

A third sub-theme that emerged from the interviews was the importance of clear job training pathways in recruiting young people into careers. This could be on-the-job pathways, university or TAFE course linked pathways, or apprenticeships. Some examples include:

> **Interviewee #36:** I moved into labouring and construction and found that I quite enjoyed it, the work and the idea of it, so it was the experience that drove me through that. So I think that was a big part of it, just finding the experience because a lot of people do it without realising what they're actually doing, so having the experience it gave me the idea. This may not be exactly what I want to do, but it's enough to know that I've got to do something, so I'll follow through with it. (Male from the Bellarine Peninsula, studying construction management.)

> **Interviewee #34:** [on no pathways for trades] … industry losing jobs. That's the case for a lot of industry as well. Like, that's why young people are leaving regional areas, and that's why the regional areas are dying. It's just that there's not a lot to hang on to. I would say in recent years it's a lot better with trade. But it's about finding apprenticeships. (Female studying at university and from regional Victoria.)

Theme 3: Properties of careers considered crucial for young people

One of the aims of this study was to understand the work values held by young people, and how these are weighted up in career selection. Figure 22 illustrates the main three desirable properties of careers emerging from the interviews.

Figure 22: Key theme 3 and sub-themes – desirable properties of careers

Sub-theme 1: Job security

The claim that millennials and post-millennials place less value on job permanency and security, and more on flexibility has not been empirically established in a clear and rigorous way (Young et al, 2019, p50–52). One of the sub-themes that emerged from these interviews is that while young people do want careers that are interesting and socially useful, they also value stable and secure wages and job tenure. These two criteria are not necessarily counter-posed. For example:

> **Interviewee #6:** It's got to help people and it's got to be high paying. Like I don't really want a desk job. I want to be out in the field and do stuff. Something different every day. (Female, 19, studying social sciences at university but not sure what career she wants.)

> **Interviewee #9:** Like I mentioned before, stability is very important as well. I have thought about transport jobs, but more like during university [part-time]. Because my friend he works at one of the train stations here in Melbourne and he gets really good pay and he still has the opportunity to study while also being able to pay rent and put food on his plate and even pay his HECS upfront and stuff like that. What's attractive with that is that it's stable with money. (Female, 20, studying criminal justice at university.)

Interviewee #24: So originally like my whole life I wanted to do an art course, but I also came to the realisation that there's not many opportunities to become an artist, or there might be but it's very competitive and, I don't know it's not an easy career field that is going to be very stable in the future or have any financial stability. (Female, 19, studying degree in education at university.)

This is consistent with some of the findings reported from a survey by Deloitte (2019), which, based on a survey of 13,416 millennials across 42 countries, found that millennials had mixed feelings about 'the gig economy'. While some were excited about the possibilities, on the cautious side, only 6% of millennials indicated that they would choose to work in the gig economy instead of full-time. Respondents raised unpredictable income (39%), hours (30%), and the inability to plan for the future (27%) as the biggest turnoffs (Deloitte, 2019, p15).

Sub-theme 2: Entrepreneurship and job status

One of the key concerns from interviewees about careers in public transport were the limited possibilities for entrepreneurship. It should be stressed that this was expressed by only a portion of the interview sample, but it was a significant portion, and especially so since this was basically the only concrete reason frequently given for not considering public transport careers. Typically this part of the cohort were highly aspirational, and the motivating factors career choice went beyond remuneration, safety, and job satisfaction, and to the nature of the career itself in terms of advancement and entrepreneurship. In particular, this was expressed as the desire in the long-term to move beyond waged work, and into investment and management. Three examples are shown below:

Interviewee #3: In Singapore or Malaysia, you can't [make money] because it's government run. Here [in Australia] it's tendered out to companies, so it's semi-privatised. But the major issue is lack of advancement in terms of career, like you'd just be on a wage, and it'd be the same wage. Even if it was a prestigious career, like doing the computer high-tech interface for trains, you wouldn't do it because you really want to make more money. (Malaysian-born male, 21, studying IT.)

Interviewee #10: At the moment, I've finished Year 12 so I just came into uni into civil engineering straightaway because I'm interested in like, you know, running projects, working with other people to get a plan done. So I'm looking at an industry like that, you know. To be in charge of projects that are running. I would be happy to take a lower paying job if allowed me to build my own business, because I don't want to be stuck in the same paying job forever. (Male, 19, studying civil engineering.)

As described above, this view is only held by a proportion of the cohort, but consideration of status are also important factors in terms of peer pressure and creating an attractive image:

Interviewee #25: I think that it's because young people have a very sort of ... like these days young people have this mindset of they, they want other people to think super highly of them, and our society is always saying like, 'Oh, if you're in a business job in a tall building then you're cool. I think that that's what our age group thinks these days is that unless you're a top businessman you're – like even us, early childhood teachers, we're low status as well because we're not in a skyscraper in a suit, you know. And I think that young people these days it's so much about show and like about doing better than other people. And I think that it's a very closed-minded mindset. (Female, 19, studying degree in education.)

Sub-theme 3: Young people seek careers that are interesting to them

The young people interviewed invoked pursuing their interests, and wanting a career that was interesting, were frequently in discussion about how they made decisions about what career paths they were considering. Combined with this were notions of personal learning and growth, and having varied tasks. What is interesting to a particular person is a matter of individual differences. Some examples from the interviews are:

Interviewee #36: So construction being an extremely sustainable business in terms of where, the potential of where it has to grow because obviously learning, there's not a lot of IT integration currently. Like, there's a lot but not a lot in the construction industry, so I see that as something that has huge growth potential like as construction sort of brings in more business information, sort of modelling style stuff like career modelling. We can, I think there's a huge growth in the future in that, so I think that's probably my number one reason why I am find that sector interesting at the moment. (Male, studying construction at university to follow in his father's footsteps.)

Interviewee #22: I look for interesting learning opportunities in a career. It's very important that I understand more about risk management because risk management, unlike other classes, it's not a class that you sit in an engineering class and a teacher tells you that this, this, this is risk, no. Every aspect of job is different. Every situation differs, so that's something you have to learn. And working with a group of engineers who have already accomplished or are accomplished in their career it's important to learn about that. (Male, 19, studying engineering.)

