

A JUST TRANSITION ON THE ROAD: IMPACT OF AUTONOMOUS VEHICLES ON SINGAPORE WORKERS



Research Partnership between **National Trades Union Congress (NTUC)** and
Lee Kuan Yew Centre for Innovative Cities (LKYCIC), Singapore University of Technology and Design

Research Partnership between
National Trades Union Congress (NTUC) and **Lee Kuan Yew Centre for Innovative
Cities (LKYCIC)**, **Singapore University of Technology and Design**



Lee Kuan Yew
Centre for
Innovative Cities

Published by National Trades Union Congress.
For information, please contact strategy@ntuc.org.sg.

Copyright © 2026 National Trades Union Congress and Singapore University of Technology and Design.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the National Trades Union Congress and Singapore University of Technology and Design.

ISBN: 978-981-94-7026-6 (print)
ISBN: 978-981-94-7027-3 (digital)

CONTENT

4	Executive Summary
7	Chapter 1 Background and Approach
10	Chapter 2 What We Found—Key Insights
36	Chapter 3 Who the Workers Are—Readiness Profiles and Implications
41	Chapter 4 Creating a Just and Effective Transition— Recommendations
65	Chapter 5 Conclusion
67	Annex A Full Methodology
70	Annex B Summary of Driver Types and Readiness Profiles
72	Annex C Landscape Review Findings
77	References
83	Research Project Team

Executive Summary

Autonomous vehicles (AVs) are moving from pilot trials to real-world deployment in Singapore, with autonomous shuttle services launched in 2026. AV deployment is set to reshape not only operational efficiency and safety, but jobs, skills, and career pathways across the transport sector. There is a need for greater understanding of how workers are experiencing and preparing for these changes.

Since the completion of this study, the Government has announced an initial manpower transition package for taxi and private-hire drivers in July 2026, developed with tripartite and industry partners (Ministry of Transport [MOT], 2026). The package includes Career Conversion Programmes (CCPs) for AV specialists and Public Transport Professionals, a new training incentive scheme, and enhanced outreach and career guidance (MOT, 2026). These measures represent an important and timely first step that corroborates and validates several concerns surfaced in this study, particularly the need for clearer pathways, practical training support, and recognition of drivers' opportunity costs. As further implementation details emerge, uncertainty surrounding the pace of AV deployment, its implications for different groups of drivers, and the longer-term employment landscape will require sustained and careful attention. The value of this report is to examine the worker realities that will shape the effectiveness of these measures over time, and to identify the longer-term system conditions needed for a fair and future-ready transition.

This study provides one of the first system-level, worker-centred assessments of AV-induced labour transitions in Singapore, drawing on a landscape review, worker survey, stakeholder engagements, and a co-design workshop. It moves beyond technology adoption debates to examine how workers interpret risks, make decisions, and navigate transition pathways in practice. It recognises that bus captains, taxi drivers, and PHV drivers face fundamentally different challenges given their different employment types, where bus captains are employees while taxi and PHV drivers are closer to self-employed/platform workers.

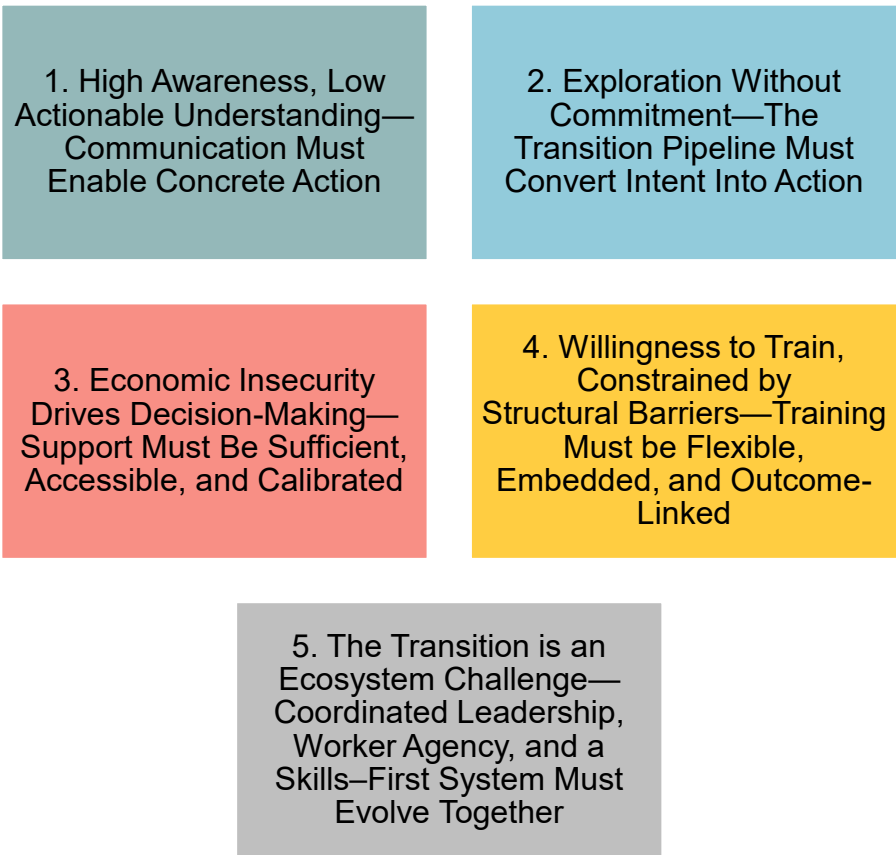
Across the findings, a central theme emerges: workers' concerns are driven not by resistance to technological advancements or a lack of awareness, but by the gap between awareness and actionable transition pathways. While workers are willing to adapt, they remain constrained by uncertainty, fragmented systems, and economic risks. Without clearer communication on when and how AV deployment will affect their roles, what support will be available, and what credible career pathways exist, it is challenging for workers to make informed training or career decisions.

Looking beyond initial transition support, two longer-term priorities should guide a just transition for Singapore's transport workers affected by AV deployment. First, tripartite partners should undertake scenario planning on the desired longer-term mix of AVs and human-driven services across taxi, PHV, and bus operations. This should consider service resilience, manpower needs, worker livelihoods, commuter needs, and the pace at which AV deployment becomes commercially and operationally viable. This is not an issue that platform operators or employers can solve on their own. Tripartite partners should continue to anticipate and ringfence human roles that matter, especially in safety-critical, commuter-facing, service-recovery, and/or higher-value operational functions for Singaporean drivers, to preserve a Singaporean Core.

Second, transition planning should not only help affected workers move out of at-risk roles, but also create sustainable pathways into better-quality work where feasible, including higher-value driving, fleet operations, commuter support, safety oversight, and other adjacent transport roles. As training incentives, CCPs, and career guidance measures are implemented, tripartite partners should monitor whether support is sufficient, accessible, and linked to real and good employment outcomes, especially for drivers facing income volatility, vehicle rental obligations, contract lock-ins, and uncertainty over whether new roles will match their livelihood needs.

Key Insights

The study surfaced five key insights regarding workforce readiness for the AV transition.

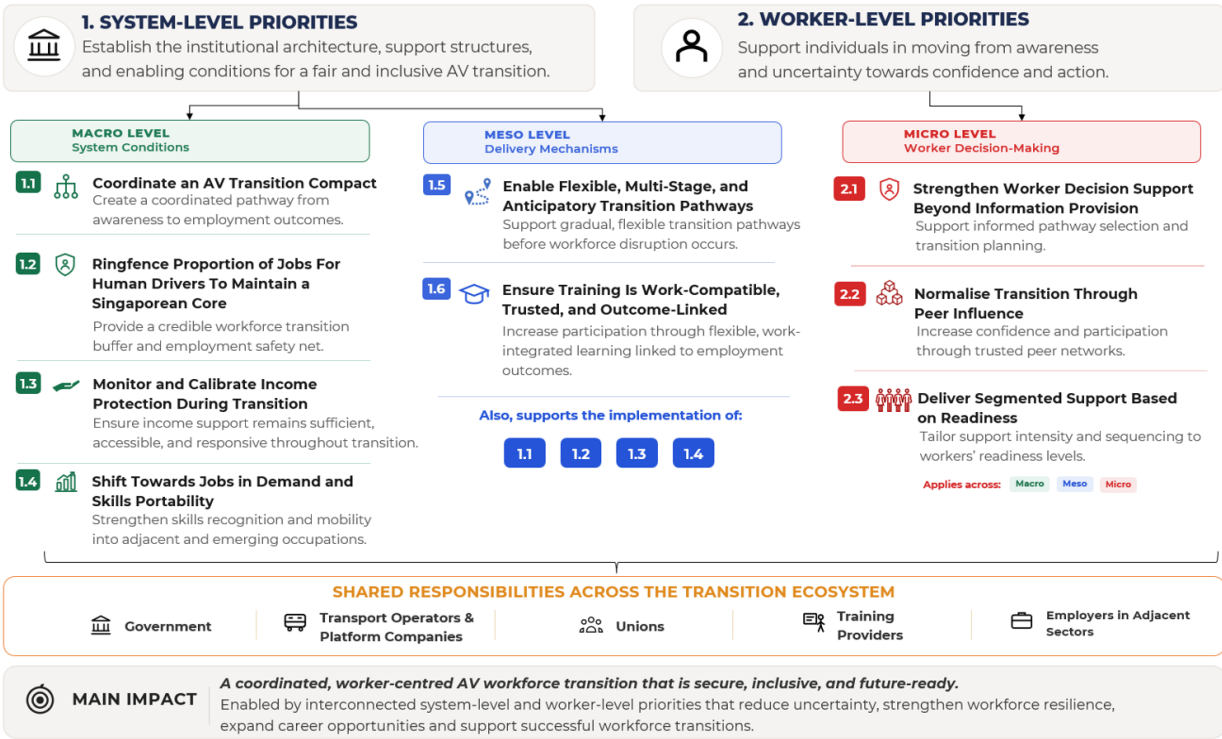


Recommendations Towards Building a Fair and Future-Ready Transport Workforce Transition

The study proposes nine recommendations organised around building an integrated transition ecosystem. Together, they set out a forward-looking approach that reduces uncertainty, strengthens economic security, supports informed decision-making, and enables movement into new opportunities within and beyond the transport sector.

ECOSYSTEM MAP OF LONGER-TERM TRANSITION PRIORITIES

Illustrating the longer-term system and worker priorities that collectively enable a just and effective AV workforce transition



Three priorities stand out:

- **Coordinate an integrated transition ecosystem** that brings together workforce planning, career guidance, skills development, financial assistance, and employment matching into a coherent worker-facing journey.
- **Strengthen economic security during periods of change** through workforce buffers and income protection measures that enable workers to engage in reskilling and career exploration without jeopardising their livelihoods.
- **Expand access to future opportunities** by strengthening links between skills development and employment outcomes, recognising transferable competencies, and improving mobility across occupations and sectors.

These priorities should be complemented by efforts to improve decision-making support, leverage peer influence to encourage preparation, and calibrate assistance according to workers' differing levels of readiness.

Ultimately, the success of Singapore's AV transition will be gauged not only by technological performance, but also by the quality of the workforce outcomes it produces. By strengthening coordinated action across tripartite partners and training providers, reduce uncertainty, protect workers' income during transition, and align support with workers' differing levels of readiness, it could demonstrate that technological innovation and workforce security are mutually reinforcing objectives. In doing so, Singapore can build a transport workforce that is resilient, adaptable, and supported through a transition that is fair, inclusive, and future-ready.

Chapter 1: Background and Approach

Autonomous vehicles (AVs) are expected to significantly reshape global transport systems, with adoption accelerating across sectors such as ride-hailing, public transport, and logistics. As AV technologies mature, cities worldwide are preparing for transformative shifts in mobility, urban planning, and labour markets. Singapore is emerging as a key testbed for various AV pilot programmes (illustrated in Figure 1), with the strategic goal of integrating AVs into the nation's public transportation network. Since early trials in 2014, AV pilots have expanded across multiple domains, including passenger shuttles, logistics, and maintenance operations.

Despite Singapore's overall high level of readiness, AV adoption is not solely a technological challenge. While AVs may enhance safety, address manpower constraints, and expand service coverage, public perceptions remain uneven. Studies consistently show that acceptance is significantly higher among those who believe the benefits outweigh the risks (Chng & Cheah, 2020; Winter et al., 2019). As deployment scales up, these perceptions will have important implications for commuter trust, adoption, and policymaking. The future of AVs therefore extends beyond technology, raising legal, ethical, educational, economic, and workforce considerations that warrant closer attention in Singapore's AV deployment strategy (see Annex B for the full review).

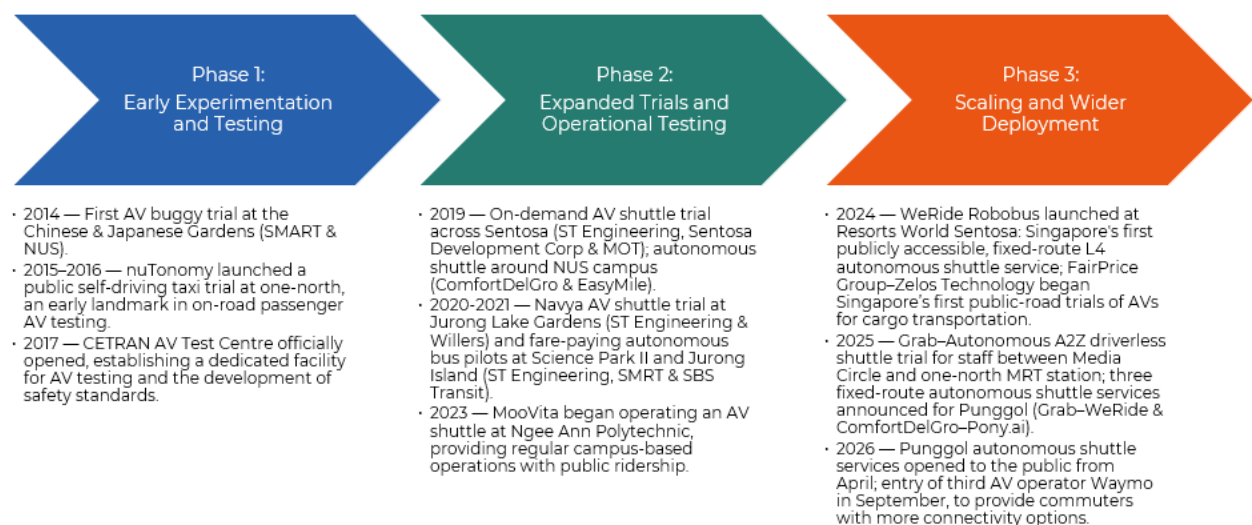


Figure 1: Key Developments in Singapore's AV Journey¹

A critical dimension of the AV transition relates to its implications for the transport workforce. Findings from our earlier study in collaboration with the National Transport Workers Union, '*Understanding the Transformation of Jobs in the Public Transport Sector: A Focus on the Attractiveness of Bus Captain as a Career*', surfaced two important insights:

- I. the AV transition will likely involve significant job redefinition; and

¹ *Note.* This figure provides a condensed overview of Singapore's AV development and is not intended to be exhaustive. The phases represent the authors' own periodisation based on the milestones presented, and the timeline was compiled from publicly available sources, including ScienceDaily (2014), Singapore-MIT Alliance for Research and Technology (2015), Grab Holdings Limited (2016; 2025), ST Engineering (2019), WILLERS Pte. Ltd. (2020), Yong (2021), Business Wire (2021), WeRide (2024; 2025), Kok (2025), Tjoe (2025), and Land Transport Authority (2025b; 2025c; 2026).

- II. human intervention will remain indispensable, especially in assisting vulnerable commuter groups and handling complex on-ground dynamics.

These insights underscore the need to balance technological deployment with continued human expertise, while ensuring viable career pathways for workers whose responsibilities may shift as AVs become more embedded in the transport system. This is especially critical for driving-intensive occupations such as taxi drivers and Private Hire Vehicle (PHV) drivers who may face heightened vulnerability as autonomous shuttles² and cars are deployed over the next few years.

In Singapore, this includes close to 82,000 workers across these sectors³. Existing research suggests that automation may lead to job displacement, job redesign, or downward occupational mobility, especially for workers with fewer transferable skills or lower educational attainment (Nissim & Simon, 2021; Yankelevich et al., 2018). Older workers may also be disproportionately vulnerable, given the ageing profile of the transport workforce.

At the same time, AV adoption is not expected to eliminate human labour entirely. Instead, it is likely to result in job transformation, with human roles remaining essential in areas such as customer service, safety oversight, and complex operational situations. New roles are also expected to emerge within the AV ecosystem, including fleet management, maintenance, and data-related functions. However, these often require new skillsets and training (KPMG, 2021; Spencer, 2018).

Despite growing recognition of these workforce implications, significant gaps remain in both research and policy. Much of the existing literature focuses on technological and user adoption, with comparatively limited attention to labour impacts, particularly from the perspective of affected workers (Frisoni et al., 2016; Waring et al., 2020). In Singapore, there has been no comprehensive, system-level study examining how AV adoption may affect transport workers' career trajectories, skills requirements, and long-term employment outcomes.

Existing workforce development systems may not yet be fully prepared for the scale and pace of transition. There is a need for greater clarity on viable transition pathways, alongside insufficient targeted support for more vulnerable worker groups. Studies further highlight a disconnect between policy intentions and workforce readiness, underscoring the need for more anticipatory and coordinated labour market strategies (Waring et al., 2020; Pettigrew et al., 2018).

Taken together, these challenges point to the need for a holistic and coordinated approach to AV deployment, one that integrates technological innovation with workforce planning, social policy, and stakeholder engagement. Tripartite collaboration among government, employers, and unions, alongside participatory approaches that incorporate worker perspectives into policy design, will be important in ensuring that the AV transition is sustainable, effective, and worker-centred (Pronello & Fedeli, 2025; Nissim & Simon, 2021).

² Autonomous shuttles are typically smaller in scale compared to autonomous buses, often comprising of less than 20 seats. Autonomous shuttles are also often used to serve specific locations or designated stops within a zone compared to autonomous buses which are intended to ply longer routes across the island.

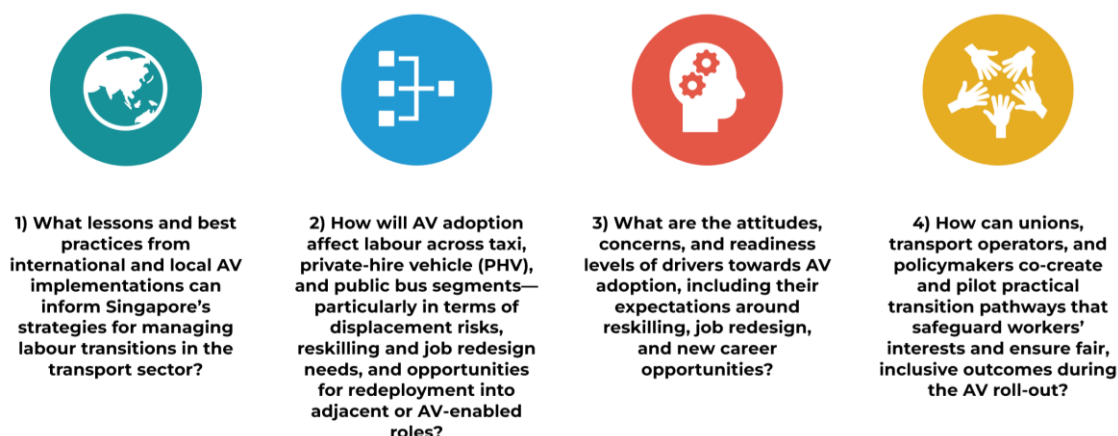
³ The figure is derived from the 2024 population of 13,117 licensed taxi drivers and 59,371 licensed private hire car (PHC) drivers reported in the Land Transport Authority's (LTA) *Annual Vehicle Statistics 2024: Motor Vehicle Population by Vehicle Type* (LTA, 2025a), together with an estimated 9,500 bus captains reported by *The Straits Times* (Chelvan, 2025b). These figures sum to approximately 82,000 workers across the three groups.

Rather than relying on one-off schemes alone, the transition will require a coordinated long-term system that evolves with AV deployment, aligns workforce planning, training, income support, job placement, and job quality, and supports workers into fair, viable, and future-ready roles.

The Current Study

It is within this context that this joint study by the Lee Kuan Yew Centre for Innovative Cities (LKYCIC) and National Trades Union Congress (NTUC) Strategy was undertaken to generate grounded insights into workers' concerns, aspirations, and transition needs to ensure that workforce considerations remain central to Singapore's AV discussion. A just and future-ready transition will require coordinated tripartite collaboration. Such a transition should not be limited to reskilling after disruption occurs. It should also involve anticipatory workforce planning, early communication, income protection, and credible job-linked pathways so that workers can prepare with confidence.

Guided by this goal, the study addresses four key research questions:



To address these questions, the study employed a mixed-method approach, comprising a landscape scan, a sector-wide stakeholder engagement workshop, a survey of transport workers, and a multi-stakeholder co-design workshop to translate insights into feasible transition pathways (see Annex A for more details). This multi-stage design enabled a ground-up understanding of labour implications while ensuring that recommendations reflect both system-level perspectives and workers' lived experiences.

The remainder of this report is organised as follows. Chapter 2 presents the study's empirical insights drawn from sector engagement focus groups, the worker survey, and the co-design workshop, while the full landscape review is provided in Annex C. Chapter 3 examines patterns of workforce readiness through a segmentation analysis, identifying distinct worker profiles and support needs (see Annex B for a summary of driver types and readiness profiles). Building on these findings, Chapter 4 sets out a series of recommendations organised through an ecological systems model, outlining actions at the system, organisational, and worker levels to support a just, fair, and future-ready AV transition. Chapter 5 concludes by reflecting on broader implications of the findings and the importance of coordinated action to ensure that technological innovation and workforce security advance together as AV deployment progresses.

Chapter 2: What We Found—Key Insights

Building on Chapter 1, we move beyond broad discussions of AV adoption to examine how transport workers experience and navigate the transition on the ground. Here we present the study's core empirical insights, drawing on sector engagements, the worker survey, and the co-design workshop. In light of recently announced transition measures, these findings should also be read as critical implementation signals: they show where support is likely to gain traction, where workers will need additional clarity and active handholding, and where scheme availability alone will be insufficient to shift behaviour or secure meaningful transition outcomes.