Theme 4: Parental influence in career decisions linked to rolling stock

A significant theme that emerged from the interviews was that of parental influence on young people and their career pathways (Figure 23).

```
        ┌─────────────────────────────────┐
        │ Key theme 4: Parental influence │
        └─────────────────────────────────┘
              │                      │
   ┌──────────────────┐    ┌──────────────────┐
   │  Sub-theme 1:    │    │  Sub-theme 2:    │
   │ Important to     │    │ Culturally       │
   │ shaping          │    │ dependent        │
   │ career choices   │    │                  │
   └──────────────────┘    └──────────────────┘
```
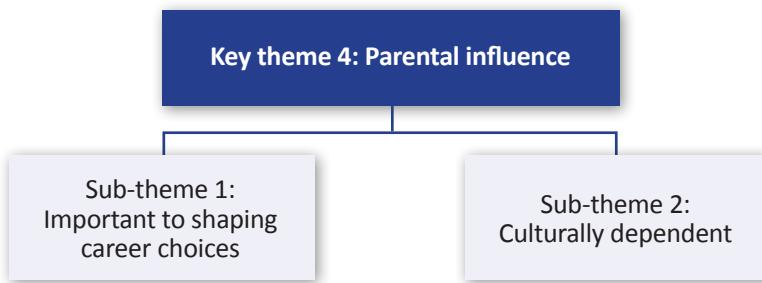
Figure 23: Key theme 4 and sub-themes – parental influence in career choices

Sub-theme 1: Parental career important to shaping career

Parental influence emerged in many of the career aspiration narratives told by interviewees in four different ways. These were:

- Parents encouraging children to train for career paths, when they were seen as either high paying, secure, or of high status. Amongst those studying engineering, there was almost universal encouragement by parents to study this, as it was seen as both well paying and respectable:

    Interviewee #36: Well my father's always been business-oriented, like running his own business or helping someone else run his own business, so he, a lot of construction stuff he's done, so he's helped run electrical companies. He's currently helping running a bricklaying company. So that was quite influential in the way of I see the way he manages things and the way he does things, and I've learned a lot and worked with him a lot, so that was a big part of it. And my mother's sort of just always just done little jobs. She hasn't really held a career sort of thing. So mostly my dad's influence in that. She, he did, does have his master's in business and finance. So yeah, I, I guess it was mostly my dad that sort of helps me out with that. (Male from the Bellarine Peninsula, studying construction management.)

- Young people following career paths their parents had taken. Many young people noted that having parents in a field gave them a concrete understanding of what was involved, thus increasing confidence to pursue a career in that field:

    Interviewee #28: So I chose this course just because I have some experience about what it is. I've tried it out with some people, just as work experience, and I quite enjoyed it, so I thought I might as well try and make a career out of it. My dad's also an electrical inspector, so that influenced my choice as well. (Male, studying pre-apprenticeship to be an electrician at outer-suburban TAFE.)

    Interviewee #17: So my mum is a nurse. I know she finished her degree some time ago. Her decision, well her wanting me to study nursing or medicine kind of did [influence me] in the sense that I felt kind of forced. That I had, you know, go through that path as well. (Female, 21, studying human services at university.)

- Young people's interests and values being shaped by their parents. This was commonly cited as a reason for choosing careers in engineering and mechanical trades, and in pursuing health careers. For example, in the accounts of the following young people, studying civil engineering at the same university in Melbourne:

    Interviewee #11: Yeah, so my dad is doing civil [engineering] as well. So that's why, it kind of pushed me towards there. But my mum isn't, she is doing aged care. And then because my dad talked to me about it, and a cousin of mine overseas had done it and talked to me about it… I've got cousins overseas that are also doing it – so it kind of pushed me toward that direction. (Male, 21.)

    Interviewee #12: My dad came from a mechanical engineering background. So that sort of had an effect on me. And my uncle is a civil engineer so that had quite an influence on me as well. (Male, 20.)

- Young people avoiding the career paths their parents had taken. As parents are sometimes seen as strong figures for modelling behaviour and socialisation, these narratives focused on their parents having bad experiences in these careers (high level of stress, job insecurity or physically difficult labour).

Sub-theme 2: Experience of parental influence different based on cultural background

Parental influence, particularly in terms of engineering, and mechanical trades (as related to trains, buses, and trams) varied by cultural background. Some experiences reflected were:

- White-collar oriented careers in engineering were strongly encouraged by families from some migrant backgrounds. In particular, some interviewees reported examples of engineering careers being relatively highly valued by their families of the following origins: China, Hong Kong, Iran, India, Sri Lanka and Serbia. For example:

  Interviewee #32: My mum is a structural engineer. My dad is a building surface engineer. They both wanted me to study engineering, because they saw it as a high status and high paying career for me. (Male, 23, from Hong Kong originally, and studying Civil Engineering at university.)

- For young people from CALD backgrounds, some cited their parents who had participated in manufacturing and other blue-collar work not wanting their children to do the same, creating obligations for what was perceived as upward social mobility. In this sense, some young people from CALD backgrounds may regard taking on trades work as a failure to progress, rather than as family tradition.

Theme 5: Perceived barriers to the participation of women

An emergent theme from the analysis of the interviews of young people was the perceived barriers to the participation of women in careers with rail, bus and tram. Consistent with the survey (Figures 13, 14 and 15), this was raised by young women themselves, with two sub-themes recurring frequently (Figure 24).


Key theme 5: Perceived barriers to the participation for women in transport

Sub-theme 1: Concerns about safety and sexism

Sub-theme 2: Lack of women in appropriate level of STEM education
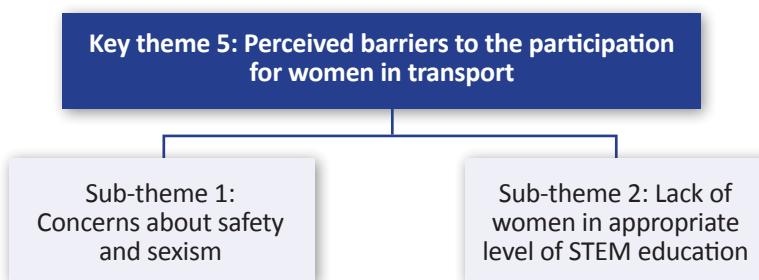
Figure 24: Key theme 5 and sub-themes – barriers to the participation of women in careers in rolling stock

Sub-theme 1: Concerns about safety and sexism

During the interviews, three concerns about the perception of safety emerged repeatedly. These were:

- Concerns about safety in the workplace, including facing sexism in the workplace.
- Concerns about safety in dealing with dangerous commuter situations. There was an awareness that taking on public-facing roles in rail and tram driving, and bus driving in particular, means that females employees may become the target of harassment or violence, especially late at night.
- Concerns about safety and getting home after late shifts, mostly pertaining to the driving and operations side of public transport careers.

This was cited by some of the young women interviewed as being an important factor in not pursuing transport careers. For example, Interviewee #9 (who had earlier stated that she had considered working in train operations in Melbourne), then went on to say that her choice of pursuing a career in law was partly motivated by safety:

Interviewee #9: You don't want to feel uncomfortable, you don't want to be at risk. Like, so that's why if you're comparing all the jobs and occupations that I listed before, I would prefer to be a lawyer because I wouldn't have to be that physically active in a corrupt society where there's crimes and stuff. (Female, 21, studying law at university.)

These concerns about safety were also compounded by concerns about sexism and being in male-dominated workplaces. Another interviewee commented:

Interviewer: How important is a diverse workforce to you?

Interviewee #38: That's a tricky question. In Architecture, it is very male dominated. And recently, I have done research on some related aspects of the public sector. It's a lot of male domination, in terms of who is actually getting the best of positions and who is winning the top prizes. So, it is quite a male dominated field, and yes, it becomes difficult to work in male-dominated sectors, but then I think you need to have that kind of attitude to actually fight for a place. (Female, studying architecture, originally from India.)

A significant barrier to career attraction is the concern that certain situations within the career will be unsafe. How this might be addressed is a question for further research.

Sub-theme 2: Experiences in STEM education

Since a major barrier to the participation of women in transport careers is the disproportionately lower rate of the women participating in STEM education (refer to Young et al., 2020, Section 3), experiences of young women with STEM education are a crucial consideration. This was an emergent theme of the interviews, with mixed experiences at school.

A sub-theme that emerged was being the only women in engineering courses:

Interviewee #34: Yeah, it is a bit pushy. I know it now is becoming pushy to get more women in STEM, and there's all these pathways, and there's all these fellowships in STEM, which is great. But then you actually get into the STEM courses and then you're alone in the course. Like, my friend does cyber security at [university in Melbourne], and she's the only girl in her course. (Female, 20, from Wangaratta, but studies at metropolitan university and stays on campus on college, commuting home every two weeks.)

However, even within STEM, there was some distinction, with experiences of some women being encouraged towards biomedical sciences and not engineering:

Interviewee #29: Yeah. I had a really bad relationship with my previous school. And then when I moved here and was asked basically the same question, a lot of people here were quite influential on it as well. They were like, you know, 'You can do it. You can do it.' I was at a very traditional public high school. What was really bizarre was, one of my friends at the old school wanted to work in biomedical sciences. She was really encouraged to do that, yet [there was] someone like myself [who] wanted to do engineering and was really discouraged. And it was often brought up that that just wasn't a path for women, that it wasn't going to happen. I was like, 'Anything can happen. Anything's possible.'

Interviewer: Did that attitude discourage you at all?

Interviewee #29: At some points it did. I thought I was just never going to make it. And that it was just never going to work. I found that getting the support from my grandparents meant a lot of to me because they're really, really close. (Female, 19, finishing VCE at TAFE.)

For some of the young women interviewed, there was either hostility or a lack of encouragement to participate in STEM. However, others had studied at high schools where the encouragement to pursue STEM was tokenistic and clumsily applied:

Interviewee #24: Yeah, they really pushed for girls to get involved in STEM. I did information technology, so it was pushed on us hard as well because we were already doing the subject. I really enjoyed it, so continuing was something that I definitely thought about. I think that has to do with engineering in a way, and that's very mathematical, very technical. That is not how my mind works. I don't do well in subjects like those. And it's very hands-on as well, very kind of like you have to that kind of mind to know how to do stuff like that, and I wouldn't. (Female, 19, pursuing an education degree.)

Theme 6: Other barriers to participation
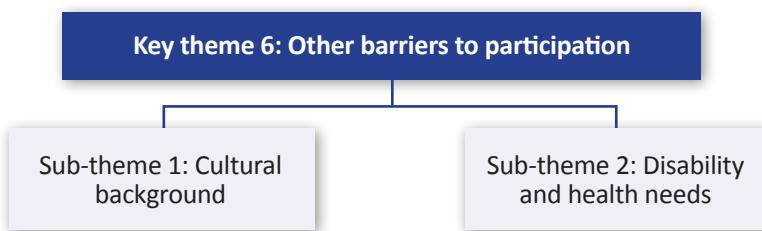
Figure 25: Key theme 6 and sub-themes – other barriers to participation in careers in rolling stock

Sub-theme 1: Perceptions of cultural barriers

In the interviews, one of the main perceptions of cultural barriers generally focused on the possibility that co-workers may not accept the person's level of English proficiency, even when it was fairly good, leading to ostracism or discrimination. However, the major mitigating factor in terms of workplaces that were seen as tolerant of those from other cultural backgrounds was the presence of cultural diversity in the workplace itself. For example:

> **Interviewee #26:** Yes, of course. When I first came here, my English and until now it is not so good. You know, it's hard for me to find a job.
>
> **Interviewer:** Do you ever think of whether there might be other Khmer-speaking people in that job? Does that attract you to a career, make you want to do the job more?
>
> **Interviewee #26:** Yeah, if there are any Cambodians in the job it's good. Because I know I can do the job, and be understood. (Male, 25, Australian permanent resident, originally from Cambodia, studying at TAFE.)
>
> **Interviewee #27:** I think this is just from my personal experiences and history, but it's like there are still a lot of like bigot and racist people out there. But it's like really, like it's really low-key though. So, in terms of like culture and diversity and all that I think we still need to like improve on that.
>
> **Interviewer:** So you'd be looking for a workplace where there were other Vietnamese people or that was obviously diverse in ethnicity?
>
> **Interviewee #27:** Yeah, because I wouldn't want to go to a workplace where I am like, the kind of a lone wolf kind of thing. Because that would be … that would make me feel really bad. And yeah, I probably wouldn't perform and all that as well. (Male, 24, outer South-Eastern Melbourne, studying a pre-apprenticeship at TAFE to become an electrician.)