The findings show that workforce readiness is shaped less by awareness or willingness to adapt, and more by structural and systemic constraints. While many workers are aware of AV developments and open to adapting, they face challenges in translating this awareness into concrete action, because timelines, future roles, and employment outcomes remain unclear. Across sectors, the results reveal a consistent pattern of gaps between awareness, preparation, and actionable pathways, shaped by uncertainty, economic vulnerability, and fragmented support systems. Together, these findings point to the need for a more coordinated and worker-centred approach to transition planning.

Insight 1: High Awareness, Low Actionable Understanding—Communication Must Enable Concrete Action

Key takeaway and implication: *Workers' high baseline awareness of AVs creates a strong starting point for transition, but awareness will not translate into action unless it is converted into trusted, role-specific, and actionable guidance. As outreach and career guidance expand, the key implementation question is whether workers understand what AV deployment means for their roles, options, eligibility, earnings, training commitments, and transition trade-offs. Future communication must therefore move beyond general awareness-raising towards clear deployment timelines, credible pathway options, visible support channels and practical decision guidance. Strengthening role-specific communication and linking information to concrete transition pathways will be critical to reducing uncertainty, building confidence, and enabling workers to act.*

High Awareness, But Engagement Remains Limited

The sector engagement session at the start of the study revealed that workers were uncertain about when AV deployment would occur, and whether workers' and operators' feedback was meaningfully reflected in transition planning. Across worker groups, participants acknowledged that AV developments were becoming increasingly visible in Singapore, yet many described these developments as something happening "around them" rather than something they were actively involved in shaping.

The worker survey reinforced these observations of uncertainty. Awareness of AV developments in Singapore was found to be already widespread across the transport workforce, with 96.3% of surveyed workers reporting some awareness of AV developments (Figure 2). However, this awareness remains largely indirect and passive. Most workers learned about AVs through media exposure (83.5%) or general awareness of AV trials (71.5%) rather than through official sources such as operators or the government (Figure 3).

Importantly, the findings reveal a sharp decline from general awareness to direct exposure and active engagement. While 83.5% of workers reported learning about AVs through media and public discourse, this fell to 40.2% who had personally seen AVs operating on the roads and further declined to just 4.5% who had attended any AV-related briefing or training. These findings suggest that although awareness of AV developments is high, deeper understanding and active engagement with the transition remain limited.

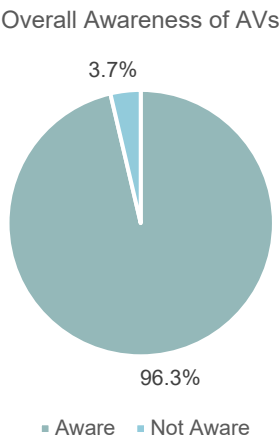


Figure 2: Drivers' Overall Awareness of AVs

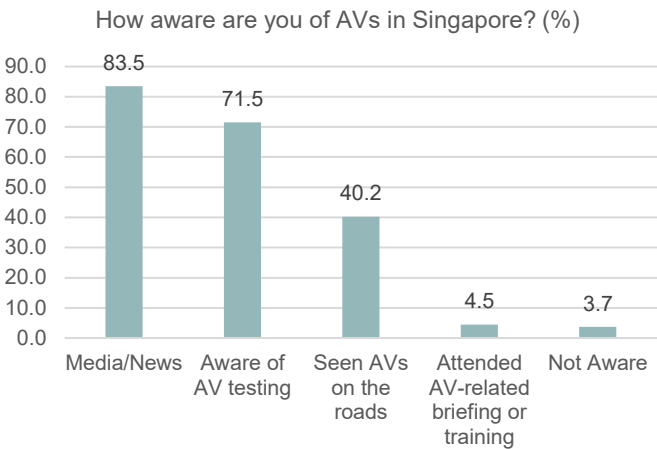


Figure 3: Breakdown of Types of AV Awareness

Similarly, across sectors, PHV drivers reported the highest exposure to AV developments through media and public discourse, followed by taxi drivers and bus captains (Figure 4). However, greater exposure did not translate into greater confidence. Many PHV and taxi drivers we spoke to described AV trials as heightening anxiety because they reinforced perceptions that disruption could happen suddenly.

Interestingly, while bus captains reported comparatively lower exposure to AV developments through media and on-road sightings compared to PHV and taxi drivers, they demonstrated the highest participation in AV-related training. This likely reflects the role of more structured organisational communication and workforce planning systems within the public bus sector. Even so, bus captains continued to express uncertainty about how future mixed fleets of autonomous and manual buses would reshape operational roles.



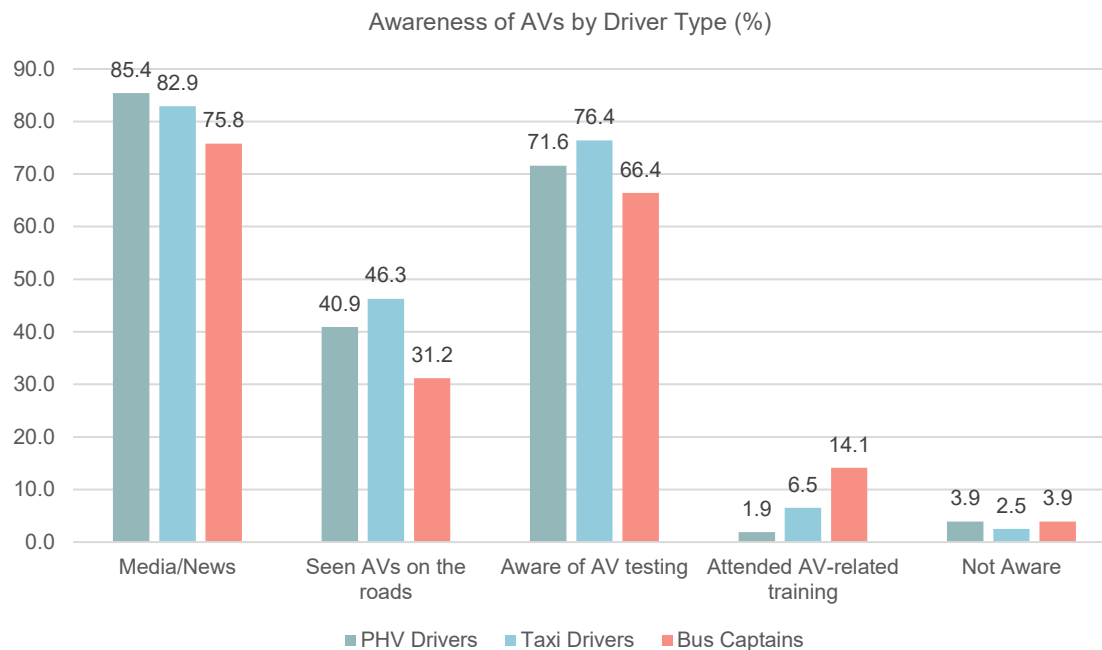


Figure 4: Awareness of AVs by Driver Type

Age differences were similarly visible. Younger workers below 40 years old generally reported greater direct exposure to AV developments, including seeing AVs on the roads, alongside slightly higher participation in AV-related training (Figure 5). This suggests greater familiarity and engagement with technological change among younger workers. In contrast, workers aged 60 and above reported the lowest levels of direct exposure and training participation, potentially reflecting shorter career horizons and lower perceived urgency to adapt.

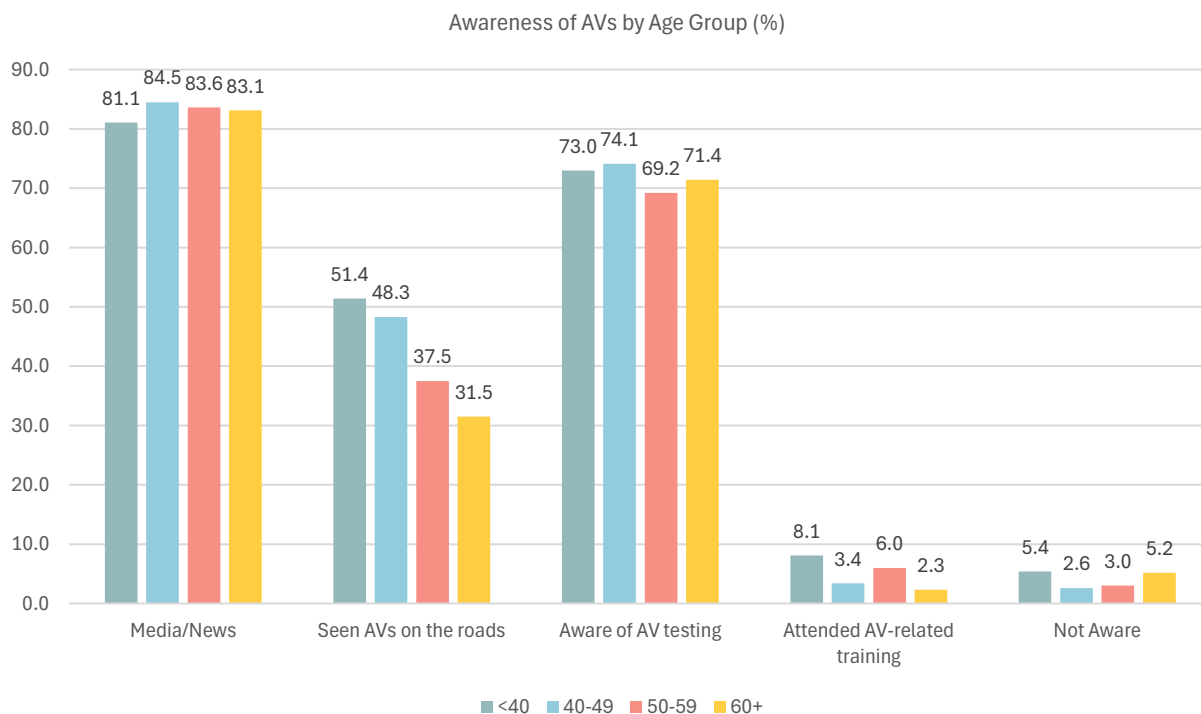


Figure 5: Awareness of AVs by Age Group

Uncertainty Persists Because Timelines and Pathways Remain Unclear

Perceptions of rollout timelines further reinforced this sense of uncertainty. While around 70.6% believe AV deployment will likely occur within the next 10 years, most expect this to happen within the medium-term range of three to 10 years rather than immediately (Figure 6). Relatively few workers expect rollout within the next two years, while 14.4% remain unsure about when AV rollout will occur at all. This creates a transition that feels sufficiently real to generate concern, yet distant enough for many workers to delay concrete preparation.

Results also indicated that confidence in adapting to the AV transition is mixed, with 49.9% of drivers being uncertain, reinforcing the issue of uncertainty rather than outright resistance against the transition (Figure 7).

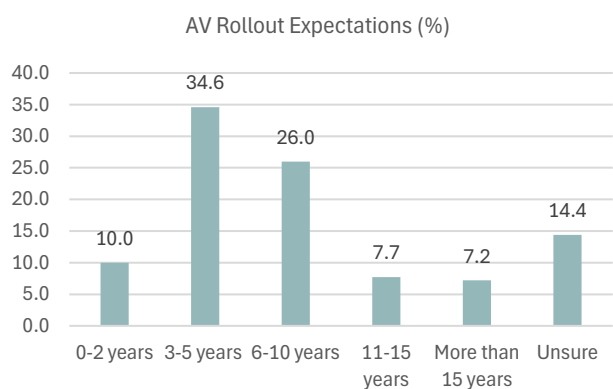


Figure 6: AV Rollout Expectations

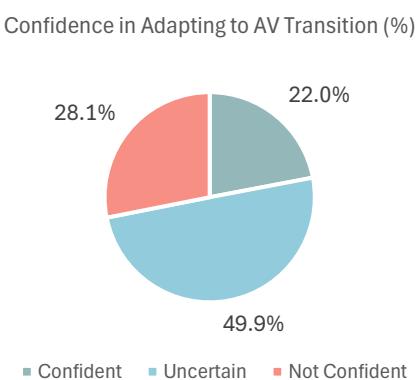


Figure 7: Confidence Towards AV Transition

When broken down by driver type, bus captains appear relatively more confident at 29.7%, followed by taxi drivers (21.1%) and PHV drivers (20.5%) (Figure 8). However, despite exhibiting higher confidence levels, bus captains also recorded comparatively high uncertainty regarding rollout timelines and future sectoral changes.



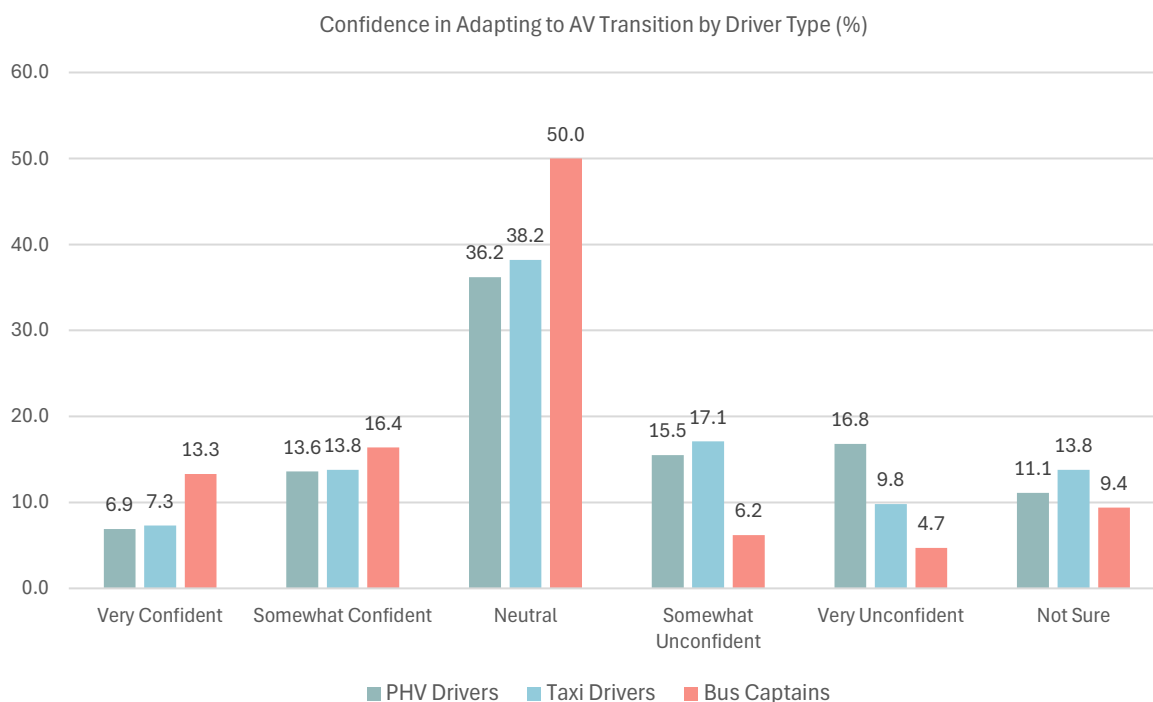


Figure 8: Confidence Towards AV Transition by Driver Type

These findings suggest that uncertainty stems less from outright resistance towards AV adoption and more from limited actionable clarity around how the transition may unfold across sectors and over time. Across both the survey and sector engagement discussions, workers repeatedly highlighted challenges in understanding what the transition would concretely mean for their jobs, career prospects, and future planning decisions.

Exposure and Actionable Clarity Improve Confidence

The findings further suggest that greater exposure and understanding of AV developments may help strengthen confidence and preparedness. Workers with higher levels of awareness and exposure generally reported greater confidence in adapting to the transition, with the clearest pattern observed among bus captains (Figure 9). This suggests that clearer, more relatable, and practically grounded engagement may help reduce uncertainty and improve transition readiness.



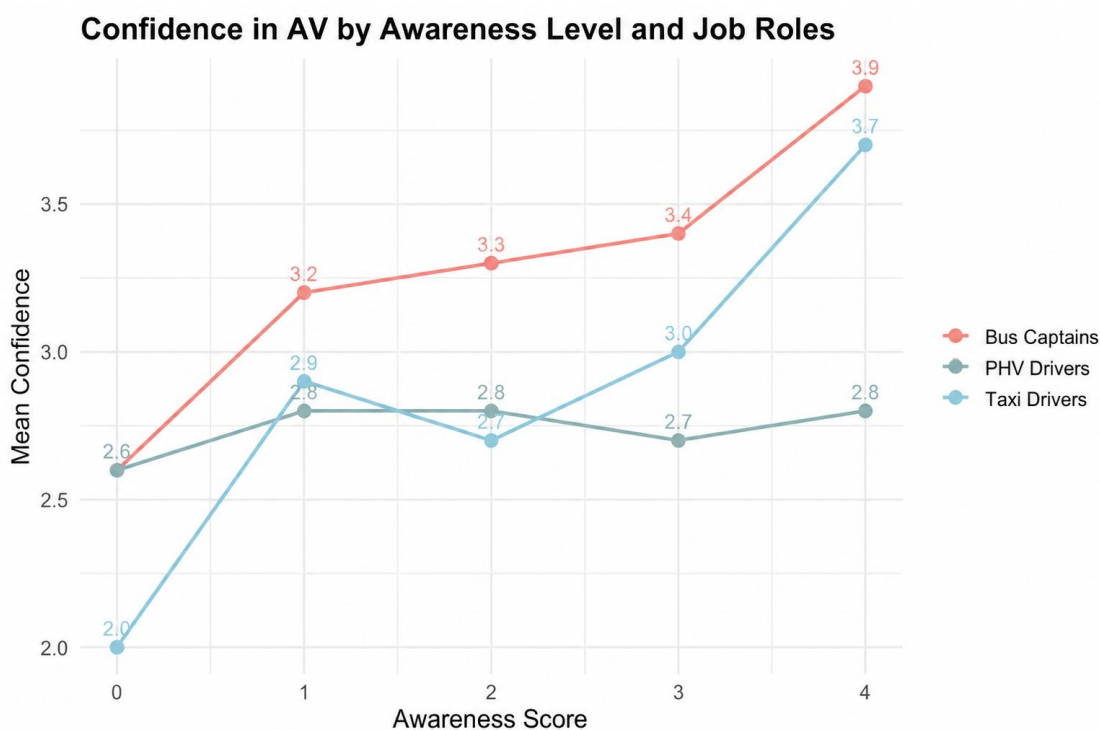


Figure 9: Confidence in AV by Awareness and Job Role

Insight 2: Exploration Without Commitment—The Transition Pipeline Must Convert Intent into Action

Key takeaway and implication: Workers are already exploring future options, but uncertainty, weak pathway visibility, and fragmented systems are preventing exploration from becoming commitment. As transition measures are implemented, the critical task is to build a continuous worker-facing pipeline that links awareness, personalised career guidance, training, placement, and post-placement support. This continuity will be essential to convert early interest into sustained participation, reduce drop-off points, and ensure that transition pathways lead to credible employment outcomes rather than one-off engagement.

Exploration is Occurring, But Action Remains Limited

The worker survey further showed that many workers had already begun preparing for the transition, although preparation often remained exploratory rather than action oriented (Table 1).

Types of Preparation	Dimension Included
Passive preparation	i) received information on AV rollout plans, ii) received advice on reskilling or upskilling, iii) received information on how AVs may affect drivers, and iv) briefed on alternative-AV-related career opportunities
Active preparation	i) planning a career change, ii) exploring other career options, iii) building skills outside of driving, and iv) attended AV-related trainings

Table 1: Types of Preparation for Upcoming AV Transition

Overall, in terms of passive preparation, around one-third of workers had received some form of information related to the AV transition, including AV rollout plans (32.5%), reskilling opportunities (32.2%), and how AVs may affect drivers (31.1%). However, fewer workers had received information on alternative AV-related career opportunities (21.8%) as seen in Figure 10.

When it comes to active preparation, around one-third of workers reported actively exploring or planning next steps related to career transition. Despite these early signs of engagement, only 4.4% had attended AV-related training, suggesting a substantial gap between awareness, exploration, and concrete action (Figure 10).

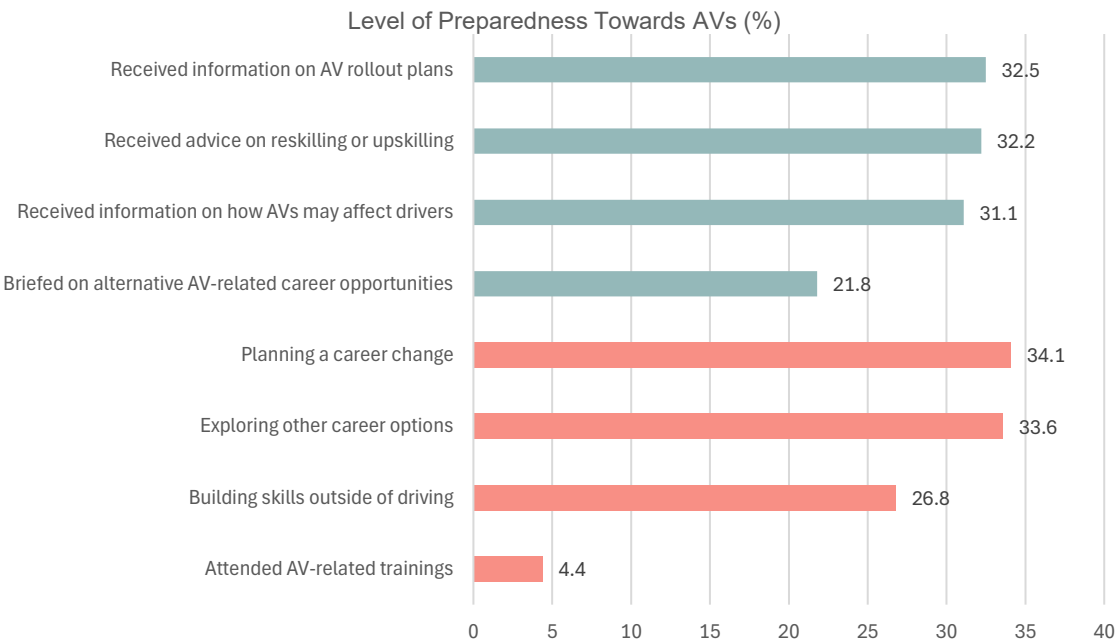


Figure 10: Level of Preparedness Towards AVs

When it comes to driver type breakdown (Figure 11), preparedness differs qualitatively across driver groups. Bus captains generally demonstrated higher levels of preparation, although much of this preparation was passive in nature through information and advice received. PHV drivers, on the other hand, showed relatively more active preparation (e.g. self-initiated exploration and planning), but their readiness remained fragile due to uncertainty and weaker institutional support structures. Taxi drivers tended to sit between these two worker groups. However, despite varying levels of preparedness, training participation remains low across the board.