The keywords that repeatedly arose in these conversations to overcome these perceived barriers is a feeling of acceptance or comfort:

> **Interviewee #21:** Yeah, of course, because of the age and the diversity you don't actually feel like you're welcome and like a part, because you actually need to help people make you feel comfortable to you or accepted in that kind of field, yeah. (Male, 24, of Sudanese-Australian background studying development at university.)

Sub-theme 2: Perceptions of disability and health needs

Another perceived barrier that emerged was that of considering one's health and disability needs, and the uncertainty about whether the transport sector was a career that could offer flexible hours to facilitate this. While transport was not at all seen as unfriendly to people with a disability, the lack of information and profile about transport careers led one interviewee with a specific condition to assume that it could not be considered:

> **Interviewee #18:** I have a chronic kidney disorder. Which means I have quite a low immune system. I'm on immunosuppressants, so in terms of symptoms, the physical symptoms, fatigue kicks in quite frequently. I'm more prone to the cold, the flu, etc, as well as that it takes longer for me to recover. Flexible working hours is very important to me. There are some days that you might not feel as well as others and which may mean you start a little bit later but end, end later as well. You might not be capable of performing as well as you would like every single day, day-in, day-out, and there needs to be concessions made there made there by those in charge, in charge of you. (Male, 28, lives with an immune disorder.)

These quotes provide some examples of the various ways in which the young people interviewed perceived barriers related to cultural background and disability and health needs as important factors shaping their career choices. Note that in both these cases, the reality of an inclusive workplace is a necessary but not sufficient condition for career attraction, but additionally, the projection of a workplace as inclusive.

Theme 7: Openness to consideration for manufacturing and maintenance once aware of it

```
┌─────────────────────────────────────────┐
│   Key theme 7: Responses to learning about │
│          transport careers               │
└─────────────────────────────────────────┘
        │                         │
┌──────────────────────┐  ┌──────────────────────┐
│ Sub-theme 1: Positive │  │ Sub-theme 2: Need      │
│ response to finding   │  │ explicit links between │
│ out potential for     │  │ skills and interests,  │
│ transport careers     │  │ and employer           │
└──────────────────────┘  └──────────────────────┘
```
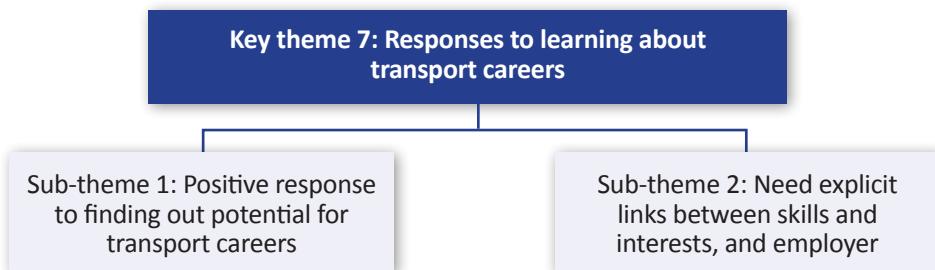
Figure 26: Key theme 7 and sub-themes – openness to considering careers in rolling stock after explicit linkages are made

Sub-theme 1: Perceptions of cultural barriers

Figure 26 displays another of the themes emerging from the interviews, that young people are fairly open to manufacturing and maintenance of trains, buses and trams (where appropriate, those studying engineering, in trades, or blue-collar work for example), once they are informed about it. However, before being informed, they are not very aware of these careers.

Many interviewees assumed that there was little need for manufacturing and maintenance jobs because of the assumption that most of this work was done offshore – the result of narratives about the decline of manufacturing in Australia.

None of the relevant interviewees had a particularly negative view of manufacturing or maintenance, and this was in contrast to other industries for which interviewees had negative images and would not consider them, such as mining (bad for the environment), nursing (poor working conditions), and labouring (low status).

Sub-theme 2: Need for explicit links between skills and interests, and employer

Another sub-theme which emerged during the interviews was the extent to which young people in fields important to rolling stock were much more open to considering careers once explicit links were established between their interests and the possible future workforce in rail, bus and tram. This was particularly so for two groups in the interviews: those engaged in pre-apprenticeships training to be electricians and electrical engineers, and those studying (at TAFE or university) or working in IT. Two examples are these statements from different young men studying in the same pre-apprenticeship group:

> **Interviewee #27:** Because like when you actually think about it, it seems obvious, a tram just runs on like electricity and stuff, so I would say, yes, now that that I am more interested in it. But before I had the impression of kind of … y'know … Thomas the Tank Engine (laughs). Renewable energy is kind of coming in so yeah how that could be incorporated into trains and buses would be really interesting to me. (Male, 24, outer-South Eastern Melbourne, studying a pre-apprenticeship to be an electrician at TAFE.)

> **Interviewee #28:** Well I know there's like a lot of electrical work that goes into making a train and obviously how buses work and stuff like that. Like maintenance and actually building them. But yeah, I, I wasn't, that wasn't the first thing I thought of at all, no. I'd probably be more interested in systems and the mechanical side of it or the electrical [side]. But yeah maybe if they had more information about it because I don't know, I have no idea about how any of it works, what any of the pathways in or anything like that is. (Male, outer-South Eastern Melbourne, studying a pre-apprenticeship to be an electrician at TAFE.)

In this case, it may not be so much about a negative image of the employer/sector, but lack of awareness potential recruits possess on how their skills and interests fit into this.