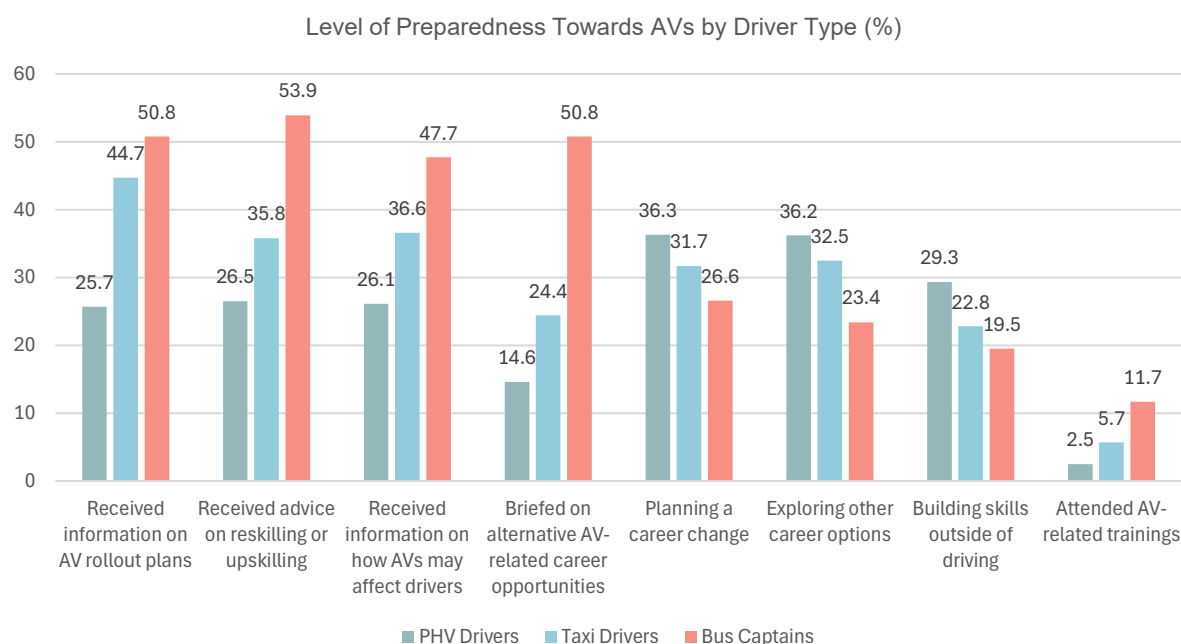


Figure 11: Levels of Preparedness Towards AVs by Driver Type

An interesting pattern emerges when looking at the breakdown by age group (Figure 12). When it comes to passive preparation, drivers aged 40-49 generally exhibit lower levels of preparedness compared to the other age groups. A clearer pattern emerges for active preparation, where younger drivers aged below 40 demonstrate the highest levels of preparedness across the board, particularly in planning a career change and exploring other career options. This suggests that younger drivers may be more actively considering their long-term career pathways beyond their current driving roles, underscoring the need to develop credible and future-ready career opportunities within the industry.

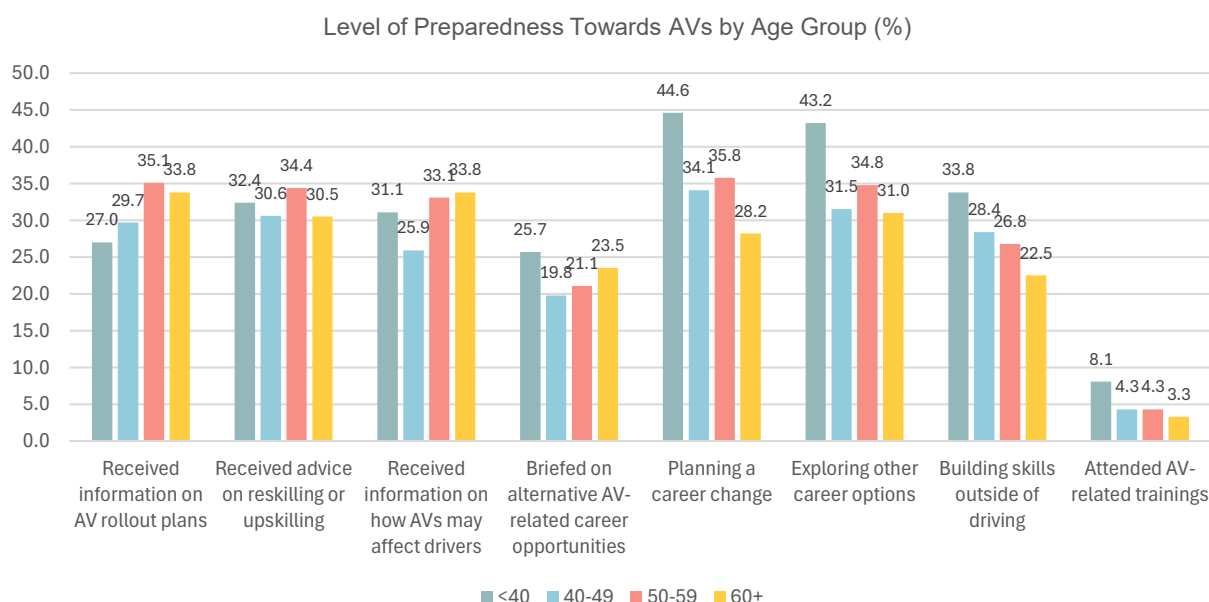


Figure 12: Levels of Preparedness Towards AVs by Age Group

Transition Pathways Remain Unclear

These patterns became clearer when examining intended future pathways (Figure 13). While close to half (47.3%) intend to remain in their current driving roles, there is a drop when it comes to those who intend to move to AV-related driving (34.7%) and AV-related non-driving roles (30.6%). Furthermore, nearly 1 in 5 drivers (19.3%) are considering leaving the transport sector altogether, while 23.3% remain unsure, underscoring substantial uncertainty and low confidence that could affect driver retention and the transition process. This is underscored by workshop participants' repeated emphasis on linking training to outcomes, providing clear career roadmaps and making progress visible and credible.

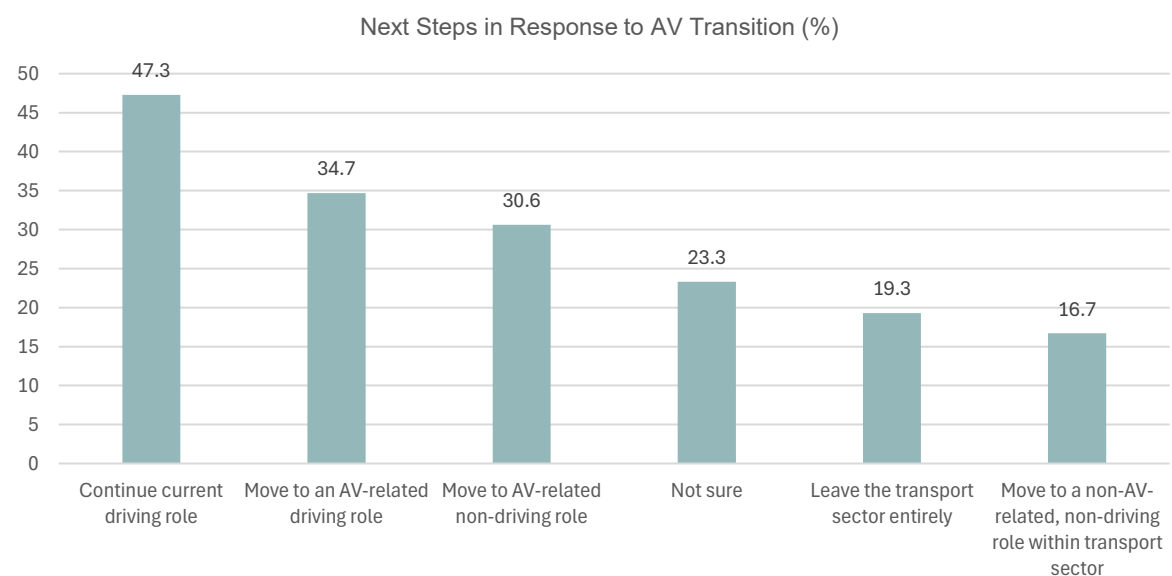


Figure 13: Drivers' Next Steps in Response to AV Transition

Driver type differences further illustrate variation in intended transition pathways (Figure 14). Firstly, taxi drivers showed the strongest tendency towards leaving the sector (18.7%) and recorded the highest level of uncertainty about their future pathways (29.3%). Secondly, PHV drivers displayed a more varied set of preferences, with similar proportions considering AV-related driving (30.7%) and non-driving roles (30.5%), while 22.6% indicated an intention to move to a non-AV-related, non-driving role within the transport sector. Thirdly, bus captains showed the strongest inclination towards AV-related pathways, with 57.0% considering a move to an AV-related driving role and 39.8% to an AV-related non-driving role. They also recorded the lowest intention to leave the transport sector entirely (13.3%) and the lowest preference for moving to a non-AV-related role within the sector (7.8%).

The findings suggest that transition decisions differ across driver groups. More structured sectors such as the public bus sector may offer more readily identifiable transition pathways, as reflected in bus captains' stronger orientation towards AV-related roles. In contrast, the gig-based PHV sector display a more varied mix of intended pathways, while taxi drivers report the greatest uncertainty and the strongest inclination to leave the transport sector altogether.

For some PHV and taxi drivers, remaining in driving may also reflect valued forms of autonomy, mobility, and lifestyle, rather than income considerations alone. Driving can provide access to a vehicle, control over work hours, flexibility for family routines, and the

ability to combine driving with other informal or self-directed work. These factors may reduce the likelihood of early exit even where workers recognise longer-term risks from AV deployment. Transition support should therefore account for both economic and non-economic motivations, rather than assuming that workers will automatically move once training or alternative pathways are available.

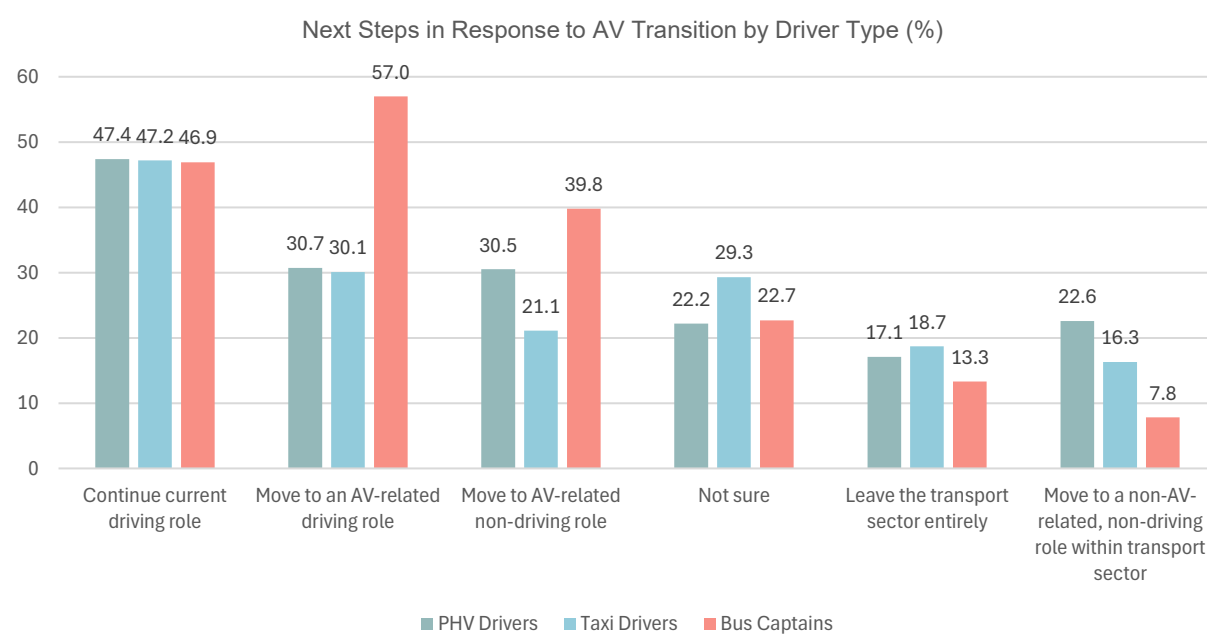


Figure 14: Drivers’ Next Steps in Response to AV Transition by Driver Type

Age differences also emerged when examining intended future pathways (Figure 15). Younger workers below 40 years old demonstrated the strongest openness towards AV-related roles, both in driving-related (48.6%) and non-driving-related pathways (45.9%). Notably, moving to an AV-related driving role was the most frequently selected pathway among this group, suggesting greater willingness to explore future-facing mobility opportunities. In contrast, workers aged 60 and above reported the lowest interest in both AV-related driving (31.5%) and non-driving roles (23.5%), while recording the highest level of uncertainty regarding future pathways (26.3%). These findings suggest that older workers may require greater pathway clarity, reassurance, and support in understanding how their existing skills and experience remain relevant within future workforce transitions.

Remaining in current driving roles was nevertheless a prominent preference across all age groups (45.5%–51.3%), and the most frequently selected pathway among workers aged 40 and above. This suggests that while openness towards transition exists, particularly among younger workers, many workers are still considering multiple possible pathways rather than committing to a major career shift. It is therefore important to differentiate expressed interest from actual take-up. Workers’ willingness to act may change once they face real trade-offs, including income loss, training time, vehicle rental obligations, contract penalties, uncertainty over job fit, and whether new roles offer comparable flexibility, lifestyle or earnings. This distinction is especially important as new support measures are implemented: the success of transition support should be assessed not only by sign-ups, but by completion, placement, retention, and longer-term livelihood outcomes.

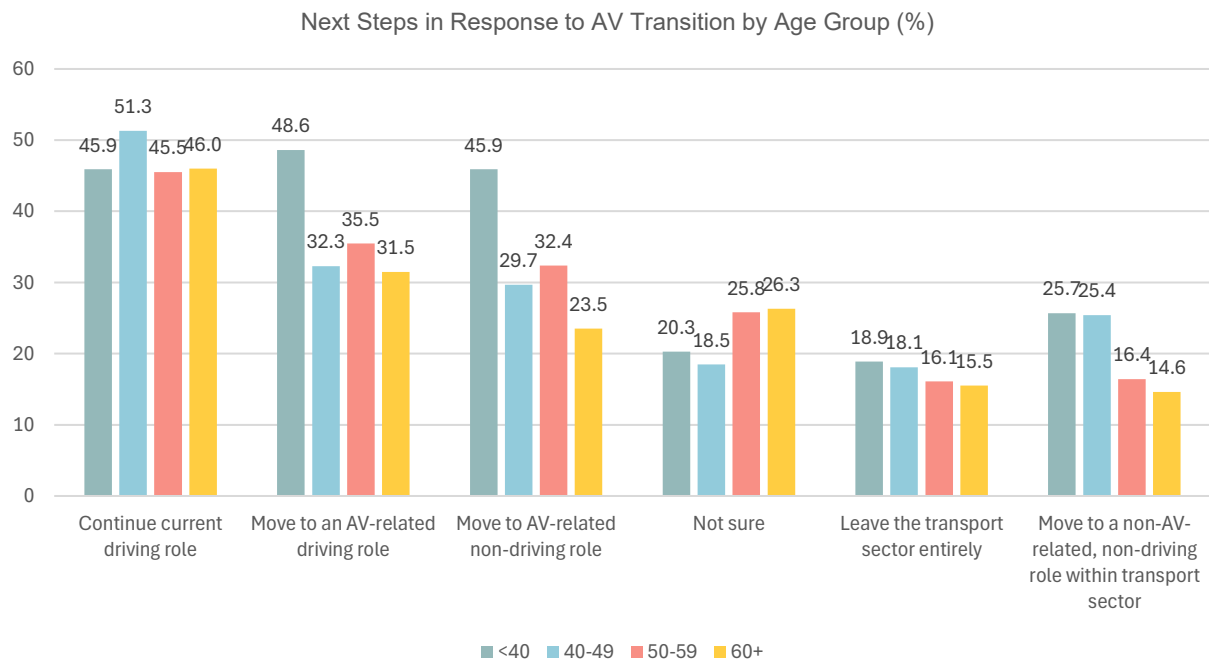


Figure 15: Drivers' Next Steps in Response to AV Transition by Age Group

Visibility, Confidence, and Pathway Continuity Matter

The findings also suggest that transition behaviour may be shaped not only by information and incentives, but also by perceptions of peer support and social norms (Figure 16). To better understand this relationship, workers' personal support for AV adoption (measured through the statement *"I support the use of AVs in Singapore"*) was compared against their perceptions of fellow drivers' support (measured through the statement *"Fellow drivers around me support the use of AVs in Singapore"*).

Workers generally expressed stronger personal support for the use of AVs in Singapore compared to the level of support they believed existed among fellow drivers (31.4% vs 14.5%). In other words, workers may be more supportive of the transition personally than they believe their peers to be.

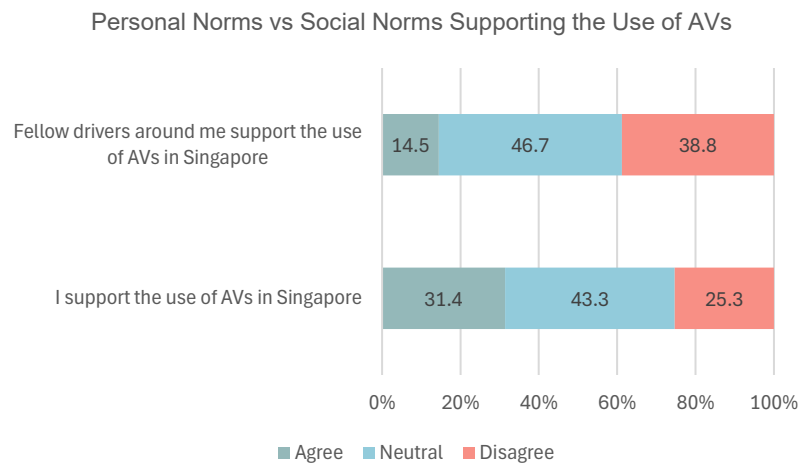


Figure 16: Personal Norms versus Social Norms

Preparedness also appeared to shape attitudes towards AV adoption. Building on the earlier analysis of passive and active preparation (see Table 1 and Figure 10), workers who had undertaken preparatory actions such as planning a career change, exploring alternative career pathways, building skills outside driving, or attending AV-related training tended to report stronger personal support for AV adoption and perceived greater peer acceptance of the transition (Figure 17).

In contrast, workers who reported lower levels of preparation generally appeared more hesitant and uncertain. While personal attitudes appeared to exert a stronger influence than perceived social norms, the findings suggest that preparedness and confidence may reinforce one another. Workers who are actively preparing for future changes may not only feel more confident about adapting to the transition but may also perceive greater acceptance of AV adoption among their peers. This points to the potential importance of making transition and preparation efforts more visible within the workforce. When workers can see colleagues attending training, exploring alternative career pathways, or taking proactive steps to prepare for future changes, the transition may appear more achievable and socially accepted, thereby encouraging greater engagement and readiness among others.

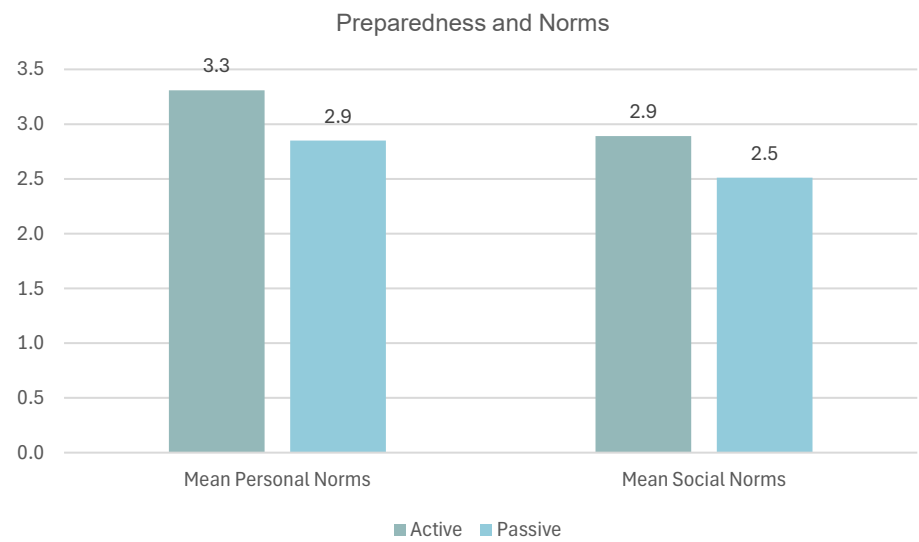


Figure 17: Preparedness in relation to Norms

The co-design workshop further reinforced the importance of visibility and continuity within the transition system. Participants repeatedly highlighted the need for clearer career roadmaps, placement-linked training opportunities, more visible examples of successful transition pathways, and stronger coordination between training, employment, and support systems. A recurring concern shared by drivers was that the current system does not yet provide a sufficiently continuous pathway from awareness to preparation and eventually to meaningful employment outcomes.

Insight 3: Economic Insecurity Drives Decision-Making—Support Must Be Sufficient, Accessible, and Calibrated

Key takeaway and implication: *Economic security is the precondition for meaningful worker participation in the AV transition. As training incentives and transition pathways are rolled out, the core implementation test is whether income protection and wage stability mechanisms are sufficient, timely, and accessible for different worker groups to*

act, especially those facing volatile earnings, vehicle rental obligations, contract lock-ins, caregiving responsibilities, and high opportunity costs. Without credible protection against immediate livelihood risk, training and transition participation will remain structurally constrained, regardless of workers’ willingness to adapt.

Economic Concerns Outweigh Technological Concerns

Economic insecurity first emerged strongly during the sector engagement session, where workers across sectors repeatedly framed the AV transition in terms of livelihood risk, financial instability, and uncertainty about their future ability to sustain themselves and their families. These concerns were later reinforced through the worker survey findings. When asked about the perceived impact of AVs, job security concerns (85.0%) and income loss (84.7%) featured as the primary concerns instead of AV-related concerns and work conditions (Figure 18).

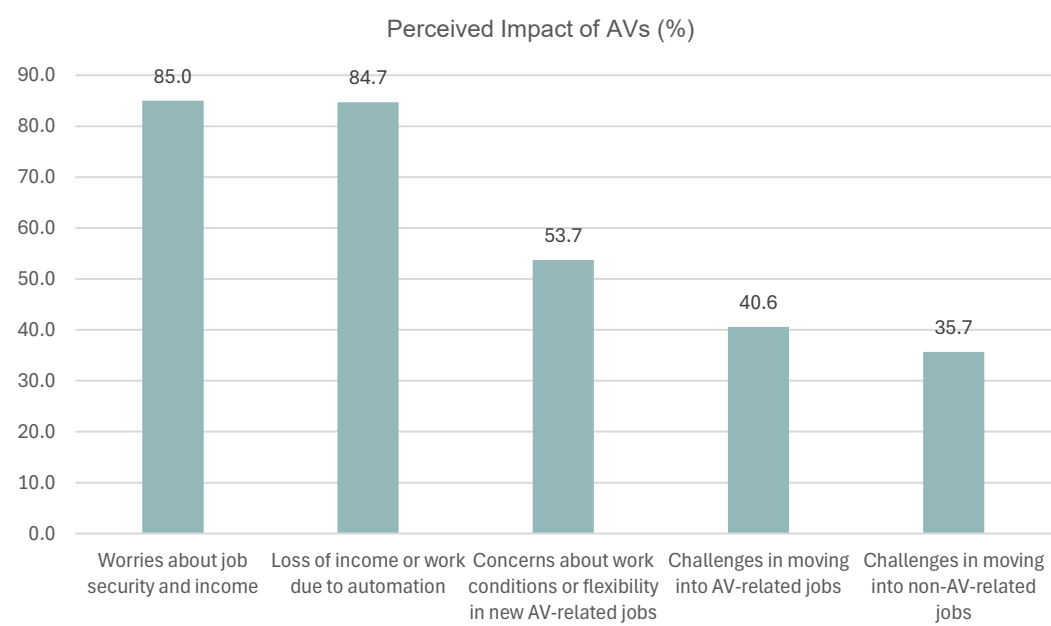


Figure 18: Perceived Impact of AVs

Different Forms of Economic Vulnerability

However, the nature and intensity of these concerns differed across driver types (Figure 19).

- PHV drivers appear the most concerned about job security (85.9%) and loss of income or work due to automation (87.7%) compared to taxi drivers and bus captains. Qualitative accounts further highlighted concerns about income volatility, exclusion from formal support systems, and uncertainty regarding the long-term viability of platform-based work.
- Taxi drivers also expressed high levels of concern about the economic impacts of AVs, while qualitative insights pointed to concerns around declining earnings and loss of occupational identity, particularly among those who had spent decades in the sector.
- Bus captains were comparatively less concerned about loss of income or work due to automation than the other sectors, although they reported greater concerns

about the conditions or flexibility of new AV-related jobs and challenges in moving into such roles. Qualitatively, workers also raise concerns about future remuneration structures, role redesign, and changing skill expectations. One possible reason for their relatively lower concerns about income or work loss is that they are employees, with employer obligations and more structured organisational support, that the other two groups lack.

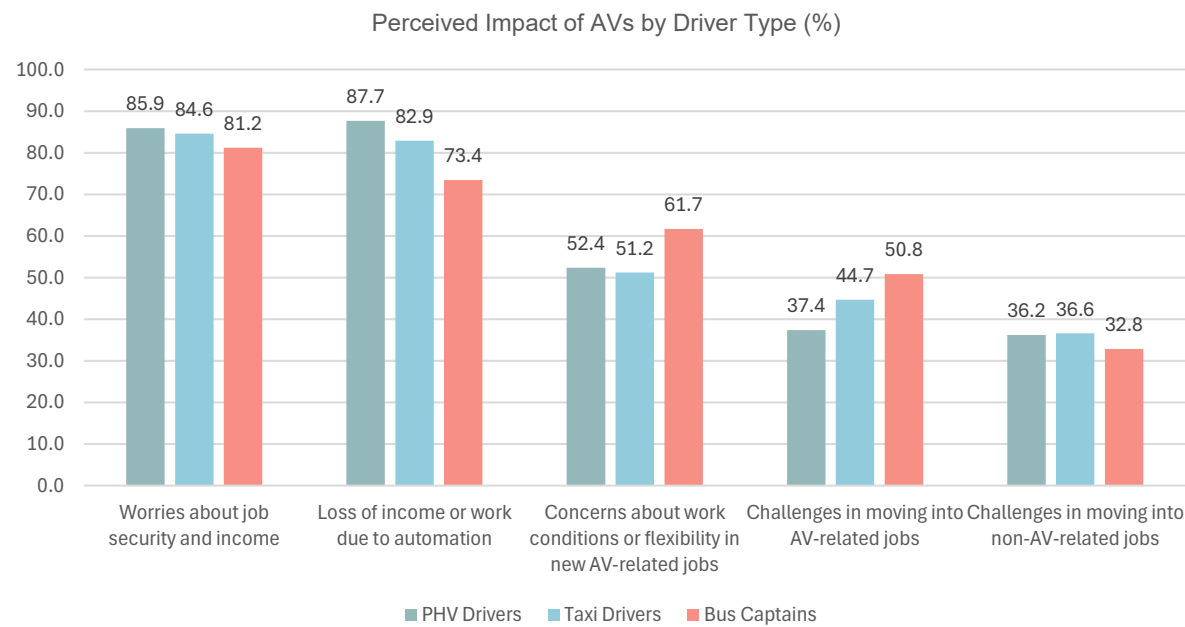


Figure 19: Perceived Impact of AVs by Driver Type

The findings also suggest that institutional structure plays an important role in shaping perceptions of economic risk. Workers in more structured employment systems, such as the public bus sector, generally reported greater trust in institutions and stronger confidence that transition processes would be managed systematically. In contrast, workers in gig-based sectors such as PHV driving often felt more exposed because they lacked the same degree of organisational protection and long-term workforce planning.

Participants from both the sector engagement session and co-design workshop also raised concerns about how the pace and uneven timing of AV deployment may create periods of workforce instability, particularly if job restructuring or reductions occur faster than new opportunities are created. Workers expressed uncertainty over whether existing transition systems would be sufficiently coordinated to absorb displaced workers smoothly across sectors and over time. These concerns suggest the importance of developing broader workforce buffering and transition mechanisms capable of managing temporary periods of labour market disruption and uncertainty.

The co-design workshop subsequently shifted discussions towards the forms of support required to make participation in the transition realistically possible. Participants repeatedly emphasised the need for wage support, income protection during retraining periods, transition allowances, and clearer information about the earning potential of future AV-related roles.

Insight 4: Willingness To Train, Constrained by Structural Barriers—Training Must Be Flexible, Embedded, And Outcome-Linked

Key takeaway and implication: *The barrier to training participation is not lack of motivation, but the structure of training and the conditions under which workers are expected to participate. Expanding training availability will not be sufficient unless training is modular, flexible, financially viable, trusted, compatible with work and caregiving responsibilities, and visibly linked to real placement opportunities. As training incentives and transition pathways are implemented, the core test is whether workers can see a credible pathway from training to employment outcomes strong enough to justify the opportunity costs of participation. Getting this right will be critical to improving take-up, sustaining completion, and building readiness for transition.*



Willingness To Train is Present, But Participation Remains Uneven

The worker survey findings suggest that transport workers generally recognise the importance of skills upgrading and reskilling, but actual participation in training remains uneven across the sector. While training participation at 40.6% is higher than industry benchmarks at 18.5%⁴ (Ministry of Manpower, 2025), most drivers fall into the zero or minimal training exposure category with 59.4% having not attended any training in the past two years, and with only a small minority—around 18.5% have attended two or more trainings (Figure 20).



Figure 20: Training Programmes Attended in the Past 2 Years

Participation patterns also differed markedly across driver types (Figure 21).

- Bus captains demonstrated substantially higher levels of training participation compared to PHV and taxi drivers, likely reflecting the influence of more structured organisational systems, clearer workforce planning processes, and stronger institutional support for training participation.
- In contrast, PHV and taxi drivers reported lower levels of training participation, suggesting that they may be less integrated into formal training ecosystems, with many relying on self-navigation and individually initiated preparation efforts.

⁴ This refers to industry benchmarks for Production and Transport Operators from the 2024 Supplementary Survey on Adult Training, Manpower Research & Statistics Department, Ministry of Manpower

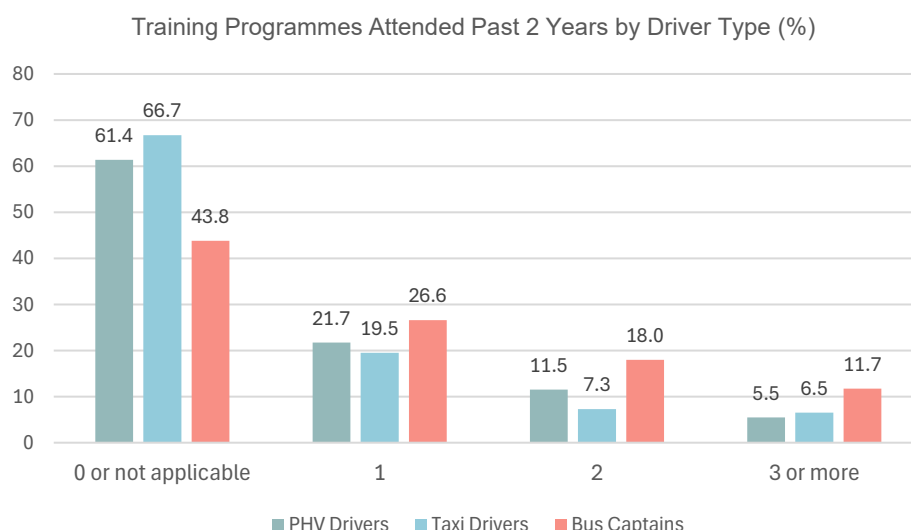


Figure 21: Training Programmes Attended in the Past 2 Years by Driver Type

Structural Barriers Outweigh Motivational Barriers

Importantly, the dominant barriers to training were overwhelmingly structural rather than psychological (Table 2). Income loss (72.1%), lack of time (70.7%), and training costs (43.5%) emerged far more strongly than concerns related to confidence (9.8%) or digital ability (10.0%). This suggests that many workers are not resistant to reskilling itself, but constrained by the practical realities of work, caregiving, and income dependency.

Rank	Barrier
1st	Loss of income during training (72.1%)
2nd	Lack of time due to work schedule (70.7%)
3rd	Cost of the training programme (43.5%)
4th	Family or caregiving responsibilities (38.4%)
5th	Not sure which training to choose (32.4%)
6th	Training not relevant to my current job scope (23.1%)
7th	Difficulty using digital tools (10.0%)
8th	Low confidence in learning new skills (9.8%)

Table 2: Ranking of Key Barriers to Training Uptake Across Respondents

The nature of these barriers also differed meaningfully across driver types (Table 3).

- PHV and taxi drivers shared broadly similar barrier profiles, with both groups identifying income loss during training, lack of time due to work schedules, and training costs as their dominant concerns. These patterns reflect the income-sensitive and less structured nature of platform-based and point-to-point driving work, where time spent away from work often translates directly into lost earnings.
- In contrast, bus captains demonstrated a somewhat different barrier profile. While they showed comparatively higher training participation overall, their concerns extended beyond lack of time due to work schedules to include caregiving responsibilities, uncertainty around which training pathways to pursue, and

concerns about training relevance to their current job scope. Bus captains also reported the highest levels of digital difficulty among the three worker groups.

Rank	PHV Drivers	Taxi Drivers	Bus Captains
1st	Loss of income during training (78.7%)	Lack of time due to work schedule (74.0%)	Lack of time due to work schedule (82.8%)
2nd	Lack of time due to work schedule (67.2%)	Loss of income during training (73.2%)	Family or caregiving responsibilities (44.5%)
3rd	Cost of the training programme (48.3%)	Cost of the training programme (38.2%)	Loss of income during training (42.2%)
4th	Family or caregiving responsibilities (38.8%)	Family or caregiving responsibilities (30.1%)	Not sure which training to choose (40.6%)
5th	Not sure which training to choose (31.4%)	Not sure which training to choose (28.5%)	Training not relevant to current job scope (32.0%)
6th	Training not relevant to current job scope (20.3%)	Training not relevant to current job scope (26.8%)	Cost of the training programme (27.3%)
7th	Low confidence in learning new skills (8.6%)	Low confidence in learning new skills (15.4%)	Difficulty using digital tools (21.1%)
8th	Difficulty using digital tools (6.7%)	Difficulty using digital tools (13.8%)	Low confidence in learning new skills (9.4%)

Table 3: Top Barriers to Training Uptake by Driver Type

Training barriers also differed across age groups (Table 4).

- While income loss and lack of time consistently emerged as the dominant barriers to training participation across all age groups, younger workers below 50 years old were substantially more likely to cite family and caregiving responsibilities, reflecting stronger competing work-life pressures among workers in earlier and mid-career family stages.
- In contrast, workers aged 50 and above were more likely to highlight uncertainty around which training pathways to pursue, whether training would remain relevant to their current roles and future prospects and difficulties navigating digital learning environments. Workers aged 60 and above also reported comparatively higher levels of digital difficulty.

These findings suggest that older workers may require clearer pathway guidance, stronger reassurance around training value and relevance, and additional support in navigating digital learning environments.

Rank	<40	40-49	50-59	60+
1st	Loss of income during training (73.0%)	Loss of income during training (77.2%)	Loss of income during training (72.6%)	Lack of time due to work schedule (69.0%)
2nd	Lack of time due to work schedule (64.9%)	Lack of time due to work schedule (72.4%)	Lack of time due to work schedule (71.9%)	Loss of income during training (65.7%)
3rd	Family or caregiving responsibilities (59.5%)	Family or caregiving responsibilities (48.7%)	Cost of the training programme (46.2%)	Cost of the training programme (40.4%)
4th	Cost of the training programme (47.3%)	Cost of the training programme (41.8%)	Not sure which training to choose (34.8%)	Not sure which training to choose (37.1%)
5th	Not sure which training to choose (24.3%)	Not sure which training to choose (27.6%)	Family or caregiving responsibilities (33.4%)	Training not relevant to current job scope (29.6%)
6th	Training not relevant to current job scope (16.2%)	Training not relevant to current job scope (19.0%)	Training not relevant to current job scope (23.4%)	Family or caregiving responsibilities (26.8%)
7th	Low confidence in learning new skills (12.2%)	Low confidence in learning new skills (7.3%)	Difficulty using digital tools (9.4%)	Difficulty using digital tools (17.8%)
8th	Difficulty using digital tools (2.7%)	Difficulty using digital tools (6.0%)	Low confidence in learning new skills (8.4%)	Low confidence in learning new skills (13.6%)

Table 4: Top Barriers to Training Uptake by Age Group

Transition Support Must Extend Beyond Training Provision Alone

The survey findings further reinforce that workers' support needs extend beyond training provision alone. As seen in Table 5, the most frequently requested forms of support were financial support or time off to attend training without income disruption (58.4%) and assurance of stable income during periods of change (55.7%). Workers also highlighted the improved work-life balance (33.4%), importance of job matching or redeployment support (32.6%), and clearer guidance on career pathways and progression opportunities (27.9%). Overall, workers prioritised practical transition support far more strongly than emotional or motivational support, suggesting that the key challenge lies less in motivating workers to adapt and more in whether transition systems realistically accommodate workers' economic and employment realities. One possibility is to explore drawing reference from an earlier scheme, the NTUC Self-Employed Persons (SEPs) Training Support Scheme during the COVID-19 pandemic, where SEPs were provided with a training allowance. This scheme could be enhanced to offer a higher training allowance to PHV and taxi drivers, who are essentially self-employed.

Rank	Support Needs
1st	Financial support or time off to attend training (so income is not affected) (58.4%)
2nd	Assurance of stable income during periods of change (55.7%)
3rd	Improved work-life balance (33.4%)
4th	Help finding or moving into another job (job matching or redeployment) (32.6%)
5th	Clear guidance on possible career paths, progression, and on-the-job training (27.9%)
6th	Recognition of existing skills, experience, and years of service (24.9%)
7th	Clear and timely communication about future jobs and skills needed (22.7%)
8th	Clear information on when AVs are expected to be widely introduced (22.5%)
9th	Emotional or motivational support when dealing with uncertainty or stress (13.7%)

Table 5: Ranking of Preferred Support Needed for Managing Workforce Transition

That is why support priorities were broadly aligned between PHV and taxi drivers (Table 6). Both groups prioritised financial support for training participation, stable income during periods of change, job matching or redeployment support, and improved work-life balance. These patterns reflect the income-sensitive and less structured nature of platform-based and point-to-point driving work, where workers may experience greater financial vulnerability and uncertainty around future mobility pathways.

In contrast, bus captains demonstrated a slightly different support profile. Alongside stable income and financial support for training, bus captains placed relatively greater emphasis on work-life balance, career guidance, recognition of existing skills and experience, and clearer communication about future jobs and skills needs. Job matching support appeared comparatively less prominent, suggesting stronger concern around role evolution and progression within existing organisational structures rather than transitions out of the sector.



Rank	PHV Drivers	Taxi Drivers	Bus Captains
1st	Financial support or time off to attend training (63.5%)	Financial support or time off to attend training (48.8%)	Assurance of stable income during periods of change (57.0%)
2nd	Assurance of stable income during periods of change (57.3%)	Assurance of stable income during periods of change (47.2%)	Improved work-life balance (45.3%)
3rd	Help finding or moving into another job (job matching or redeployment) (35.1%)	Help finding or moving into another job (job matching or redeployment) (35.0%)	Financial support or time off to attend training (45.3%)
4th	Improved work-life balance (30.9%)	Improved work-life balance (32.5%)	Clear guidance on possible career paths, progression, and on-the-job training (35.2%)
5th	Clear guidance on possible career paths, progression, and on-the-job training (26.6%)	Recognition of existing skills, experience, and years of service (26.0%)	Recognition of existing skills, experience, and years of service (31.2%)
6th	Recognition of existing skills, experience, and years of service (23.3%)	Clear information on when AVs are expected to be widely introduced (27.6%)	Clear and timely communication about future jobs and skills needed (28.1%)
7th	Clear information on when AVs are expected to be widely introduced (23.1%)	Clear guidance on possible career paths, progression, and on-the-job training (26.0%)	Help finding or moving into another job (job matching or redeployment) (19.5%)
8th	Clear and timely communication about future jobs and skills needed (21.3%)	Clear and timely communication about future jobs and skills needed (23.6%)	Emotional or motivational support when dealing with uncertainty or stress (15.6%)
9th	Emotional or motivational support when dealing with uncertainty or stress (11.3%)	Emotional or motivational support when dealing with uncertainty or stress (22.8%)	Clear information on when AVs are expected to be widely introduced (14.8%)

Table 6: Ranking of Preferred Support Needs by Driver Type

While financial support and stable income consistently emerged as the most important forms of support across all age groups, differences emerged beyond these shared priorities (Table 7).

- Younger workers below 50 years old placed comparatively greater emphasis on improved work-life balance, job matching or redeployment support, and career guidance, reflecting stronger concerns around balancing work, caregiving responsibilities, and future career mobility during earlier career stages.
- In contrast, workers aged 50 and above increasingly prioritised recognition of existing skills and experience, career guidance, and clearer information about AV rollout timelines.

These findings suggest that older workers may place stronger emphasis on pathway clarity, recognition of accumulated experience, and clearer understanding of how workforce transitions may unfold over time.

Rank	<40	40-49	50-59	60+
1st	Financial support or time off to attend training (59.5%)	Financial support or time off to attend training (62.9%)	Assurance of stable income during periods of change (59.5%)	Financial support or time off to attend training (57.3%)
2nd	Assurance of stable income during periods of change (55.4%)	Assurance of stable income during periods of change (57.3%)	Financial support or time off to attend training (55.5%)	Assurance of stable income during periods of change (48.8%)
3rd	Improved work-life balance (39.2%)	Improved work-life balance (33.2%)	Help finding or moving into another job (job matching or redeployment) (30.6%)	Improved work-life balance (36.6%)
4th	Help finding or moving into another job (job matching or redeployment) (37.8%)	Help finding or moving into another job (job matching or redeployment) (30.6%)	Clear guidance on possible career paths, progression, and on-the-job training (30.1%)	Help finding or moving into another job (job matching or redeployment) (29.1%) / Recognition of existing skills, experience, and years of service (29.1%) /
5th	Clear guidance on possible career paths, progression, and on-the-job training (29.7%)	Clear guidance on possible career paths, progression, and on-the-job training (29.3%)	Improved work-life balance (29.8%)	
6th	Clear and timely communication about future jobs and skills needed (20.3%)	Recognition of existing skills, experience, and years of service (22.8%)	Recognition of existing skills, experience, and years of service (25.4%)	
				Clear information on when AVs are expected to be widely introduced (29.1%) (tie)
7th	Recognition of existing skills, experience, and years of service (17.6%)	Clear and timely communication about future jobs and skills needed (22.8%)	Clear and timely communication about future jobs and skills needed (22.4%)	Clear and timely communication about future jobs and skills needed (23.9%)
8th	Clear information on when AVs are expected to be widely introduced (14.9%)	Clear information on when AVs are expected to be widely introduced (21.6%)	Clear information on when AVs are expected to be widely introduced (20.4%)	Clear guidance on possible career paths, progression, and on-the-job training (22.5%)
9th	Emotional or motivational support when dealing with uncertainty or stress (13.5%)	Emotional or motivational support when dealing with uncertainty or stress (14.2%)	Emotional or motivational support when dealing with uncertainty or stress (10.7%)	Emotional or motivational support when dealing with uncertainty or stress (17.4%)

Table 7: Ranking of Preferred Support Needs by Age Group

The co-design workshop further reinforced the importance of embedding training within broader transition systems rather than treating training as an isolated intervention. Participants repeatedly stressed that training should be modular, flexible, financially supported, and directly connected to visible employment outcomes, including clearer pathways into AV-related and adjacent non-driving roles.