Understanding this is crucial, following on from one of the major recommendations of a report by BIS Oxford Economics (2018), regarding opportunities for broader engagement with cognate trades:

> For the rail industry, it will become increasingly important to recognise what these portable job clusters are – that is, in training people for positions in rail, what are the potential other occupations that could also be being trained for? Conversely, what are the occupations, with just a little additional training or new skill acquisition, could be fertile grounds for recruiting high quality rail staff? (BIS Oxford Economics, 2018, p87).

Case studies: Two young people thinking about which career paths to pursue

The following two case studies highlight many of the themes emerging from the analysis of the interviews. Reading through the narratives of these two people holistically illustrates the complexity of the ways in which various factors contribute to their decisions around careers.

Joshua

Joshua* (Interviewee #5) is a nineteen-year-old male, studying mechanical engineering at a metropolitan university. He is doing so because he has a strong interest in automotive repair and is looking to develop his skills in that area through a degree.

Having completed school in his hometown of Bendigo, he has recently moved to Melbourne for further education. His father was a CEO in an office and his mother was in banking, and his parents have no knowledge or interest in either of his chosen fields of nursing or engineering. At school he studied some subjects related to engineering – specialist maths and engineering. Towards the end of school, he was 'on the fence' as to whether to study engineering or nursing, but after some deliberation, he chose nursing, completing one semester of a nursing degree at a tertiary institution in Melbourne. After the first semester, he realised it was turning out to be different from what he had anticipated, so he 'jumped ship' and sat the rest of the year out.

The following year, he enrolled in a Bachelor of Engineering at a different tertiary institution in Melbourne. He is prospectively looking at several fields for after graduation, including working with aircraft or automotive vehicles. His interest in his career path started with wanting to be a racing car driver, which later developed into wanting to understand how they work, culminating in a broad interest in mechanics.

He cites the most important characteristics in looking for a career and/or employer are personal sense of enjoyment in what he does, as well as opportunities for learning and personal development. Innovation and being on the cutting edge are interesting to him, and he states that he'd like to steer away from the everyday kind of maintenance.

The thought of working in the rail sector has crossed his mind, in terms of either driving a train or maintenance of trains. He doesn't know that much about the details of rail, but believes he would be interested due to his general interest in mechanics and how things work. When asked what he envisaged is done in a rail maintenance workshop, he imagined that there is a differentiation between diesel and electrical engine maintenance. He does not think it would be that different to a car, in terms of skills required. He thinks automation will soon replace drivers in the future, but that there will have to be a lot of technology development between now and that point.

Despite an interest in mechanics and having entertained the possibility of working in rail, he has never thought of a career with buses. He uses the bus frequently but doesn't view working on buses in their current state. When the interviewer raised the possibility of technology-integrated buses, he said that something like that would interest him, as well as the possibility of working on design to introduce electric buses as they are environmentally innovative.

Emily

Emily* (Interviewee #20) is 18 (importantly to her, turning 19) and is from a medium-sized town in northern Victoria. She is studying an Advanced Diploma of Civil Engineering at a dual-sector institution in Melbourne. She commutes twice a week from home (three hours on a V/Line train each way) to study, staying overnight with her sister in Melbourne three nights a week. She has completed part of her diploma and is considering her next move in terms of career. She is considering continuing engineering or changing to her other interests, either fashion (textiles) or nursing.

Emily is currently unsure about her commitment to engineering and is thinking of discontinuing her studies as she is not enjoying it. A compounding barrier to her dissatisfaction is the draining demands of regional travel.

Her main influence for doing engineering were her parents, who insisted she pursue the field due to job opportunities (her father has PhD in linguistics, and her mother is a methods engineer for machinery). Her sister is pursuing a PhD in 'technology and applied science', although she isn't sure that her sister was an influence in her study choice. However, her parents have high praise for her sister's career path, which might have led her to considering STEM.

---

* Interviewees #5 and #20 presented here been given pseudonyms, based on the most common male and female names registered for births in the year 2000 in Australia.

At her particular high school, an independent school in regional Victoria, she experienced barriers discouraging women from pursuing STEM. She did Level 3 Maths in Further Methods and Specialist, and really enjoyed them, however has not similarly been enjoying Civil Engineering. Science was prioritised at her school, with a large amount of spending on facilities, but it wasn't pushed on women. In her current course, she also has issues:

> My friend who is a female in civil engineering … we sit in lectures, she will put up her hand for an answer – I understand it's really sexist – but she will put up her hand, and, and she will say something, and the teacher will just ignore her … yeah, she's cracked, she's cracked a few times.

Emily did a work experience placement in nursing towards the end of school. She found this challenging:

> I want to go to work. I want to be able to enjoy my job. And nursing was probably for me, the biggest thing was women in the nursing field get abused. Verbally abused. The pay, the hours are not great, and all I hear is bad news about nursing. And it's really, really not good.

There were also safety concerns associated with the shift work and long hours associated with nursing:

> Nursing, late hours with no travel. I don't have my license or anything, so I knew studying was just not going to happen going back and forth doing placement, especially women at 9pm. It's also looking down the track of when you do have placement hours and you obviously want to have a kid one day. You're a nurse, you have to do night shifts. Like, it's just not great. You just think that, if that's what I have to do in the future. I'm not going to be able to do 12-hour shifts if I have a kid.

The other career she has entertained, apart from engineering and nursing, is fashion. When she was younger, fashion was one of her goals, but she came to realise there were no jobs in fashion. She says that although she hasn't had any professional experience within the fashion industry, she has designed clothes and wants to seriously pursue it. She was partly exposed to fashion as her mother works as an engineer in clothing manufacture.

Emily does think about her future in concrete financial terms:

> Because at the end of the day it's, prices are going up on everything, and how are you going to live off? I think, I remember growing up and knowing if you had a million dollars you were set for life, you know what I mean? And then you get to this age, you couldn't get a down deposit for like a normal nice house for anything less than $700,000. So I think having a good pay, having no stress, I know it sounds like the dream, but I think it's a combination of everything at the end of the day. It's really, you've got the weigh up when you choose a job so …

In terms of moving around, she would be quite happy to move from Shepparton to Melbourne for work, or move anywhere in regional Victoria where appropriate jobs were available.