Insight 5: Transition is an Ecosystem Challenge—Coordinated Leadership, Worker Agency, And Skills-First System Must Evolve Together

Key takeaway and implication: As transition measures move from announcement to implementation, coordination must shift from scheme launch to outcome management. Success should be measured not only by programme availability, but by whether workers are aware of support, take it up, complete training, secure placements, remain in viable roles, sustain wage outcomes, and report confidence in the transition process. These outcomes will depend less on individual worker effort alone than on how effectively government, employers, unions, and training providers align responsibilities, share data, close drop-off points, and connect training to real career mobility. Building an integrated, skills-first transition ecosystem will therefore be critical strengthening trust, enabling movement across sectors, and ensuring that AV workforce transition delivers measurable livelihood outcomes rather than fragmented programme participation.

Expectations For Coordinated and Inclusive Transition Support

The worker survey findings show that transport workers overwhelmingly expect institutions, particularly the government, to play a leading role in coordinating and managing the AV transition. Around 68.9% of workers assigned primary responsibility for managing the transition to the government, while only 16.7% believed responsibility lay mainly with themselves (Figure 22).

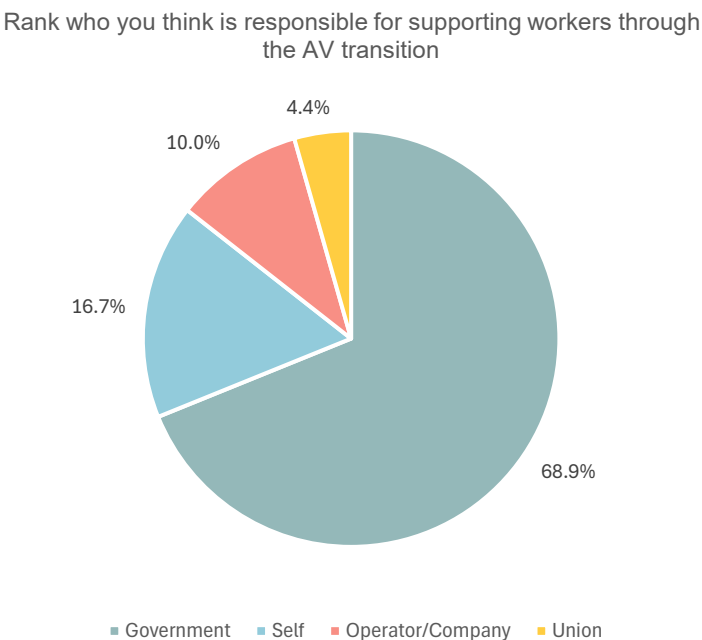


Figure 22: Ranking of Responsibility for Supporting Workers through AV Transition

However, findings from the engagement suggest that this should not be interpreted simply as passivity or dependency. Rather, many workers viewed the AV transition as a large-scale structural transformation that individuals cannot realistically navigate alone. Workers repeatedly emphasised the need for coordinated planning,

credible pathways, clearer communication, and stronger institutional support across the transition process.

Perceptions of responsibility differed across driver types (Figure 23).

- PHV drivers were the most likely to view government as primarily responsible for supporting workers through the transition (72.3%), while bus captains were comparatively more likely to assign responsibility to themselves (25.0%).
- Taxi drivers tended to sit between these groups. These patterns suggest that workers in more structured organisational environments may feel greater confidence and agency in navigating transition processes, while workers in more fragmented or platform-based sectors may perceive stronger dependence on institutional coordination and support.

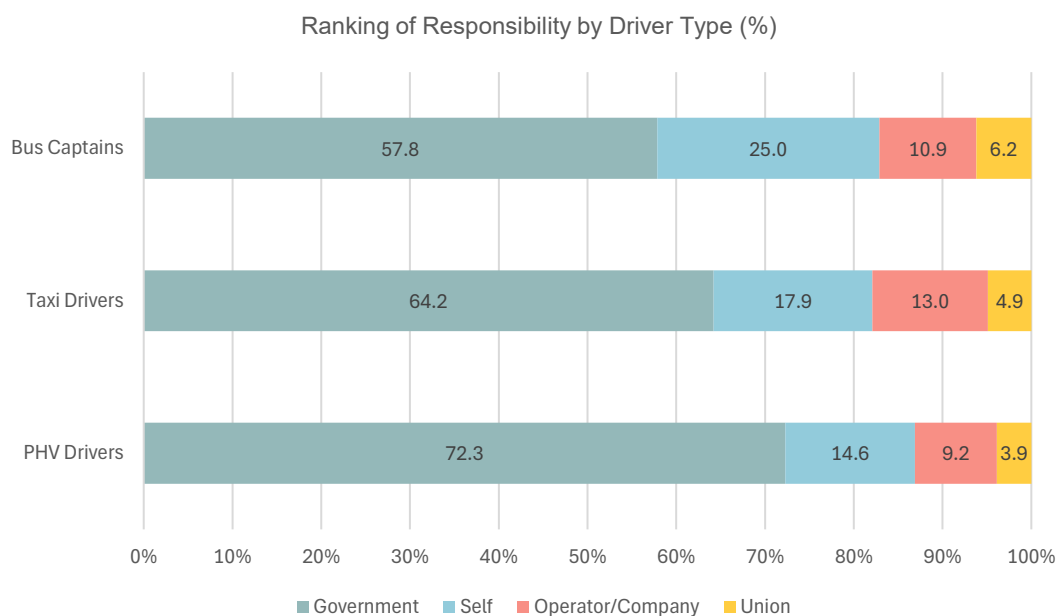


Figure 23: Ranking of Responsibility for Supporting Workers through AV Transition by Driver Type

Age differences similarly revealed differing expectations around transition responsibility (Figure 24).

- Younger workers below 40 years old were comparatively more likely to view adaptation as an individual responsibility (23.0%), while older and mid-career workers placed relatively greater emphasis on institutional and employer-led support.

This may reflect differing perceptions of career mobility, employability, and long-term labour market security across age groups.

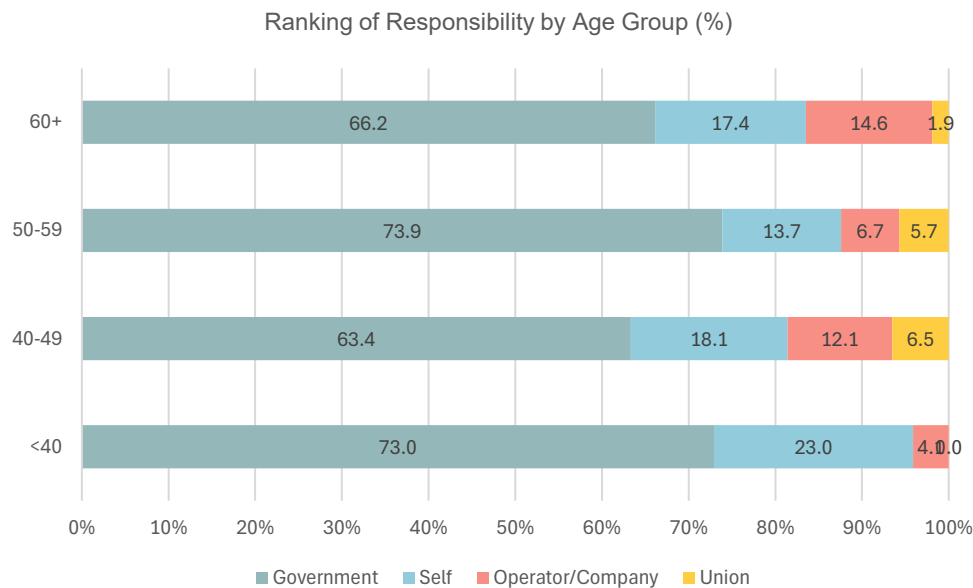


Figure 24: Ranking of Responsibility for Supporting Workers through AV Transition by Age Group

At the same time, workers also expressed wanting greater involvement in shaping the transition itself. A recurring concern raised during the sector engagement session was that workers often felt their feedback was collected but not visibly reflected in policy or operational decisions. The co-design workshop further reinforced the importance of balancing system-led coordination with meaningful worker participation in shaping transition pathways, training systems, and future workforce planning.

Existing Systems Do Not Yet Support Skills-First Mobility

The findings also highlighted broader structural challenges surrounding how workers’ skills and experience are recognised across the labour market. During the sector engagement and co-design workshops, many participants felt that transport workers possess substantial transferable competencies, including operational coordination, safety management, customer service, crisis handling, and situational decision-making, yet these capabilities are often not recognised outside traditional driving roles.

Participants repeatedly highlighted the absence of standardised ways to document and communicate transferable competencies across sectors. Many felt that skills accumulated through years of transport work were difficult to signal effectively to employers beyond the transport industry. As a result, workers often struggled to translate existing experience into recognisable capabilities when considering transitions into adjacent sectors or emerging AV-related roles.

Uncertainty around skills recognition was especially pronounced when workers discussed mobility into industries such as logistics, facilities management, hospitality, and customer operations. Many participants were unsure how employers in these sectors would evaluate their experience, particularly where hiring systems continue to rely heavily on formal qualifications, conventional employment histories, or narrowly defined job titles. Concerns were especially strong among older workers, who feared that years of practical experience could be undervalued despite possessing substantial operational and customer-facing expertise.

The findings further suggest that current workforce transition systems remain fragmented and insufficiently aligned across training, hiring, and career mobility pathways. Workers consistently highlighted uncertainty around future jobs, required skills, and how existing competencies could translate into AV-related or adjacent non-driving roles. The co-design workshop further reinforced concerns that hiring and transition systems continue to rely heavily on fragmented sector-based pathways, making it difficult for workers to identify how their experience may remain relevant across industries.

Participants therefore repeatedly emphasised the importance of moving towards more skills-first approaches that recognise demonstrated competencies rather than relying primarily on formal credentials or previous job titles alone. Such approaches were seen as particularly important for supporting workforce mobility across both AV-related and non-transport sectors.

Interestingly, while unions were frequently discussed as important transition stakeholders during the sector engagement and co-design discussions, only a relatively small proportion of workers identified unions as the primary actor responsible for supporting workers through the transition. This suggests opportunities for unions to further strengthen visibility and engagement within future workforce transition efforts, particularly among workers in more fragmented sectors.



Chapter 3: Who the Workers Are—Readiness Profiles and Implications

Chapter 2’s insights collectively show that Singapore’s transport workers are broadly aware of the AV transition, but differ significantly in how prepared, confident, and supported they are. Importantly, the workforce is not homogeneous. Some workers are actively preparing for change, while others remain uncertain, cautious, or constrained by structural barriers. The key takeaway is workforce transition strategies must be both broad-based and differentiated. While system-wide interventions are necessary, effectiveness depends on how well support is sequenced and targeted, e.g. greater emphasis on confidence-building and reassurance for lower-readiness workers, pathway clarity for the moderate group, and progression opportunities for those prepared to move. Delivering the right support at the right stage will help ensure that no group is left behind.

Profiling the Workforce: Traits, Barriers, and Support Needs

We developed three main worker readiness profiles—**Concerned Observers** (19.7%), **Cautious Adapters** (62.6%), and **Confident Champions** (17.7%)—based on workers’ attitudes and adaptive behaviours (Figure 25). These profiles become especially important as transition measures move from announcement to implementation. While a broad support package may be available to all eligible workers, take-up is unlikely to be uniform. Some workers may be ready to enrol quickly, while others will need reassurance, income security, one-to-one guidance, or low-risk exposure before they are prepared to commit. The profiles therefore help identify not only what support is needed, but how support should be sequenced, targeted, and delivered to move different groups from awareness to action. A summary of the key characteristics and support needs across driver types and readiness profiles is provided in Annex B.

The profiles are differentiated along two key dimensions: (i) levels of confidence and concern regarding the AV transition; and (ii) degree of active preparation and training participation. Notably, awareness and information levels cut across all three profiles, suggesting that access to information alone does not determine readiness.

	Concerned Observers (19.7%)	Cautious Adapters (62.6%)				Confident Champions (17.7%)	
	Low Awareness, Low Information (19.7%)	Low Awareness, Low Information (16.1%)	Low Awareness, High Information (9.5%)	Medium Awareness, Low Information (27.9%)	High Awareness, High Information (9.1%)	Medium Awareness, Low Information (9.5%)	Low Awareness, High Information (8.2%)
Attitudes to AV Transition							
Confidence	Low	Medium	Medium	Medium	Medium	High	High
Concern	High	Medium	Medium	High	High	Low	Low
Adaptive Behaviour & Readiness							
Active Preparation (Building skills / Exploring options / career change / taking AV-related training)	Low	Low	Medium	Low	Medium	Medium	Medium
Training participation (Any type)	Low	Low	Medium	Low	Medium	Medium	Medium

Figure 25: Profiles of Workers Based on Attitudes and Behaviours

Concerned Observers

Demographic Traits:

Concerned Observers (19.7%) are characterised by low confidence, high concern, and low active preparation. They are disproportionately represented by PHV drivers (24.2% of PHV drivers), followed by taxi drivers (12.2%) and bus captains (7.0%) as shown in Figure 26. Concerned Observers also tend to be relatively young, with 83.9% aged 60 years or below.

Barriers:

This group is not resistant to change; they simply lack clarity, confidence, and institutional scaffolding needed to take the first step. Without targeted intervention, this group risks being left furthest behind.

Top Three Support Needs:

1. Financial support or time off to attend training
2. Assurance of stable income during periods of change
3. Help finding or moving into another job (job matching or redeployment)

Support Focus:

Concerned Observers require stronger reassurance-oriented interventions. They place comparatively greater emphasis on job matching or redeployment, recognition of existing skills and experience, clearer communication about future jobs and skills, and clearer information about AV rollout timelines. These patterns suggest workers in this segment are primarily seeking confidence, clarity, and assurance that they will not be left behind during the transition (see Figure 27).

Cautious Adapters

Demographic Traits:

Cautious Adapters (62.6%) form the largest and most diverse profile within the workforce—effectively the “movable middle”. Taxi drivers demonstrate the highest representation ratio at 66.7% followed by PHV drivers (62.3%) then bus captains (60.2%), reflected in Figure 26.

Barriers:

They are generally open to change but held back by combinations of information gaps, low awareness, or insufficient confidence to take concrete action. Given the diversity within this group, Cautious Adapters were further segmented into four sub-profiles to better reflect the unique needs of each segment: (1) Low awareness, low information, (2) Low awareness, high information, (3) Medium awareness, low information, and (4) High awareness, high information. Critically, they are most responsive to targeted intervention, and where resources are likely to yield the greatest system-wide impact.

Low awareness, low information:

19.5% of bus captains are represented in this group followed by PHV drivers (16.8%) and taxi drivers (9.8%). Drivers in this group are more likely to be working part-time compared to other segments, which may contribute to concerns or perceptions of job stability. This segment is open, but unaware and lacks information. They currently exhibit low levels of active preparation and training participation.

Low awareness, high information: This segment has a higher ratio of bus captains (14.8%) and taxi drivers (13.0%) compared to PHV drivers (7.6%). Drivers in this group tend to have longer job tenure, with 61.5% having worked eight years or longer. This segment

generally demonstrates low awareness although individuals are beginning to take action. They also exhibit medium levels of active preparation and training participation.

Medium awareness, low information: PHV drivers (30.2%) and taxi drivers (30.1%) make up most of this group. Drivers from this segment tend to have shorter job tenure, with 56.1% having worked less than eight years. This segment reflects medium levels of awareness but lack information thereby limiting preparation. They also tend to showcase high levels of concern regarding the AV transition.

High awareness, high information: Taxi drivers have a higher representation ratio at 13.8% compared to bus captains (10.2%) and PHV Drivers (7.8%). Drivers in this group tend to have longer job tenure, with 59.5% having worked eight years or longer. They are informed and aware and taking steps to prepare but remain cautious with high concern levels.

Top Three Support Needs:

1. Financial support or time off to attend training
2. Assurance of stable income during periods of change
3. Help finding or moving into another job (job matching or redeployment)

Support Focus:

Cautious Adapters appear more focused on reducing practical and informational barriers. While they shared similar concerns about financial stability, they placed relatively stronger emphasis on work-life harmony, career guidance, progression pathways, and clearer transition information. As the largest workforce segment, this profile appears broadly open to adaptation (see Figure 27).

Confident Champions

Demographic Traits:

Confident Champions (17.7%) are comparatively more confident, proactive, and prepared for workforce transition. This segment is proportionately represented by bus captains at 32.8% followed by taxi drivers (21.1%) and PHV drivers (13.6%).

Barriers:

Confident Champions are less concerned and more willing to adapt, with many already taking concrete preparatory steps such as training participation or career exploration. However, even within this group, differences remain in terms of information clarity and pathway visibility, with a further segmentation into two sub-profiles: (1) Medium awareness, low information and (2) Low awareness, high information:

Medium awareness, low information: Taxi drivers showcase a higher representation ratio at 13.8%, followed by PHV drivers (9.2%) and bus captains (7.0%). This segment is likely to be made up of older drivers with 66.7% aged 50 and above. Drivers in this sub-profile are ready and motivated but lack information to take more action in adapting to the transition.

Low awareness, high information: Bus captains are disproportionately represented at 25.8% (of all bus captains) compared to the other two driving roles. This segment tends to comprise of older and seasoned drivers, with 58.2% aged 50 and above, and exhibiting longer job tenure of eight years and above (65.7%). Drivers within this sub-profile showcase low awareness but high information, signalling that they are informed and already taking proactive steps to deal with the AV transition.

Top Three Support Needs:

- 1. Financial support or time off to attend training
- 2. Assurance of stable income during periods of change
- 3. Improved work-life balance

Support Focus:

Confident Champions demonstrate comparatively stronger readiness and motivation to adapt but showed a preference for the importance of clearer communication, structured progression pathways, and sustained transition support. Compared to the segments, greater emphasis was placed on work-life harmony and clearer communication around future jobs and skills needs (see Figure 27).

	Concerned Observers (19.7%)	Cautious Adapters (62.6%)				Confident Champions (17.7%)	
	Low Awareness, Low Information	Low Awareness, Low Information	Low Awareness, High Information	Medium Awareness, Low Information	High Awareness, High Information	Medium Awareness, Low Information	Low Awareness, High Information
Driver Type (n=818)							
Bus Captains (n=128)	9 (7.0%)	25 (19.5%)	19 (14.8%)	20 (15.6%)	13 (10.2%)	9 (7.0%)	33 (25.8%)
Taxi Drivers (n=123)	15 (12.2%)	12 (9.8%)	16 (13.0%)	37 (30.1%)	17 (13.8%)	17 (13.8%)	9 (7.3%)
PHV Drivers (n=567)	137 (24.2%)	95 (16.8%)	43 (7.6%)	171 (30.2%)	44 (7.8%)	52 (9.2%)	25 (4.4%)

Figure 26: Profiles of Workers with Driver Type Breakdown (figures in bold denote notable representations of approximately 20% [rounded] or higher within each driver group).

Overall, the findings suggest needed support converged around several core priorities. Across all profiles, the most consistently prioritised support were financial support or time off to attend training and assurance of stable income (Table 8), reinforcing a broader pattern that workers’ concerns are driven by concerns around livelihood stability, transition uncertainty, and practical realities of adapting while maintaining economic security.



Rank	Concerned Observers (19.7%)	Cautious Adapters (62.6%)	Confident Champions (17.7%)
1st	Financial support or time off to attend training		
2nd	Assurance of stable income during periods of change		
3rd	Help finding or moving into another job (job matching or redeployment)		Improved work-life balance
4th	Recognition of existing skills, experience, and years of service	Improved work-life balance	Clear and timely communication about future jobs and skills needed
5th	Improved work-life balance	Clear guidance on possible career paths, progression, and on-the-job training	
6th	Clear guidance on possible career paths, progression, and on-the-job training	Recognition of existing skills, experience, and years of service	
7th	Clear and timely communication about future jobs and skills needed / Clear information on when AVs are expected to be widely introduced (tie)	Clear information on when AVs are expected to be widely introduced	
8th	-	Clear and timely communication about future jobs and skills needed	Help finding or moving into another job (job matching or redeployment)
9th	Emotional or motivational support when dealing with uncertainty or stress		

Table 8: Top Support Needs by Worker Profiles

Worker Profiles	Concerned Observers (19.7%)	Cautious Adapters (62.6%)			Confident Champions (17.7%)	
Snapshot	Concerned, low confidence, not taking action	Generally open to change, but held back by gaps in information, awareness, or confidence			Motivated and ready to transition, with varying levels of information to act effectively	
Support focus	Provide assurance & reduce resistance	Bridge gaps to facilitate action			Accelerate and sustain transition momentum	

Worker Profiles	Low Awareness, Low Information (16.1%)	Low Awareness, High Information (9.5%)	Medium Awareness, Low Information (27.9%)	High Awareness, High Information (9.1%)	Medium Awareness, Low Information (9.5%)	Low Awareness, High Information (8.2%)
Snapshot	Open but unaware and lacks information	Informed but low awareness, beginning to act	Aware but lacks information, limiting preparation	Informed, aware and taking steps but cautious	Ready and motivated but lacking information to act fully	Fully ready, informed & already taking steps
Support focus	Build awareness & close information gap	Convert information into awareness & action	Close information gap to trigger action	Convert awareness into confidence & commitment	Accelerate transition with targeted information	Accelerate & sustain targeted momentum

Figure 27: Proposed Support Focus by Worker Profiles

Chapter 4: Creating a Just and Effective Transition—Recommendations

This chapter sets out longer-term priorities for strengthening Singapore's AV workforce transition system as recently announced measures move from launch to implementation. Since the completion of this study, the Government has announced an initial manpower transition package for taxi and private-hire car drivers, including CCPs, training incentives, and enhanced outreach and career guidance⁵. These measures are a timely and important starting point, but their long-term success will depend on more than scheme availability. The key implementation test is whether workers know about the support, trust it, can realistically take it up, and progress into fair, sustainable employment outcomes. Support must also be calibrated to the differing realities of PHV drivers, taxi drivers, and bus captains. Accordingly, the recommendations in this chapter should be read as longer-term design principles and implementation priorities that complement and inform the continued evolution of Singapore's tripartite transition efforts.

The central question is no longer simply whether support exists, but whether it is trusted, accessible, differentiated, sufficient, and clearly linked to viable jobs.

The nine recommendations below focus on the conditions required to move from scheme availability to actual take-up, placement, retention, and longer-term livelihood security. They are structured around an ecological systems model recognising that workforce transition is shaped by interactions between system conditions, organisational delivery mechanisms, and worker agency (Figure 28).

The recommendations also draw on lessons from comparable workforce transitions globally including Australia, Canada, the European Union (EU), the United Kingdom (UK) and the United States (US), with particular attention to the role of coordinated multi-stakeholder governance (International Transport Forum [ITF], 2023; Pronello & Fedeli, 2025), targeted training and transition pathways (Bratanova et al., 2026; Federal Transit Administration, 2025; The Treasury, 2023), and worker-led approaches (including labour and income protection against displacement risks) in managing the shift to automated transport systems (Bratanova et al., 2026; Bredgaard et al., 2008; European Transport Workers' Federation, n.d.; Hyman et al., 2024). These international experiences underscore the importance of occupational evolution over job displacement, and the need for workers to have credible, accessible pathways into future roles tailored to their needs (Bratanova et al., 2026; Dahl et al., 2014; ITF, 2023; Lane et al., 2017; OECD, 2023; Hoque & Bacon, 2011).

A just and effective transition therefore requires a coordinated ecosystem that enables early action, reduces uncertainty, and protects workers from disproportionate income and employment risks (Pettigrew et al., 2018).

⁵ The July 2026 package, in brief. Announced through a tripartite partnership involving Ministry of Transport (MOT), Ministry of Manpower (MOM), NTUC, Grab, ComfortDelGro, and other stakeholders, the package comprises: the CCP for AV Specialists and the CCP for Public Transport Professionals, both offering up to 90% salary support during reskilling; a Training Incentive Scheme paying \$20/hour capped at 80 hours (up to \$1,600 per driver) as a lower-commitment "early taste" before a full CCP commitment, running as a pilot from 2027–2029; and a SWDA resource hub (MOT, 2026).

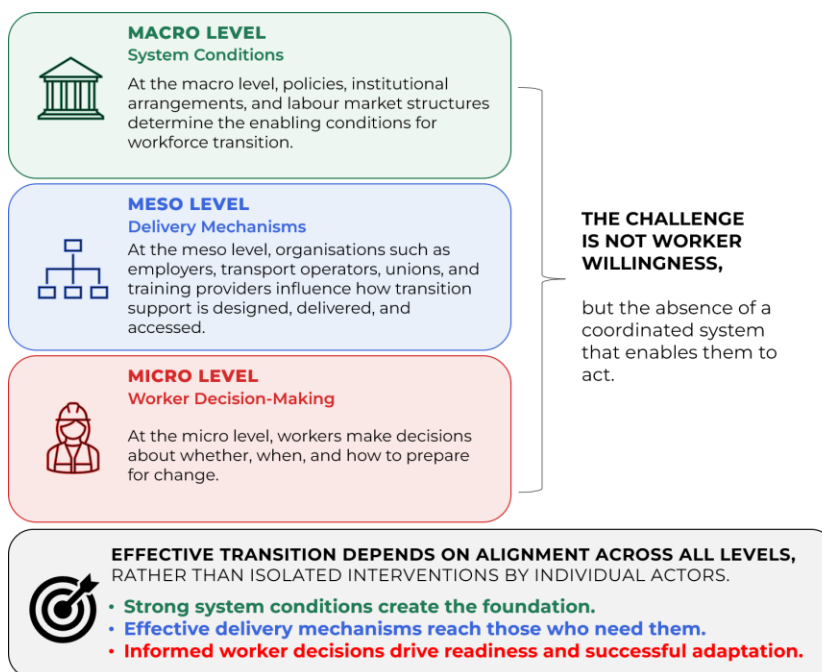


Figure 28: Ecological Systems Framework for a Just and Effective Transition

Effective transition depends on alignment across all levels of the system, rather than isolated interventions by individual actors. Taken together, the recommendations offer an integrated, coherent transition system rather than a set of standalone measures. Organised into two complementary groups and mapped across the transition ecosystem in Figure 29, they seek to align system conditions, organisational delivery mechanisms, and worker agency. The recommendations comprise:

1. *System-level priorities*, which establish the institutional architecture, support structures, and enabling conditions for a fair and inclusive AV transition.
2. *Worker-level priorities*, which support individuals in moving from awareness and uncertainty towards confidence and action.

At the centre of all recommendations is a shared objective: to ensure that Singapore's AV transition delivers not only technological success, but also secure, inclusive, and future-ready workforce outcomes for all workers.



1. System-Level Priorities

1.1 Coordinate an AV Transition Compact

What should be done

Tripartite partners could anchor an AV Transition Compact to align evolving tripartite measures into a coherent worker-facing journey, integrating career guidance, training, income support, job placement, and post-placement support. The compact should provide clarity on AV deployment timelines and workforce implications, define responsibilities across partners, and support collaborative workforce scenario planning for anticipatory labour market action. The goal is to move beyond fragmented, actor-specific interventions towards a well-signposted pathway from awareness to employment. Support interventions should focus not only on participation, but on whether support translates into meaningful outcomes, including training completion, placement, retention, wage stability, and job quality.

Why this matters

Workers are generally aware of AV developments, but many have limited concrete understanding of what this means for their jobs, careers, and future opportunities. Without role-specific clarity, particularly around deployment timelines, workforce implications, and transition pathways, workers often delay preparation or rely on speculation and fragmented information sources. As a result, awareness does not necessarily translate into action. A coordinated and well-signposted transition system is therefore needed to provide workers with confidence that support is timely, navigable, and responsive to their evolving needs.

International evidence similarly highlights the importance of preparing transition systems ahead of large-scale automation. The ITF's *Adapting (to) Automation: Transport Workforce in Transition* report emphasises the need for anticipatory strategies to manage automation, such as assessing workforce impacts before large-scale deployment and involving stakeholders in developing governance frameworks for automation (2023). Likewise, Pronello and Fedeli (2025), drawing on a policy co-creation process involving more than 600 stakeholders across 40 countries, emphasise the value of sustained social dialogue, coordinated governance, and shared responsibility among governments, employers, trade unions, and workers. Together, these studies suggest that successful workforce transitions depend not only on the availability of support measures, but also on continued coordination, clear communication, and mechanisms to adapt support as workforce needs evolve.

Singapore's July 2026 transition package demonstrates the strength of this coordinated approach. The next phase is therefore not to design a new system, but to ensure that the ecosystem continues to function cohesively from the worker's perspective. This includes maintaining clear communication as AV deployment progresses, ensuring support remains responsive to the differing realities of taxi drivers, PHV drivers, and, in time, bus captains, and monitoring whether workers are successfully progressing from awareness and training into sustainable employment outcomes. As AV deployment expands, continued coordination across tripartite partners will be important to reduce uncertainty, strengthen confidence in transition pathways, and refine support based on emerging workforce needs.

Key actions

Priority Level	Action
Immediate	• Integrate existing and upcoming transition measures into a unified worker-facing journey, rather than requiring workers to navigate separate schemes, agencies, and touchpoints. This should connect the CCP for AV Specialists, CCP for Public Transport Professionals, Training Incentive Scheme, and SWDA resource hub through a common intake, referral, advisory, and progress-tracking pathway. • Build the backend coordination needed to make the work journey seamless, including shared data, referral, and case-management systems across programmes. Workers should be supported as a single transition case, with their needs, referrals, milestones, and outcomes tracked across the journey rather than restarting each time they move between schemes. (The worker-facing journey is further elaborated in Recommendation 2.1.) • Develop role-specific transition roadmaps for PHV drivers, taxi drivers, and bus captains that reflect differences in employment arrangements, income structures, age profiles, skills baselines, exposure to institutional support, and likely transition pathways. • Provide regular sector-specific updates to both operators and workers on AV rollout plans, likely workforce implications, available support, eligibility requirements, key timelines, and next steps, so that communication moves from general reassurance to actionable transition guidance. • Establish shared outcome indicators to track whether transition measures are producing real worker outcomes, not only programme activity. These should include awareness, advisory take-up, training enrolment and completion, placement, retention, wage outcomes, worker satisfaction, and transition drop-off points, disaggregated where possible by worker group, age, readiness profile, and employment arrangement.
Mid-term	• Run joint workforce scenario planning across tripartite partners to anticipate how slower, staged, or accelerated AV deployment may affect PHV drivers, taxi drivers, and bus captains differently, including impacts on job demand, income stability, role redesign, displacement risk, training needs, and workforce absorption capacity. • Create a shared AV Workforce Transition Dashboard that tracks progression through the full transition journey, from awareness of support and advisory participation to training completion, CCP conversion, placement, six- and twelve-month retention, wage outcomes, worker satisfaction, and drop-off points. Results should be disaggregated by worker group, age, readiness profile, employment arrangement, and pathway type to identify where support is working, where bottlenecks are emerging, and where recalibration is needed.

Expected impact

A coordinated transition system would reduce uncertainty-driven inaction by giving workers clearer, role-specific information and a navigable pathway from preparation to employment. It would also reduce system fragmentation, enabling workers to access guidance, training, and placement support through a single, coherent journey.

Who should act

Stakeholder	Role
Government	Support in coordinating the AV Transition Compact, including workforce planning, policy direction, funding, regulatory safeguards, workforce impact monitoring, and alignment across transport, manpower, skills, and employment agencies.
NTUC	Represent worker interests in transition planning, surface ground concerns early, and guide workers towards suitable advisory, training, financial support, and placement pathways.
Transport operators and platform companies	Identify at-risk roles and workers, share deployment plans proactively, support job redesign, and participate in place-and-train arrangements, and commit to employer-linked transition outcomes where feasible.
Training providers	Provide transparent information on learning pathways and outcomes, and co-design flexible, modular, and work-compatible training with employers and unions to ensure programmes are linked to real job requirements and recognised credentials.

1.2 Ringfence Proportion of Jobs For Human Drivers To Maintain a Singaporean Core

What should be done

Call on the government (MOT and MOM) to establish a Workforce Transition Buffer that can absorb or support workers with credible employment options if AV deployment disrupts income or job viability before longer-term transition pathways (such as the ones established under Recommendation 1.1) are secured. Government and tripartite partners should conduct forward-looking workforce modelling to assess displacement risks across taxi, PHV, and bus sectors under different AV deployment scenarios, and identify a pipeline of transitional employment opportunities, redeployment pathways, and workforce buffer roles. These buffer roles should serve as short-term employment absorption during periods of disruption and complement, rather than replace, the longer-term, skills-based redeployment into adjacent sectors outlined in Recommendation 1.4.

This should include also assessing the feasibility of maintaining a strategic reserve of higher-value human-operated transport roles (e.g. limousine drivers, passenger experience officers, or drivers for medical tourism) in the longer term, that can provide employment absorption capacity during periods of workforce disruption, economic downturn, or accelerated AV deployment and exploring ringfencing those high-touch, higher-value roles for Singaporean drivers.

Why this matters

Many workers are concerned not only about whether AVs will affect their jobs, but also about what happens if their existing roles become less viable faster than new opportunities emerge. Even where workers are willing to adapt, the absence of visible fallback options increases risks and discourages proactive preparation. Without assurance that alternative employment or transitional support will be available, workers may delay action for fear of being left without viable work. A well-designed people-centric

safety net would help provide reassurance during periods of uncertainty and enable workers to engage with transition pathways with greater confidence.

International experience suggests that workforce disruption is best managed when employment safeguards are planned alongside technological change rather than introduced only after displacement occurs. During the automation of the Paris Métro by Régie Autonome des Transports Parisiens (RATP), workforce transition was integrated into implementation, with train drivers redeployed to other lines or transitioning into supervisory roles, while staff continued to perform important functions in operations, incident response, safety, and passenger assistance and communication (Groupe RATP, 2023). Similar lessons emerge from broader structural transitions: Germany’s hard-coal phase-out combined advance planning with measures such as retraining, decommissioning work, bridge payments, and early retirement arrangements to protect affected workers during long-term industry restructuring (Oei et al., 2020). Although these contexts differ from AV adoption, they point to a common principle: workforce continuity and credible safeguards should be deliberately built into transition planning, supported by institutional commitment and investment before large-scale displacement occurs, rather than relying primarily on reactive assistance after jobs are lost.

For Singapore, this suggests that a Workforce Transition Buffer should form part of the broader AV transition strategy, providing visible assurance that transitional employment and support mechanisms are in place as automation progresses. Such an approach can reduce uncertainty, strengthen worker confidence, and encourage earlier engagement with reskilling and career transition initiatives.

Key Actions

Priority Level	Action
Immediate	Commission a joint economic and transport workforce assessment to quantify displacement risks under different AV deployment scenarios, identify which worker groups and roles are most exposed, and determine the appropriate scale, composition, activation triggers, and governance of workforce buffer roles.
Mid-term	- Maintain a standing pipeline of workforce buffer roles across transport and adjacent sectors, focused on higher-value human-facing, safety-critical, service-recovery positions, and operational-resilience functions where human judgement remains strategically important. - Make workforce impact assessment a standard part of AV deployment and regulatory planning, including assessment of displacement risk, redeployment capacity, workforce absorption options, and implications for maintaining a Singaporean Core. - Create rapid-response transition mechanisms for affected workers, enabling fast referral to temporary employment, redeployment, income support, training, and career guidance when AV deployment creates sudden or uneven disruption.
Long-term	Define where human-operated roles should remain strategically protected within an increasingly automated transport system, especially in higher-value, safety-critical, commuter-facing, and service-resilience functions where human judgement continues to add operational value. This should include assessing an appropriate human-driven fleet proportion for taxi and PHV services, and strengthening Singaporean Core pathways for bus captains into higher-value roles in safety oversight, commuter support, service recovery, and operations as deployment models evolve.

Expected impact

A Workforce Transition Buffer would provide workers with a visible and credible safety net, reducing uncertainty and making it easier to engage proactively in transition planning. By ensuring that temporary employment, redeployment opportunities, and support mechanisms are available during periods of disruption, it would strengthen confidence in the transition process and facilitate smoother labour market adjustment. More broadly, it would enhance workforce resilience by providing additional employment absorption capacity during periods of AV-driven disruption or wider economic shocks.

Who should act

Stakeholder	Role
Government (MOT and MOM)	Commission and lead workforce scenario modelling and buffer design, including determining the scale, composition, activation criteria, funding arrangements, and governance mechanisms of workforce buffers. Evaluate whether selected higher-value human-operated transport roles should be retained as strategic workforce buffers and, where appropriate, supported through regulatory or policy measures.
Unions	Advocate for worker protections in buffer design and monitor whether income, job security, and access to fallback options are protected in implementation.
Transport operators	Identify workers and roles at higher risk of displacement, contribute transitional and workforce buffer opportunities, support early redeployment, and retain human-facing, safety-critical, and service-quality roles where operationally justified.

1.3 Monitor and Calibrate Income Protection During Transition

What should be done

As training incentives and transition support measures are implemented, the government (MOT, MOM, and SWDA) should monitor whether income protection is sufficient, accessible, and calibrated to the realities of different worker groups. For PHV and taxi drivers, this means accounting not only for foregone earnings, but also for vehicle rental obligations, contract lock-ins, operating costs, income volatility, and penalties that may arise from early exit. Income support should be assessed against whether it enables workers to participate meaningfully in advisory, training, and transition activities without undermining their immediate livelihoods.

Why this matters

Our findings show that economic insecurity is the dominant factor shaping worker behaviour. Concerns about income loss and job security outweigh concerns about technology itself and directly constrain participation in training and transition activities. For many workers, particularly those in income-sensitive roles such as PHV and taxi driving, time spent in training can translate into immediate income loss. Without credible financial support, workers are likely to delay participation, even when they recognise that change is necessary. Addressing economic risk is therefore not supplementary, but foundational to enabling transition.

The Training Incentive Scheme within the July 2026 package responds directly to this concern in principle: \$20 per hour, capped at 80 hours (up to \$1,600 per driver), explicitly designed to offset vehicle rental fees and income foregone during training. Whether this resolves the underlying concern in practice is a separate question. Driver reactions at

launch already flag two specific frictions this report's findings anticipated: one being that the \$20 hourly rate is roughly half his typical earnings, meaning higher-earning drivers lose out proportionally more; and another problematising the disbursement timing, noting that drivers dependent on daily or weekly rental payments cannot absorb a 30-day wait for reimbursement (Chelvan & Hamzah, 2026). Both concerns map directly onto this report's finding that economic insecurity, not technology itself, is the dominant factor shaping worker decision-making. The scheme's existence does not remove the need to monitor whether its calibration matches worker cash-flow realities.

International evidence demonstrates that income protection can play a critical role in supporting workforce adaptation. A 2024 evaluation of the United States Trade Adjustment Assistance programme found, during its operation, wage insurance increased employment probabilities, shortened periods of non-employment, and improved long-term earnings among displaced workers. Notably, the programme was found to be broadly self-financing, with higher tax revenues and reduced unemployment benefit payments offsetting programme costs (Hyman et al., 2024). Similarly, Denmark's flexicurity model combines income security with active labour market and training policies, reducing the immediate financial risks associated with career transitions and enabling workers to participate more readily in retraining and employment support programmes (Bredgaard et al., 2008). Collectively, these examples suggest that income protection is not merely a welfare measure, but an enabling mechanism that allows workers continuously engage in training, career exploration, and transition activities without bearing the full economic cost of adjustment alone.

Key actions

Priority Level	Action
Immediate	• Monitor whether the Training Incentive Scheme’s disbursement structure (\$20/hour, capped at 80 hours over the 2027-2029 pilot) is adequate relative to drivers' actual foregone earnings, particularly for higher-earning taxi and PHV drivers, and whether disbursement frequency (rather than a lump monthly claim) better matches daily or weekly rental payment cycles. • Assess whether vehicle rental contract lock-in penalties—reported by National Taxi Association representatives as typically running one to three years—offset the value of training incentives for drivers seeking to reduce hours or exit early to retrain.
Mid-term	• Link income support to meaningful milestones such as advisory completion, skills assessment, training completion, placement, and retention. • Explore additional non-monetary support where workers face unusually high opportunity costs, contract penalties, or caregiving constraints.
Long-term	• Review take-up and drop-off data as it accumulates to identify whether income risk remains a barrier despite available support and recalibrate accordingly.

Expected impact

A just transition requires collective ownership of risk, with government, employers, and unions jointly supporting workers to maintain income stability while they retrain, explore, and transition into new roles. Reducing income risk would remove the primary participation barrier, enabling workers to engage earlier and more consistently in transition activities. This would strengthen uptake of training and career mobility pathways,

while giving workers greater confidence to pursue longer-term transitions without compromising their immediate livelihoods.

Who should act

Stakeholder	Role
Government (MOT, MOM, and SWDA)	Continuously monitor and calibrate income protection schemes, including legislating eligibility criteria that cover platform workers who fall outside standard employment frameworks and develop shared-risk financing frameworks.
Unions	Advocate for adequate protection levels, assist workers in accessing support, and monitor whether scheme design reaches the most economically vulnerable cohorts.
Transport operators and platform companies	Contribute to shared-risk financing models and provide paid learning time or transitional employment opportunities where operationally feasible.

1.4 Shift Towards Jobs in Demand and Skills Portability

What should be done

SWDA could develop a skills-based mobility framework that translates workers’ existing driving experience into recognised transferable competencies accepted across sectors. Many transport workers possess substantial transferable skills, including customer service, safety management, operational coordination, and incident response, but current hiring systems often privilege formal qualifications and job titles, making these capabilities difficult to signal to employers outside traditional driving roles. Government, employers, unions, and training providers should work together to identify, validate, and recognise these competencies, enabling workers to access adjacent and emerging occupations based on what they can do rather than the roles they currently hold.

Skills should be recognised in adjacent jobs in demand. This includes technician roles (Van Fossen et al., 2023) related to mechanical and maintenance occupations (e.g. automotive technician, EV maintenance technician, fleet maintenance planner) which enables drivers to build on their tacit knowledge through additional technical training (e.g. automotive technology, computer diagnostics, maintenance planning). This underscores the emphasis on skills similarity and skills-based mobility in enabling more sustainable and worker-centred transitions (Dawson et al., 2021).

As AV-related and adjacent roles emerge, workers need clarity not only on whether they can enter these roles, but whether these jobs offer reasonable wages, stable employment arrangements, recognised credentials, and progression pathways. A skills-based mobility framework could therefore help workers compare pathways based on both entry requirements and longer-term livelihood prospects.

Why this matters

Workers consistently identified skills invisibility as a structural barrier to cross-sector mobility. Many were uncertain how their experience would be evaluated by employers in other industries, such as logistics, facilities management, hospitality, or commuter support where transport-related competencies may be directly applicable. The challenge is not the absence of transferrable skills, but the absence of recognised ways to document and communicate them. This limits workers' career options and reinforces dependence on within-sector pathways at a time when these opportunities may be contracting.

International experience demonstrates how skills recognition can facilitate workforce mobility. The Australian Government's proposed National Skills Passport seeks to create portable records of qualifications, skills, and competencies that can be shared across employers and sectors, helping workers communicate their capabilities beyond formal job titles and credentials (The Treasury, 2023). Complementing this, Bratanova et al. (2026) developed a workforce transition methodology that identifies viable career pathways by assessing skill similarity, labour market demand, and wage outcomes across occupations, demonstrating how existing competencies can be mapped to adjacent roles and emerging opportunities. Singapore already possesses many of the foundational elements required for such an approach through the Careers and Skills Passport, which consolidates verified employment, skills, qualifications, and certifications into a portable digital profile that can be shared with employers and used for career planning (Workforce Singapore, n.d.). The opportunity is therefore to strengthen competency mapping and skills recognition for transport workers, making their capabilities more visible, portable, and transferable across sectors within the existing national skills infrastructure.

Key actions

Priority Level	Action
Immediate	• Develop competency profiles and portable credentials that convert transport workers' driving experience, workplace learning, and practical know-how into recognised transferable skills, making their capabilities visible to employers in AV-related, adjacent transport, logistics, facilities management, customer operations, and other jobs in demand.
Mid-term	• Embed transport workers' competency-based credentials within the national Careers and Skills Passport to improve skills visibility, strengthen career advisory, and support movement into AV-related, adjacent transport, and non-transport roles. • Drive skills-first hiring in adjacent growth sectors by encouraging employers to recognise transport workers' demonstrated competencies, such as safety management, customer service, incident response, operational coordination, and service recovery, as relevant evidence of job readiness.
Long-term	• Enable portfolio, fractional, and multi-role career pathways that let workers combine driving, training, trial placements, and adjacent-sector work while progressively transferring skills across occupations. (Further elaborated in Recommendation 1.5).