When asked about careers in rolling stock, she had heard very little, and never thought about it, except perhaps when she is on a train. The first careers that come into her mind when asked about careers were project management, logistics, train drivers, conductors, and tram inspectors. In this regard, she had a much higher level of knowledge of rolling stock careers than most of the youth cohort surveyed. Some of this knowledge comes from word-of-mouth and personal connections. Firstly, she lives near the offices of a major company, where construction and maintenance of trains occurs. Secondly, her partner, who is also an engineer, got offered an internship at this company through his dad. In this case, family connections played a major part.

Her reflections on her perception of the level of innovation in rail careers pointed to her understanding largely being formed from the point-of-view of a customer, in particular her extensive experiences of V/Line and what she has heard about the possibilities for a fast train between Melbourne and Shepparton. She says while newer technologies would make rail a more attractive career, and she perceives the money and stability would be great, she is apprehensive about whether she would be able to enjoy it. In this sense, she would need more 'hands-on' engagement with the sector before she would consider a career in it.

Knowledge gaps and further research

The key knowledge gaps identified include:

The need to understand the segment of young people most immediately close to being attracted to careers in rolling stock

Of the 18%, 9%, and 12% segments who indicated 'yes' to having considered a career in rail, bus, and tram respectively (see Figure 3, p13), what would motivate them to apply for career? Why is there a discrepancy between the sizable segments identified and the small numbers who are applying for transport jobs? Further research needs to be undertaken on the segment that indicated 'yes' to having considered careers in rail, bus and tram.

The need to understand the segment of young people next most immediate to careers in rolling stock

This segment includes those who indicated 'possibly' to having considered careers in rail (31%), bus (23%) and tram (25%). What kinds of engagement would be required to have them consider public transport careers?

What sort of information needs to be provided about careers?

The interviews indicate that young people's perceptions of the public transport sector are fairly superficial, and in general not dogmatically held. In some senses it is more like the sector has 'no image' rather than a negative image. To what extent will the provision of more knowledge (as indicated in Figure 7, p17) be effective in increasing attraction? What role does framing (how the information is presented) play?

How to create a more true-to-life perception of rolling stock careers?

How can the operations-centric perception of public transport careers be corrected, with more consciousness around the possibilities for careers in manufacturing and maintenance?

Better employer image or improving how the diversity of job roles is conveyed?

The ways in which young people make decisions about careers in complex, and evidence from the qualitative part of our study provides indications that young people place task-specific or field-specific interests above the sector they work in. If this is true, then increasing attraction may not be just about promoting the image of the sector and individual employers, but more about drawing links between their interests. Further research is required to focus on this question with young people.

Addressing safety concerns of women

It is clear from the work (Figures 12–15, p21–23, and Figure 24, p35), that safety concerns are a significant issue for women. In transport jobs this manifests in three ways: concerns about safety with colleagues in the workplace; concerns about safety with customers/commuters on the job, particularly when working alone (e.g., bus driver); and safety while returning home from late-night shifts. As a result of our findings in this study, there is a fair understanding of the problem, but we need to know what solutions would make women feel safe in the context of these jobs.

Conveying social and environmental benefits

Young people value social purpose or benefits to society in choosing a career. To what extent might the promotion of the social and environmental benefits of public transport, and the possibility of green innovation in the future make the sector more attractive to young people?

Needs and opportunities

The segment of young people who might be open to considering public transport careers is proportionately large compared to the small amount of people actually taking up careers in the sector. Therefore, there is a large audience:

- 48% of young people had considered a career in rail (only 17% replied yes, but a much large proportion of 31% indicated possibly).
- 33% had considered a career with buses (only 10% replied yes, but a much large proportion of 23% indicated possibly).
- 37% had considered a career with trams or light rail (only 12% replied yes, but a much large proportion of 25% indicated possibly).

There is an openness on the part of young people to hearing more about careers in public transport. Only 11% of the total sample surveyed indicated that they did not want any of these forms of information to consider a career in public transport, and this proportion is notably small.

Many young people view public transport careers as being innovative, with 42% of the young people surveyed perceiving public transport careers as 'highly innovative' or 'somewhat innovative'. This percentage of respondents is favourable compared to a number of other industries.

References

Australasian Railway Association. (2006). *The changing face of rail: a journey to the employer of choice: attraction and retention of employees in the Australasian Rail Industry.*

BIS Oxford Economics. (2018). *Australian Railway Association capability study: Skills crisis: A call to action*.

Chamorro-Premuzic, T., Furnham, A., and Moutafi, J. (2004). The relationship between estimated and psychometric personality and intelligence scores. *Journal of Research in Personality, 38*, 505–513.

Deloitte. (2019). *The Deloitte Global Millenial Survey 2019: Societal discord and technological transformation create a 'generation disrupted'.*

Fouad, N. A. and Santana, M. C. (2016). SCCT and underrepresented populations in STEM fields: moving the needle. *Journal of Career Assessment, 25*(1). https://doi.org/10.1177/1069072716658324

Hobbs, L., Jakab, C., Millar, V., Prain, V., Redman, C., Speldewinde, C., Tytler, R., and van Driel, J. (2017). *Girls' future – our future: The Invergowrie Foundation STEM report*. Invergowrie Foundation, Melbourne.

Liamputtong, P. (2009). *Qualitative research methods*. Oxford University Press Australia and New Zealand.

The Australian Centre for Social Innovation. (2017). *Addressing disadvantage in southern Melbourne: Towards outcomes*. Melbourne.

UK Department for Transport. (2016). *Transport infrastructure skills strategy: building sustainable skills*. London.

Wallace, M., Lings, I., Sheldon, N., and Cameron, R. (2011, 7–9 December). *Attracting young engineers to the rail industry in Australia*. Paper delivered at ANZAM Conference, Wellington, New Zealand.

Young, C., Jones, R. N., Heenetigala, K., Ooi, D., Lung, S., and Parry, N. (2020). *Reimagining the workforce: the Victorian rolling stock context. Literature review*. Rail Manufacturing Cooperative Research Centre, Melbourne.

Appendix 1: Survey

This survey was administered through the data collection company Student Edge.[1] The full survey cohort followed, and was completed between 13 October and 2 November 2019.

The first analysis involved calculating descriptive statistics. The second part of the analysis involved using the biographical data questions (Q1–11) to segment out different parts of the population. The third part of the analysis involved calculating correlations to determine the internal factors that underlie openness to applying for careers in rolling stock.

Q1. What is your age? (Drop down menu for ages.)

Q2. What is your gender? Categorical: (a) male; (b) female; (c) other.

Q3. What is the postcode of your regular address?

Q4. Do you consider yourself from any of the following cultural backgrounds? You may choose more than one.
- ☐ Australia
- ☐ England
- ☐ China
- ☐ India
- ☐ New Zealand
- ☐ Philippines
- ☐ Vietnam
- ☐ South Africa
- ☐ Italy
- ☐ Malaysia
- ☐ Scotland
- ☐ Sri Lanka
- ☐ South Korea
- ☐ Germany
- ☐ Greece
- ☐ Other (free response box)

Q5. In terms of work history, which best describes your situation?
- ☐ I have never worked a steady job
- ☐ I have worked in a steady job for up to a year
- ☐ I have worked in a steady job for between a year and three years
- ☐ I have worked in a steady job for more than three years

Q6. In terms of work history, which category best describes the steady jobs you have held? You may select more than one.
- ☐ Accounting
- ☐ Banking and Financial Services
- ☐ Administration and Human Resources
- ☐ Advertising
- ☐ Public Relations
- ☐ Media and Arts
- ☐ Agriculture
- ☐ Animal and Horticulture
- ☐ Automotive
- ☐ Transport and Logistics
- ☐ Construction, Architecture and Design

---

1. https://studentedge.uservoice.com/knowledgebase/topics/147697-survey

- ☐ Education and Training
- ☐ Electrical and Electronics
- ☐ Engineers and Engineering Trades
- ☐ Executive and General Management
- ☐ Government, Defence and Protective Services
- ☐ Health and Community Services
- ☐ Hospitality, Food Services and Tourism
- ☐ Information and Communication Technology (ICT)
- ☐ Legal and Insurance
- ☐ Manufacturing
- ☐ Mining and Energy
- ☐ Personal Services
- ☐ Sales, Retail, Wholesale and Real Estate
- ☐ Science
- ☐ Sport and Recreation
- ☐ Other (free response box)

Q7. Please indicate which of the following qualifications you have completed or are currently enrolled in (you may select more than one)?
- ☐ Year 10 certificate
- ☐ Year 12 certificate
- ☐ Trade apprenticeship
- ☐ TAFE qualification
- ☐ TAFE or University Diploma
- ☐ University bachelor's degree
- ☐ University higher degree

Q8. Which of the following categories of work do you aspire to? You may select up to three.
- ☐ Accounting
- ☐ Banking and Financial Services
- ☐ Administration and Human Resources
- ☐ Advertising
- ☐ Public Relations
- ☐ Media and Arts
- ☐ Agriculture
- ☐ Animal and Horticulture
- ☐ Automotive
- ☐ Transport and Logistics
- ☐ Construction, Architecture and Design
- ☐ Education and Training
- ☐ Electrical and Electronics
- ☐ Engineers and Engineering Trades
- ☐ Executive and General Management
- ☐ Government, Defence and Protective Services
- ☐ Health and Community Services
- ☐ Hospitality, Food Services and Tourism
- ☐ Information and Communication Technology (ICT)
- ☐ Legal and Insurance
- ☐ Manufacturing

☐ Mining and Energy
☐ Personal Services
☐ Sales, Retail, Wholesale and Real Estate
☐ Science
☐ Sport and Recreation
☐ Other (free response box)

Q9. Which of the following would you consider the highest motivator for a job or career? (Choose top three)
☐ A career with social purpose that helps people
☐ A career that is good for the environment, or helps develop renewables and smart cities
☐ The ability to get 'hands on' and have a tangible short-term impact
☐ The opportunity to be involved in technological innovation
☐ The ability to learn new skills
☐ Flexible working conditions
☐ A diverse workforce
☐ Professional working conditions
☐ Stability of the industry

Q10. Would you prefer to apply for a job where the work was more routine or more innovative?
☐ Highly routine
☐ Routine
☐ A mix of routine and innovative
☐ Innovative
☐ Highly innovative

Q11. I would prefer to apply for a job that had clear benefits for society.
☐ Strongly agree
☐ Agree
☐ Neither agree nor disagree
☐ Disagree
☐ Strongly disagree

Q12. I would prefer to apply for a job that offered the possibility for continuing job security.
☐ Strongly agree
☐ Agree
☐ Neither agree nor disagree
☐ Disagree
☐ Strongly disagree

Q13. I would prefer a job where the workplace culture was inclusive of me.
☐ Strongly agree
☐ Agree
☐ Neither agree nor disagree
☐ Disagree
☐ Strongly disagree

Q14. I would not consider applying for a job if I perceived that the work involved manual labour.

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

Q15. I would not consider applying for a job if it lacked opportunities for continual learning.

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

Q16. I would not consider applying for a job that lacked possibilities for career advancement.

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

Q17. I would not consider applying for a job if it were perceived as being of low status or low prestige.

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

Q18. What are/were your parents' occupations? You may select more than one.

- ☐ Accounting
- ☐ Banking and Financial Services
- ☐ Administration and Human Resources
- ☐ Advertising
- ☐ Public Relations
- ☐ Media and Arts
- ☐ Agriculture
- ☐ Animal and Horticulture
- ☐ Automotive
- ☐ Transport and Logistics
- ☐ Construction, Architecture and Design
- ☐ Education and Training
- ☐ Electrical and Electronics
- ☐ Engineers and Engineering Trades
- ☐ Executive and General Management
- ☐ Government, Defence and Protective Services
- ☐ Health and Community Services
- ☐ Hospitality, Food Services and Tourism
- ☐ Information and Communication Technology (ICT)
- ☐ Legal and Insurance
- ☐ Manufacturing

☐ Mining and Energy

☐ Personal Services

☐ Sales, Retail, Wholesale and Real Estate

☐ Science

☐ Sport and Recreation

☐ Other (free response box)

Q19. To what extent has your parents' career been influential on your own choice of career?