Expected impact

A skills-based mobility system would expand the range of viable career pathways available to workers, enabling cross-sector movement based on demonstrated competencies rather than formal credentials and occupational titles alone. This would improve labour market flexibility, make better use of existing workforce capabilities, and strengthen long-term adaptability as jobs evolve.

Who should act

Stakeholder	Role
Government (SWDA)	Continue to design and oversee the national skills passport framework, establish common competency standards, and incentivise skills-first hiring across sectors.
Employers	Adopt skills-first hiring practices, recognise competency-based credentials in recruitment and internal mobility decisions, and engage in joint competency mapping with training providers and operators.
Transport operators	Document workers' competencies, apply transferable skills recognition in internal redeployment decisions, and support mobility into adjacent and emerging roles.
Unions	Support skills documentation, career advisory services, and worker navigation of mobility pathways.
Training providers	Align credentials, assessments, and learning pathways with competency-based frameworks and recognised industry skills standards.

1.5 Enable Flexible, Multi-Stage, & Anticipatory Transition Pathways

What should be done

Transition support should begin well before workers are directly displaced and provide pathways that allow workers to transition progressively, rather than requiring a single move from one full-time occupation to another. The transport sector including SWDA, supported by NTUC’s Employment and Employability Institute (e2i), should proactively identify workers in segments likely to be affected by AV deployment, using indicators such as deployment timelines, vehicle type, and worker tenure, and offer early, low-commitment opportunities to explore future pathways before their current roles are impacted. At the same time, transition pathways should reflect the realities of workers in platform-mediated or self-employed arrangements, whose livelihoods depend on flexible and variable work patterns. Rather than relying solely on conventional full-time conversion models, partners should develop task-based, portfolio, and trial work arrangements that allow workers to combine income sources, test adjacent roles with lower risk, and transition incrementally. This could include short-term attachments with AV operators and technology firms, task-based opportunities with logistics and facilities management partners, or portfolio arrangements that combine reduced driving hours with paid training or work attachments, enabling workers to build skills, confidence, and financial security over time.

Why this matters

PHV and taxi drivers already operate under employment arrangements that are closer to self-employed or platform work than to conventional full-time employment. Consistent with this, taxi drivers in the study showed the strongest tendency to leave the sector altogether rather than retrain within it, suggesting that for many, the issue is not simply whether to reskill, but whether available pathways align with the way they want to work.

There is also an important timing dimension to workforce transitions. Workers who begin considering alternatives only when their current roles are visibly at risk have less opportunity to explore options, build confidence, and adjust their income arrangements gradually. Recommendation 1.1 addresses this at the system level through workforce scenario planning and early signalling of AV deployment. Building on that principle, workers in higher-risk segments should also have opportunities to begin low-commitment

exploration, such as trial attachments, job shadowing, or task-based placements, before their existing roles are disrupted, rather than only after.

The recently announced transition measures, including the strengthened CCPs and enhanced financial support, provide an important foundation for workers who are ready to move into structured reskilling pathways. However, early feedback from drivers suggests that, for some, the key consideration is not the availability or affordability of training, but whether the destination roles offer sufficient flexibility and autonomy to match their current working arrangements (Chelvan & Hamzah, 2026). This points to the value of complementing existing pathways with additional transition options that allow workers to explore emerging roles incrementally before making a full commitment.

International experience also highlights the need for employment systems to respond to increasingly fluid forms of work. The European Union’s Platform Work Directive, for example, establishes a rebuttable legal presumption of employment where facts indicating direction and control by a digital labour platform are present (European Parliament & Council of the European Union, 2024). While the EU framework addresses employment classification rather than workforce transition specifically, it reflects a broader challenge relevant to Singapore’s AV transition: how to ensure that protections and support remain accessible as workers move between conventional employment, self-employment, platform work, and potentially hybrid arrangements during a transition. This becomes particularly important if workers are encouraged to combine existing driving work with training, attachments, or emerging AV-related roles rather than making an immediate, complete occupational switch.

For lower-readiness workers, particularly the Concerned Observers identified in this study, a requirement to commit immediately to a full-time career change may represent too large a step. Providing non-linear, multi-stage transition pathways would create smaller, lower-risk entry points into the evolving AV ecosystem, allowing workers to maintain income flexibility while gradually building skills, confidence, and experience. Rather than replacing existing CCPs, these pathways would broaden the range of transition options available, helping workers remain engaged until they are ready to undertake more substantial career transitions.

Figure 30 illustrates one example of how such a pathway could operate. Instead of requiring a direct move from one occupation to another, workers progressively rebalance their work across successive transition stages—combining existing driving roles with emerging AV-related roles before eventually moving into new careers as their readiness, skills, and confidence grow.

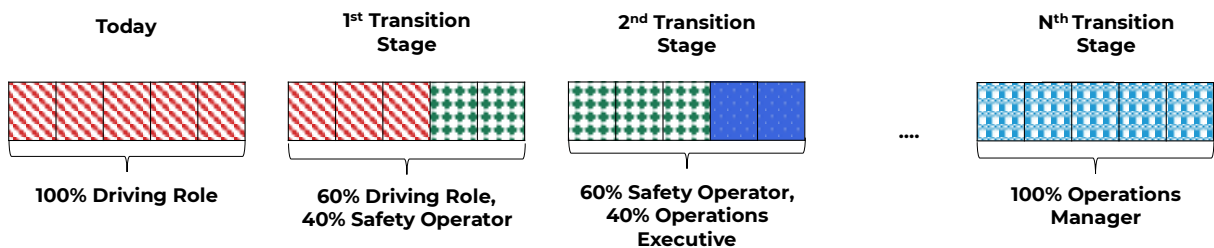


Figure 30: Example of a multi-stage and fractional workforce transition pathway. Workers progressively rebalance their work across successive transition stages, using fractional employment arrangements to gain skills and experience while maintaining income and labour market attachment before transitioning into longer-term roles.

Key Actions

Priority Level	Action
Immediate	- Identify worker segments facing earlier or higher-probability disruption based on AV deployment timelines by route, zone, or vehicle type or vehicle category, and offer these workers priority access to low-commitment exploration options—such as briefings, skills diagnostics, job shadowing, short attachments, or trial placements, before their current roles are directly affected. - Clarify CPF, income-support, insurance, and employment-status treatment for workers combining multiple income sources during transition, including part-time, task-based, platform-mediated, portfolio, and fractional work arrangements, so that hybrid pathways remain covered by appropriate safety nets rather than falling between existing categories. - Convene platform operators, transport operators, unions, training providers, and adjacent-sector employers to co-design task-based, trial and fractional work pilots that complement rather than duplicate existing CCP pathways. These pilots should allow workers to test emerging AV-related and adjacent roles with lower risk, while maintaining income continuity and accumulating recognised experience.
Mid-term	Convert job-shadowing and short-term attachment into paid trial placements, so drivers can test AV safety-operator, fleet operations, or adjacent-sector roles without committing upfront to full CCP conversion, while still maintaining income and building recognised transition experience.
Long-term	Track alternative-pathway pilot uptake and outcomes as a distinct line item in the AV Workforce Transition Dashboard, disaggregating results by whether workers entered before or after role disruption and comparing them against CCP conversion, placement, retention, and wage outcomes when the Training Incentive Scheme pilot concludes in 2029.

Expected Impact

Widening the set of viable transition pathways beyond full-time redeployment and letting workers begin testing these pathways before disruption occurs, would reduce the risk that workers in platform-mediated roles are excluded from support by design or by timing. It would also let the transition system absorb workers at a pace and risk level suited to their circumstances, rather than forcing a single discrete leap under time pressure.

Who should act

Stakeholder	Role
Government (SWDA)	Clarify regulatory and income-support treatment of hybrid/portfolio work arrangements; fund pilot programmes. SWDA, supported by NTUC's e2i, could administer low-commitment transition pathways for drivers.
Transport operators and platform companies	Co-design and host task-based, trial, and fractional placements; share workforce data to evaluate pilots.
Unions	Working with NTUC's e2i, ensure alternative arrangements do not become a mechanism for underemployment; monitor income adequacy.
Employers in adjacent sectors	Offer trial and fractional placements as entry points for workers testing new roles.

1.6 Ensure Training Is Work-Compatible, Trusted, and Outcome-Linked

What should be done

Transport operators, employers in adjacent sectors, and training providers could complement short-form training incentives and CCP pathways, for transport workers to enter new and meaningful employment. Rather than requiring workers to step away from employment to retrain, learning should be modular, flexible, and integrated with work wherever possible. Apprenticeship-based, place-and-train, earn-and-learn models, and staged pathways should be explored and expanded to enable workers to acquire skills while maintaining income and labour market attachment. Employers should be more closely involved in programme design and delivery to ensure training reflects industry needs and leads to genuine employment opportunities. Training should also be delivered in formats that minimise disruption to workers' livelihoods and provide greater confidence in the employment outcomes before workers commit.

Why this matters

While willingness to train is generally present, our findings show that participation is constrained primarily by time pressures, income considerations, competing responsibilities, and uncertainty about whether training will lead to meaningful employment opportunities. Traditional training models often impose high opportunity costs, particularly for workers in irregular or income-dependent roles such as PHV and taxi drivers. Beyond accessibility, workers also need confidence that investing time in training will translate into tangible career outcomes.

The July 2026 support package represents an important step towards addressing these barriers. The enhanced CCPs provide salary support while workers train in their new roles, reducing the need to choose between earning an income and reskilling, while the Training Incentive Scheme offers lower-commitment opportunities for workers to explore new skills before deciding whether to undertake a longer CCP pathway (MOT, 2026). Building on this foundation, continued attention should be given to how training is delivered, including modular, off-peak, hybrid, and online formats that better accommodate irregular work schedules, as well as greater transparency on employment outcomes to strengthen workers' confidence that training will lead to meaningful employment.

International experience highlights the value of integrating workforce development with employment. In the United States, the Federal Transit Administration's (n.d.) Workforce Development Initiative supports apprenticeships, on-the-job training, work-based learning, and technical training programmes that enable transit workers to acquire new skills while remaining connected to employment. Singapore already has experience implementing similar approaches through initiatives such as the SkillsFuture Work-Study Programme and the CCPs, which combine structured learning with workplace-based training. The opportunity is therefore not to introduce entirely new models, but to continue strengthening and adapting these approaches to meet the needs of transport workers, particularly those in flexible and income-dependent employment arrangements.

Figure 31 illustrates how continuous, work-integrated training can accompany workers across successive transition stages, enabling skills to be accumulated progressively alongside work rather than through a single period of full-time retraining. Together with the fractional and multi-stage transition pathways illustrated in Figure 30, this

demonstrates how learning and employment can reinforce one another throughout the transition journey.

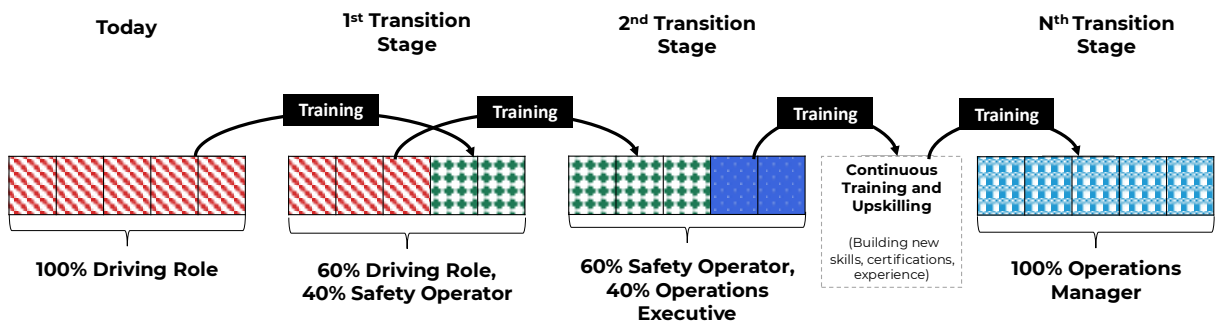


Figure 31: Continuous work-integrated training supports progressive career transitions. Workers build new skills continuously while remaining employed, enabling each transition stage to strengthen readiness for the next. Figure 30 illustrates how these capabilities can be translated into fractional and multi-stage career transitions.

Who should act

Stakeholder	Role
Immediate	- Track whether short-form course participation is translating into meaningful progression, including movement into longer-term CCPs, AV-related or adjacent-sector job placements, paid trial placements, or other concrete career outcomes. This should distinguish between one-off course attendance and progression along a credible transition pathway. - Monitor whether the approximately 2,000 SWDA supported short-form courses under the Training Incentive Scheme are genuinely work-compatible for drivers, including whether they are offered in modular, off-peak, online, hybrid, or asynchronous formats that allow workers to participate without forgoing full driving shifts. This should directly address driver feedback at the package’s launch that training must fit around income-generating work rather than require workers to absorb significant opportunity costs.
Mid-term	- Expand work-integrated learning models, including work-study, place-and-train CCPs, and earn-and-learn programmes, so workers can acquire new skills while maintaining income, labour market attachment, and confidence in the transition pathway. - Provide modular, stackable, hybrid, and asynchronous learning options that fit irregular and shift-based work patterns, allowing workers to build credentials progressively without having to forgo full driving shifts or caregiving responsibilities. - Strengthen employer involvement in training design, delivery, and placement commitments, so programmes are aligned with real job requirements and give workers clearer confidence that training leads to viable employment outcomes. - Publish training-to-employment conversion rates by provider, course, and pathway type, including progression into CCPs, paid trial placements, job placements, retention, and wage outcomes, so workers can assess which programmes credibly lead to jobs rather than only certificates.
Long-term	Scale apprenticeship-based transitions pathways that combine paid work, supervised training, employer mentoring, and recognised credentials, enabling workers to enter AV-related, adjacent transport, and emerging occupations through a lower-risk, outcome-linked route.

Expected impact

Flexible, work-integrated training would reduce opportunity costs and increase accessibility, enabling more workers to participate without substantially disrupting their livelihoods. Stronger alignment between training provision and labour market demand would improve confidence in the value of participation and support smoother transitions into sustainable employment.

Who should act

Stakeholder	Role
Training providers	Redesign programmes around workers' schedules, baseline skills, and transition needs, using modular, flexible, and work-integrated formats linked to employment outcomes.
Government	Fund flexible models and apprenticeship pathways, condition funding on employer involvement and placement outcomes, and coordinate with income support under Recommendation 1.3.
Transport operators and platform companies	Provide protected training time, workplace learning opportunities and operational and role-specific input on emerging AV-related skills needs.
Employers in adjacent sectors	Participate in apprenticeship, work-study, and placement partnerships for workers moving into adjacent or higher-value roles.
Unions	Surface workers' training barriers, support outreach and trust-building, and work with partners to ensure training is accessible, practical, and linked to employment outcomes.

2. Worker-Level Priorities

2.1 Strengthen Worker Decision Support Beyond Information Provision

What should be done

SWDA and NTUC's e2i could innovate digital "one-stop" navigator platforms (Figure 32), by ensuring that workers consistently receive structured personalised decision support and not only information. While Recommendation 1.1 establishes the underlying data, referral, and case-management architecture, this recommendation focuses on the worker experience built on top of it. Rather than serving primarily as a resource repository, transition guidance should help workers compare options, understand trade-offs, and evaluate the implications of different transition pathways. It should provide personalised insights on potential occupations, expected earnings, training requirements, skills gaps, and employment prospects, supported by access to career coaching and experiential opportunities. The objective is to help workers move from exploration and uncertainty to informed decision-making and action.

Why this matters

Workers are already exploring potential options but struggle to translate exploration into concrete action. This is not due to lack of willingness, but because transition decision-making is complex, uncertain, and perceived as high risk. Workers frequently weigh multiple considerations, including income stability, training requirements, job prospects, and long-term career viability, often without clear or accessible guidance. As a result, many remain in a prolonged state of "exploration without commitment", delaying participation in training, career planning, and transition activities. Effective guidance systems are therefore critical to reducing decision uncertainty, helping workers evaluate

trade-offs more confidently, and enabling them to make informed choices about their future pathways.

International experience demonstrates the value of combining information with personalised guidance during workforce transitions. The United Kingdom's National Careers Service provides one example, combining digital labour market information with personalised career guidance to help individuals assess career options, understand training requirements, and make informed employment decisions. An independent evaluation found no measurable impact on employment or benefit-dependency outcomes but identified a robust and sustained positive effect on subsequent participation in education and training (Lane et al., 2017). This distinction is particularly relevant to the proposed Transition Navigator: guidance may be effective in helping workers take an initial step towards transition, such as entering training, but may not by itself translate into successful employment outcomes. This reinforces the importance of linking guidance with the placement and outcome-tracking mechanisms proposed elsewhere in this report. In the context of automation, the ITF (2023) similarly highlights the importance of supporting workers to adapt to changing skill requirements and navigate emerging employment opportunities. Together, these examples suggest that effective transition systems require both accessible information and structured guidance that helps workers move from awareness to informed action.

The July 2026 package represents an important step in this direction through the introduction of the SWDA's one-stop resource hub, which centralises information on available support measures. This recommendation therefore does not propose creating a parallel platform. Rather, it proposes strengthening the guidance function within existing infrastructure by integrating pathway comparison, personalised advisory support, and decision-support resources that help workers interpret information, evaluate trade-offs, and plan their transitions with greater confidence.

Key actions

Priority Level	Action
Immediate	Develop a digital Transition Navigator companion within existing worker-facing platforms, such as the SWDA one-stop resource hub, to convert available information into personalised decision support (illustrated conceptually in Figure 32). The navigator should help workers compare transition pathways, earnings implications, training requirements, eligibility for support, time commitments, and employment prospects, so they can identify realistic next steps based on their current role, income needs, readiness level, and constraints.
Mid-term	Expand personalised career coaching and advisory support to help workers move from information to decision-making, including interpreting pathway options, comparing trade-offs, assessing job fit, and developing realistic transition plans based on income needs, readiness, constraints, and preferred work arrangements.
Long-term	Institutionalise low-risk exploration pathways, including job shadowing, workplace visits, career discovery programmes, and short-term attachments, enabling workers to test job fit, understand trade-offs, and build confidence before committing to longer-term training, CCP conversion, or job placement.

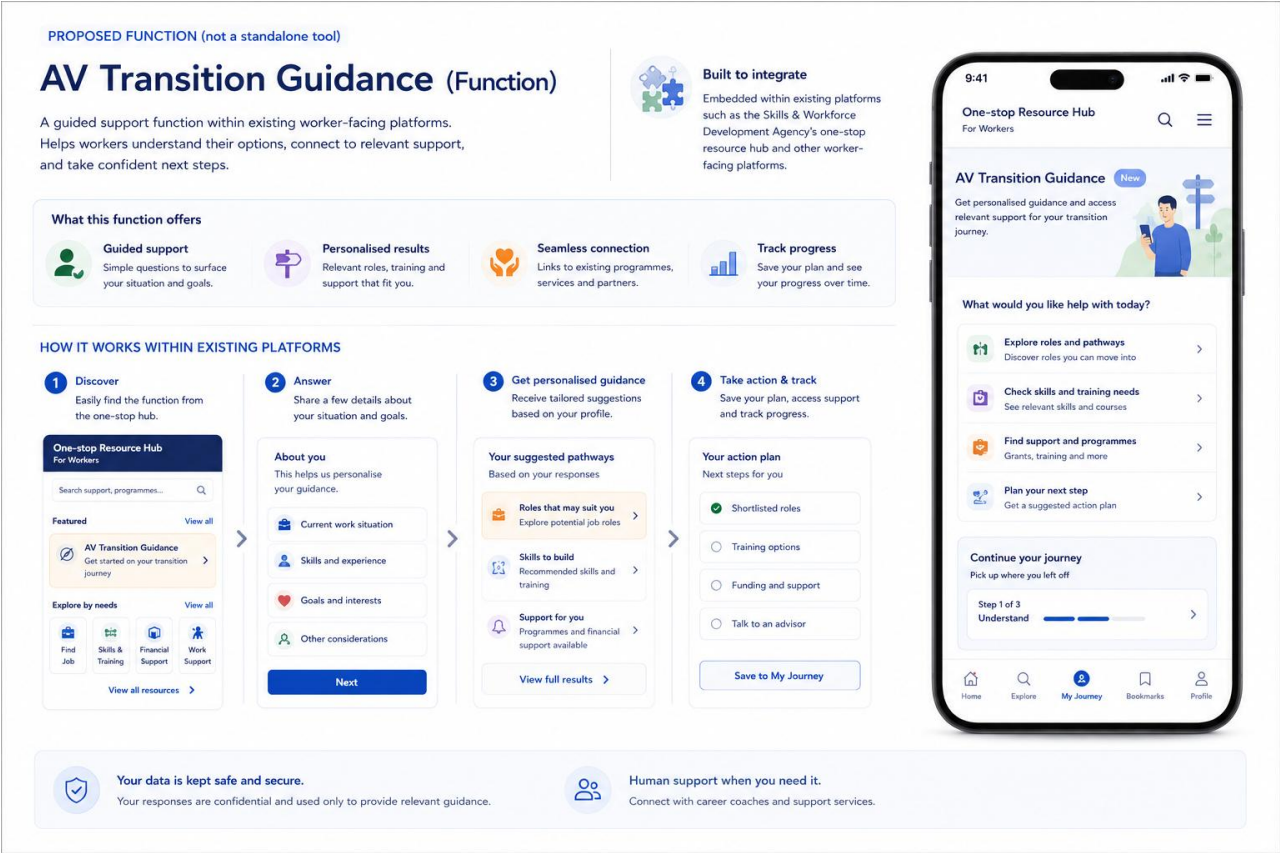


Figure 32: Illustrative example of an integrated worker transition guidance function, showing how workers may progress from self-assessment and pathway exploration to personalised transition planning. The figure is conceptual and illustrates one way this guidance function could be incorporated into existing worker-facing platforms such as the Skills & Workforce Development Agency's one-stop resource hub.

Expected impact

Reducing decision-making complexity through integrated transition guidance would help workers move more confidently from exploration to action. By combining accessible information with personalised guidance and career exploration opportunities, workers would be better equipped to compare options, evaluate trade-offs, and commit to transition pathways that align with their circumstances and aspirations.