☐ Highly positive influence

☐ Somewhat positive influence

☐ Neither positive nor negative influence

☐ Somewhat negative influence

☐ Highly negative influence

Q20. Which three the following job characteristics would most likely stop you applying for that type of job.

☐ Little need for innovation or complex problem solving

☐ Traditional or old-fashioned workplace culture

☐ Old technologies

☐ Limited job roles

☐ Lack of diversity and inclusiveness

☐ Not welcoming for women

☐ Lack of career advancement

☐ Lack of job security

☐ Low status

☐ Lacked clear benefits to society.

Q21. Have you ever thought about a career in the following public transport industries:

a. Rail

☐ Yes

☐ Possibly

☐ Not at all

b. Bus

☐ Yes

☐ Possibly

☐ Not at all

c. Tram/light rail

☐ Yes

☐ Possibly

☐ Not at all

Q22. Can you please list the top five job roles you thought of when asked about transport jobs? (Free response)

a. _____

b. _____

c. _____

d. _____

e. _____

Q23. How often do you use public transport?
- ☐ Usually – At least three times a week
- ☐ Frequently – At least once a week
- ☐ Seldomly – About once a fortnight
- ☐ Rarely – Less than once a month

Q24. Do you perceive of the public transport sector as an innovative or a traditional place to work?
- ☐ Highly innovative
- ☐ Somewhat innovative
- ☐ Neither innovative nor traditional
- ☐ Somewhat traditional
- ☐ Highly traditional

Q25. How knowledgeable do you think you are about what is involved in a career in the public transport industry?
- ☐ I am highly knowledgeable
- ☐ I know more than most
- ☐ I know about as much as the average person
- ☐ I know less than most
- ☐ I don't really know anything

Q26. What other information about careers in public transport would you need if you were to make a more informed decision?
- ☐ I would need to know if it aligned with my own career goals or aspirations
- ☐ I would want to hear from other young people already working in public transport, and how they find it.
- ☐ I would want to know more about the different jobs available
- ☐ I would want to know more about career paths and job security
- ☐ Other

Q27. If you were to be offered a career in the public transport industry, how well do you think you would perform?
- ☐ I would be amongst the best in performing this job
- ☐ I would be above average in performing this job
- ☐ I would be about average in performing this job
- ☐ I would be below average in performing this job
- ☐ I would be amongst the worst in performing this job

Q28. Do you perceive there to be barriers to the participation of women in public transport jobs?
- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

Q29. If so, what are these barriers? (Free response)

Q30. Do you perceive there to be barriers to the participation of people of culturally diverse backgrounds in public transport jobs?

- ☐ Strongly agree
- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree
- ☐ Strongly disagree

Q31. If so, what are these barriers? (Free response)

Q32. Do you have any other comments on careers in public transport? (Free response)

Appendix 2: Semi-structured interviews

For the community interviews, participants were recruited with a combination of targeted sampling and snowball sampling. Young people were recruited by contacting university and TAFE lecturers via email, as well as emailing youth centres and community organisations. In the community interviews, participants were briefed by the interviewer, who provided a Plain Language Statement and a Consent Form for signing before commencing the interview.

The interviews were conducted with a variety of young people in Victoria between 21 August and 19 November, 2019.

Ethics for this research project were approved by the Victoria University Human Research Ethics Committee, as application *HRE19-104 Reimagining the workforce: building, smart, sustainable and safe public transport.*

Semi-structured interview questions are presented below. Note that the discussion was free to deviate from these questions, depending on topics that emerged.

What is your age?

What is your suburb of residence?

What are you studying or training in?

What is your ideal career? (open-ended to start)

Have you wanted to do other careers? How did you decide between them?

What are the main characteristics you look for in a career? (open-ended)

How importantly do you rate (insert below characteristics)? (ask about those which have not yet been discussed)
- A career that is interesting
- A career that is innovative
- A career that is good for society/ethical
- A career that is not stressful
- A career with a high level of safety
- A career that pays well
- Opportunities for advancement
- Opportunities for learning
- Opportunities for travel
- Flexibility of hours
- Permanency of contract
- Leave allowances (e.g., maternity leave).

What careers did your parents have?

In what ways were the careers influential for you?

Do you have carer/children responsibilities?

What sort of career path would you like?

What sorts of education and training pathways into a career would be attractive to you?

What sacrifices would you pursue to attain the career you want?

Have you ever considered a career in the rail/bus/tram industries (ask about each separately)?
- What did you find attractive/unattractive about these careers?
- What were the first five job roles you thought of when I asked if you had considered a career in public transport?
- What do you think of careers in these industries?
- How much do you know about what they involve?
- What are the positive and negative features of these industries to you?
- Do you think they are attractive?
- What sort of people do these jobs (stereotypes)?
- What does a rail or bus manufacturing operation look like (describe)?
- Do you think this sector in Australia is more innovative, less innovative, or about the same level of innovation as the same industries overseas? Elaborate on answer.

For women:

- Were you encouraged to study STEM in school?
- How do you feel about rail/bus/tram as a female-friendly workplace?
- Do you feel that there are barriers to employment of women in this sector?
- Cultural background
- Do you feel there are cultural barriers to employment of diverse cultures in this sector?

If interviewee is regional:

- Willingness to move to metropolitan or other regional areas for work in this sector?

Survey and interview analysis

Thematic analysis procedures detailed by Liamputtong (2013) were used (Figure 2.1). This included coding key words and themes expressed by interviewees in discussion and then subsequent coding. Codes were then referenced against the existing literature, and themes collated across all of the interviews undertaken. The themes were defined and linked to the participants' stories, research literature and research questions.

```
Data collection → Transcription and correction → Thematic coding → Theme generation → Data presentation
                  Transcription and correction → Content (frequency) analysis → Data presentation
                  Transcription and correction → Data presentation
```

Figure 2.1: Qualitative data analysis process