Who should act

Stakeholder	Role
Government (SWDA)	Fund and develop digital tools such as the digital Transition Navigator platform, commission and coordinate career advisory services supported by NTUC's e2i, and ensure the Navigator is integrated with existing national careers and skills infrastructure.
Unions	Working with NTUC's e2i, offer in-person coaching and guidance at the workplace level and identify workers who require more intensive advisory support and connect them to appropriate services.
Transport operators and platform companies	Facilitate access to workplace visits, operational role exposure, and career discovery opportunities that allow workers to explore pathways in context.
Employers	Offer job shadowing, short-term attachments, and trial placements that give workers low-risk opportunities to assess pathway suitability before committing.
Training providers	Align advisory and referral services with learning pathways, provide clear, accessible information on training requirements, duration, costs, and expected employment outcomes to inform workers' decision-making.

2.2 Normalise Transition Through Peer Influence

What should be done

As early movers enter AV-related roles or adjacent pathways, their experiences should be made visible to other workers. However, peer stories should remain realistic rather than overly promotional, including both the benefits and trade-offs involved in transition. Tripartite partners could establish a peer transition ambassador model to normalise transition preparation and encourage pro-active worker action through trusted voices. Rather than relying solely on formal communications or institutional messaging, transition efforts should leverage trusted peer networks. Ambassadors could include bus captains, taxi drivers, PHV drivers, or workers who have completed training, entered adjacent roles, or begun preparing for AV-related changes. Their role would be to share realistic transition experiences, address misconceptions, strengthen drivers' self-agency, and connect peers to advisory, training, and support channels. The model should also create a network for workers in similar situations, fostering mutual support, confidence, and collective readiness for AV-related changes.

Why this matters

Our findings highlight a disconnect between personal attitudes and perceived social norms. While many workers are individually open to preparing for the AV transition, they often believe their peers are more hesitant or resistant. This misperception creates a form of social inertia, where workers delay action because they assume others are not moving either. At the same time, workers who are already engaged in preparatory activities, such as training or career exploration, tend to report higher levels of confidence and stronger support for AV adoption. This suggests that visible participation and peer validation play an important role in shaping behaviour. Making transition pathways visible and socially reinforced can therefore help shift perceptions, reduce hesitation, and encourage earlier engagement.

International evidence demonstrates the potential for peer influence to shape participation in workforce-related programmes. Dahl et al. (2014), for example, found substantial peer effects in programme participation, with take-up increasing among

coworkers after a peer participated; information transmission about the costs and benefits of participation was identified as an important mechanism. This suggests that making peers’ actions visible can help reduce uncertainty and influence others’ willingness to participate. The United Kingdom’s Union Learning Representative (ULR) model provides a complementary example of how peer-based support can be institutionalised within workplaces. ULRs are union representatives drawn from existing employees who encourage workplace learning and provide workers with advice and guidance on accessing appropriate training. Evidence suggests that ULRs can have a positive, although partial, influence on training participation, particularly where appropriate organisational support is in place (Hoque & Bacon, 2011). Together, these findings suggest that trusted peers can play an important role in making transition activity more visible, sharing practical information, and encouraging engagement with training and workforce transition opportunities.

Key actions

Priority Level	Action
Immediate	- Establish peer ambassador programmes, recruiting workers across all three sectors who have successfully undertaken training, redeployment, or career transitions. - Showcase diverse and realistic worker journeys across both AV-related and non-transport pathways to highlight a multiple-pathways transition opportunity.
Mid-term	- Publicise placement and employment outcomes, not just training participation. - Create cohort-based training and transition programmes allowing workers to prepare alongside peers.

Expected impact

Strengthening positive social norms around transition would reduce the social inertia currently suppressing early action. Visible peer examples would make transition appear more achievable and socially accepted, accelerating engagement. Greater visibility of successful pathways would normalise transition behaviours and increase overall participation across the workforce.

Who should act

Stakeholder	Role
Unions	Lead peer ambassador programmes, develop ambassador training and support materials, and embed peer engagement within existing worker outreach activities.
Government	Provide funding, coordination, and evaluation support for peer-based transition initiatives.
Transport operators and platform companies	Facilitate worker participation in ambassador activities and provide access to internal communication channels and workplace platforms.
Employers	Showcase successful transition stories, provide testimonials from workers who have entered new roles, and support outreach efforts that demonstrate the viability of alternative career pathways.

2.3 Deliver Segmented Support Based on Readiness

What should be done

NTUC could introduce readiness-based support tiers to ensure that workers receive support matched to their starting points, constraints, and capacity to act. Rather than providing identical support to all workers, the interventions outlined in Recommendations 1.1–2.2 should be delivered with varying levels of intensity and sequencing based on workers' readiness profiles. Workers with lower readiness may require greater reassurance, financial protection, and personalised guidance before engaging in transition activities. Those with moderate readiness may benefit most from structured pathway information and practical support to convert intention into action. Workers with higher readiness should be able to access accelerated training, advanced development opportunities, and faster progression into new roles. Support should be reviewed periodically and adjusted as workers progress through the transition journey.

Why this matters

Our findings show that the workforce comprises distinct readiness profiles, ranging from workers who are uncertain and constrained to those who are already proactive and preparing for change. These differences are shaped by a combination of economic security, access to institutional support, and clarity of available pathways. A uniform approach risks creating mismatches between worker needs and the support provided. For instance, workers who are uncertain or constrained may feel overwhelmed by complex transition requirements, while workers who are already prepared may become frustrated by unnecessary delays or generic interventions. The challenge is therefore not simply motivating workers to act but ensuring that support is calibrated to their ability to engage at different stages of the transition process.

The ITF (2023) also highlights that automation affects transport workers unevenly according to factors such as occupation, age, education, and skill profiles, implying that a one-size-fits-all approach is unlikely to meet the needs of all workers. Instead, workers facing greater barriers to adaptation may require more intensive support, while those who are already prepared can benefit from faster progression into training and employment pathways. Similarly, OECD (2023) evaluations of active labour market policies in Finland emphasise the importance of targeting interventions towards groups with different support needs in order to improve programme effectiveness and employment outcomes. Together, these findings suggest that differentiated support is more likely to achieve broad participation and successful workforce transitions than uniform approaches.

Key actions

Priority Level	Action
Immediate	• Embed readiness assessment into advisory and transition systems so support is matched to workers' actual preparedness, constraints, and decision needs. Assessment outputs should guide personalised pathway recommendations through channels such as the AV Transition Navigator proposed in Recommendation 2.1. • Segment outreach and follow-up based on readiness profiles, so early movers are directed quickly to pathways, interested but uncertain workers receive guided conversion support, and lower-readiness or higher-constraint workers receive reassurance, income protection, and low-risk exposure before being asked to commit.
Mid-term	• Segment the intensity, sequencing, and combination of interventions across Recommendations 1.1–2.2, according to workers' readiness profiles, ensuring that lower-readiness, moderate-readiness, and higher-readiness workers receive different combinations of reassurance, advisory support, income protection, training, low-risk exposure, and placement assistance. • Tailor communication, advisory intensity, training formats, and placement support to each readiness profile, so service delivery moves from a uniform offer of schemes to a targeted transition journey that reduces drop-off and improves take-up among workers who face greater constraints.
Long-term	• Track worker progression and dynamically adjust support tiers over time, so workers can move between different levels of reassurance, advisory support, income protection, training, and placement assistance as their readiness and circumstances evolve. Readiness-based support should be treated as an ongoing transition management function, not a one-time design task.

Expected impact

Delivering differentiated support aligned to worker readiness would improve both programme effectiveness and resource efficiency by ensuring that workers receive the right support at the right time. This would reduce disengagement among workers facing greater barriers to transition, accelerate progression among those already prepared to act, and increase the overall effectiveness of the wider transition system.

Who should act

Stakeholder	Role
Government	Design policy and funding frameworks that support differentiated service delivery, including readiness assessment infrastructure and resource allocation calibrated to worker need.
Unions	Identify workers' readiness levels through direct engagement, provide tailored outreach and advisory support, and help workers navigate appropriate transition pathways.
Transport operators and platform companies	Share workforce intelligence, identify workers who may require additional support, and align workforce transition planning with worker readiness profiles.
Employers	Offer placement and employment opportunities suited to different stages of worker preparedness and progression.
Training providers	Adapt programme design, pacing, entry requirements, and delivery formats to accommodate workers with different readiness levels and learning needs.

Collectively, these recommendations recognise that workforce transitions are not solely a technological challenge, but also an economic, institutional, and social one. By combining system-level reforms with worker-centred support, Singapore can strengthen workforce resilience, support labour market adaptation, and ensure that the benefits of AV adoption are shared more broadly across society.



Chapter 5: Conclusion

Singapore's transport sector is entering a period of significant transformation as AV technologies move from pilot testing towards real-world deployment. The deployment of AVs will also reshape jobs, skills requirements, and career pathways across the transport ecosystem. The central challenge is whether workers can move through that change with clarity, security, and credible pathways into future work.

The recently announced manpower transition package marks an important first step in responding to these concerns. It recognises that drivers need structured pathways, practical training support, and career guidance as AV deployment progresses. The longer-term challenge is to ensure that such support remains responsive as implementation details evolve, and that it translates into actual take-up, successful placement, fair jobs, and sustainable livelihoods.

Our study finds that transport workers are neither resistant to change nor unaware of the developments taking place around them. Awareness of AV developments is already widespread across taxi drivers, PHV drivers, and bus captains, and many workers have also begun exploring how they might adapt. Yet the findings consistently show a gap between awareness and actionable transition pathways. Workers may be willing to prepare, but uncertainty about deployment timelines, future job opportunities, income security, and the practical steps needed to prepare continues to delay commitment and action. Economic concerns, particularly around job loss and income disruption, remain more immediate to workers than the technology itself, while participation in training is often constrained by time pressures, caregiving responsibilities, potential income loss, and uncertainty over whether training will lead to meaningful employment outcomes. However, an important point to highlight is that a positive mindset shift is crucial in accepting that disruption is going to occur and that active steps need to be taken for workers to be willing and able to transition into new roles. And workers' willingness to act will depend on whether the transition system provides sufficient clarity, confidence, and credible support for them to take practical steps towards new roles.

The findings also highlight that the workforce is not homogeneous. Different sectors and worker groups face distinct vulnerabilities, opportunities, and readiness levels. Some are already taking steps to prepare for change, while others require greater reassurance, guidance, and support before they are willing to act. These differences reflect distinct readiness profiles shaped by varying levels of confidence, concern, preparedness, and institutional support. As a result, one-size-fits-all transition will be insufficient. Greater empathy is required for certain groups of transport workers like PHV and taxi drivers who face real practical limitations like car rental contracts, penalties, and lifestyle considerations beyond economic drivers, like the need for flexible work to support family routines or caregiving needs. Therefore, effective transition strategies must be both broad-based and differentiated, combining system-wide support with targeted interventions that respond to workers' starting points, constraints, capacity to act, and interests.

In response, this report proposes nine recommendations organised through an ecological systems model. Together, they form an integrated framework rather than a collection of standalone measures. Collectively, they address the key barriers identified in this study, including uncertainty, fragmented pathways, financial risk, and limited recognition of transferable skills, while creating a clearer bridge from awareness to action and from preparation to employment.

Overall, the findings demonstrate that successful workforce transitions require more than training alone. Workers need clear pathways, economic security, recognised skills, and confidence that future opportunities are both real and attainable. As Singapore moves from initial support measures to longer-term AV deployment, success should be measured not only by the number of workers trained, but by whether workers are able to access better-quality roles, sustain their livelihoods, and move through change with dignity and confidence. Achieving this will require continued coordination across government, unions, employers, transport operators, platform companies, training providers, and workers themselves. In doing so, Singapore can demonstrate that technological innovation and worker security are mutually reinforcing objectives.



Annex A: Full Methodology

The study employed a mixed-method approach to address the stated research questions.

Landscape Scan and Literature Review

The study began with a comprehensive review of both global and local literature to identify best practices, research gaps, and lessons relevant to AV-induced labour transitions. This included analysing evidence and case studies on labour implications of automation, sector-specific risks, and international strategies used to support vulnerable worker groups. To contextualise the insights for Singapore, the team concurrently examined the national AV landscape—covering policy developments, regulatory frameworks, industry trials, workforce composition, and ongoing upskilling initiatives. This dual analysis enabled the integration of global learnings with Singapore’s unique transport, regulatory, and labour-market conditions, thereby providing a grounded basis for the subsequent research design and stakeholder engagements.

Sector Engagement Focus Group

A sector-specific focus group involving 25 participants was then conducted to surface in-depth insights on key worker concerns, sector preparedness, potential adjacent job opportunities for affected worker and additional resources required for a fair transition (Figure 33). Participants comprised union leaders, taxi and PHV drivers and operators, public transport operators, and representatives from government and regulatory bodies, ensuring broad representation across the AV and transport ecosystem.

Sample Breakdown of Sector Engagement Participants (n=25)

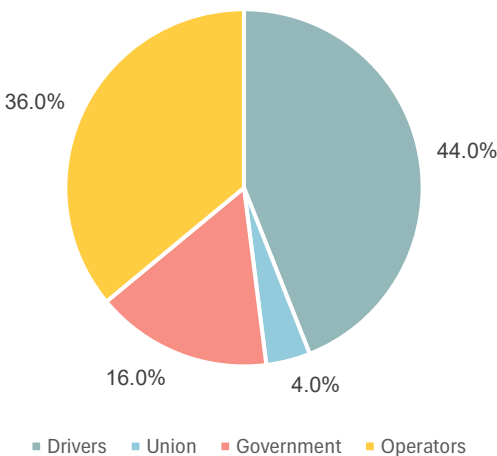


Figure 33: Sample Breakdown of Sector Engagement Participants

To promote meaningful and balanced participation, stakeholders were organised into six groups comprising union, operator and government representatives. This structure was chosen to enable participants to hear from each other’s perspectives, ensuring that all

perspectives were considered rather than relying on a top-down method that could overlook worker concerns. Discussions centred on several key topics, including the expected timeline and scope of AV roll-out, the worker segments most likely to be affected, existing upskilling and reskilling initiatives, institutional readiness for large-scale transitions, and regulatory or policy challenges that may hinder or enable the transition. Insights generated from the participants were recorded and analysed to inform the refinement of worker survey questions, ensuring that system-level perspectives are meaningfully integrated into worker-level instruments.

Quantitative Worker Survey

Next, a quantitative survey was administered across the taxi, PHV, and public bus driving sectors to capture drivers’ and bus captains’ attitudes and awareness of AVs, while also assessing their perceptions of job security, interest in skills upgrading, and readiness for career transition. A total of 818 drivers across the three sectors were recruited (Figure 34) comprising 567 PHV drivers, 123 taxi drivers, and 128 public bus captains representative of the driver population⁶. Recruitment was carried out through NTUC-affiliated unions, operator networks, and sector associations to ensure broad outreach across different age groups, work tenures, and employment arrangements.

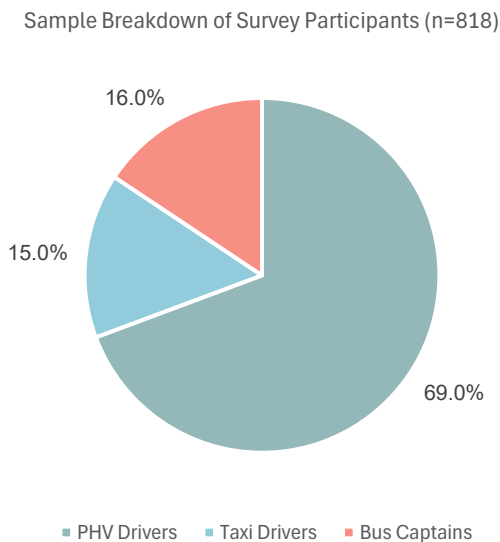


Figure 34: Sample Breakdown of Survey Participants

Co-Design Workshop

Findings from earlier phases were consolidated into a comprehensive evidence base to guide a multi-stakeholder co-design workshop, which brought together stakeholders from across the AV ecosystem (union, operator, and government representatives) to ensure that diverse perspectives were represented in shaping the workforce transition. The workshop involved 31 participants, drawn from the same stakeholder groups as the sector

⁶ These numbers reflected a rough percentage distribution representation of all three groups in the existing driver population, as reported in the Annual Vehicle Statistics 2024: Motor Vehicle Population by Vehicle Type (Land Transport Authority, 2025a) which recorded 13,117 licensed taxi drivers and 59,371 licensed PHV drivers in 2024, alongside an estimated 9,500 bus captains as cited by The Straits Times (Chelvan, 2025). The population distribution is approximately 16% taxi drivers, 72% PHV drivers and 12% bus captains.

engagement focus group across driver, operator, training provider and government representatives (Figure 35).

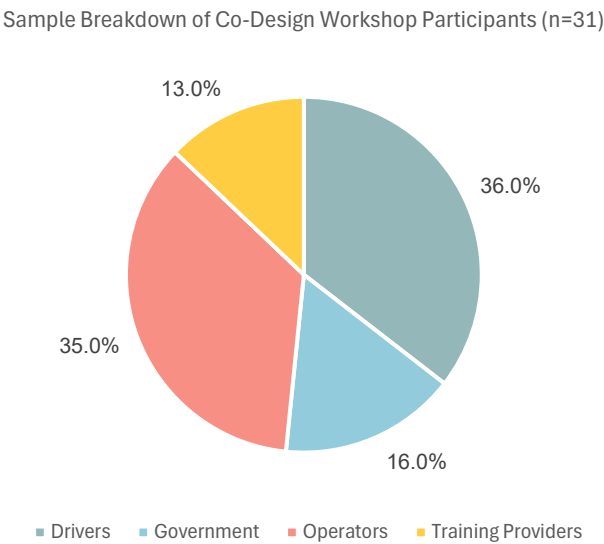


Figure 35: Sample Breakdown of Co-Design Workshop Participants

The co-design workshop served two main purposes: first, to identify key gaps in skills and institutional support; and second, to co-develop a set of worker transition profiles that capture varying levels of vulnerability, readiness, and opportunities within the taxi, PHV, and public bus driving workforce. Building on these insights, participants collaboratively discussed targeted AV transition pathways, reskilling initiatives, and job redesign strategies that are both responsive to the practical needs of drivers and feasible within institutional and policy frameworks. At the conclusion of this phase, workshop outputs were consolidated and integrated into the final analysis, forming the basis for the recommendations presented in this report.

Annex B: Summary of Driver Types and Readiness Profiles

PHV Drivers

Transition Profile:
Demonstrate relatively high self-initiated readiness through proactive career planning and skills exploration but lack structured institutional support to transition.

Constraints & Barriers:
High levels of income insecurity and job loss concerns due to the precarious nature of platform work and lack of access to training and upskilling resources.

Support Priorities:

- Financial assistance and income protection during career transitions
- Paid time off for training and upskilling
- Flexible upskilling and employment pathways (e.g. fractional or part-time work opportunities) that align with non-linear work patterns

Taxi Drivers

Transition Profile:
Showcase moderate transition readiness, with awareness of the transition and some proactive preparation.

Constraints & Barriers:
Participation in training and upskilling remains limited due to structural barriers (e.g. time and financial constraints). Most likely to consider exiting the sector or transitioning into non-driving, non-AV-related roles.

Support Priorities:

- Financial assistance and income protection during career transitions
- Paid time off for training and upskilling
- Clearly defined career conversion pathways into adjacent occupations within and outside the transport sector

Bus Captains

Transition Profile:
Most transition-ready and institutionally supported group with strongest intention to remain in the sector. However, it is mostly driven by employer-led information rather than self-initiated efforts.

Constraints & Barriers:
Less concerned about immediate job displacement but attentive to longer-term issues such as remuneration structure, job redesign and evolving skill requirements.

Support Priorities:

- Paid time off for training and upskilling
- Greater work-life flexibility to accommodate family and caregiving responsibilities
- Continued career development opportunities to support progression into future driving-related or supervisory roles

PHV Drivers: Concerns, Barriers, Support Needs

Concerned Observers (24.2%)		Cautious Adapters (62.3%)			Confident Champions (13.6%)	
Low Awareness, Low Information	Low Awareness, Low Information	Low Awareness, High Information	Medium Awareness, Low Information	High Awareness, High Information	Medium Awareness, Low Information	Low Awareness, High Information
137 (24.2%)	95 (16.8%)	43 (7.6%)	171 (30.2%)	44 (7.8%)	52 (9.2%)	25 (4.4%)

Concerns

- Loss of income or work due to automation (87.7%)
- Worries about job security and income (85.9%)
- Concerns about work conditions/flexibility in new AV-related jobs (52.4%)

Barriers to Training

- Loss of income during training (78.7%)
- Lack of time due to work schedule (67.2%)
- Cost of the training programme (48.3%)

Preferred Support Needs

- Financial support or time off to attend training (63.5%)
- Assurance of stable income during periods of change (57.3%)
- Job matching/redeployment (35.1%)

Taxi Drivers: Concerns, Barriers, Support Needs

Concerned Observers (12.2%)		Cautious Adapters (66.7%)			Confident Champions (21.1%)	
Low Awareness, Low Information	Low Awareness, Low Information	Low Awareness, High Information	Medium Awareness, Low Information	High Awareness, High Information	Medium Awareness, Low Information	Low Awareness, High Information
15 (12.2%)	12 (9.8%)	16 (13.0%)	37 (30.1%)	17 (13.8%)	17 (13.8%)	9 (7.3%)

Concerns

- Worries about job security and income (84.6%)
- Loss of income or work due to automation (82.9%)
- Concerns about work conditions/flexibility in new AV-related jobs (51.2%)

Barriers to Training

- Lack of time due to work schedule (74.0%)
- Loss of income during training (73.2%)
- Cost of the training programme (38.2%)

Preferred Support Needs

- Financial support or time off to attend training (48.8%)
- Assurance of stable income during periods of change (47.2%)
- Job matching/redeployment (35.0%)

Bus Captains: Concerns, Barriers, Support Needs

Concerned Observers (7.0%)	Cautious Adapters (60.2%)				Confident Champions (32.8%)	
Low Awareness, Low Information	Low Awareness, Low Information	Low Awareness, High Information	Medium Awareness, Low Information	High Awareness, High Information	Medium Awareness, Low Information	Low Awareness, High Information
9 (7.0%)	25 (19.5%)	19 (14.8%)	20 (15.6%)	13 (10.2%)	9 (7.0%)	33 (25.8%)

Concerns

- Worries about job security and income (81.2%)
- Loss of income or work due to automation (73.4%)
- Concerns about work conditions/flexibility in new AV-related jobs (61.7%)

Barriers to Training

- Lack of time due to work schedule (82.8%)
- Family or caregiving responsibilities (44.5%)
- Loss of income during training (42.2%)

Preferred Support Needs

- Assurance of stable income during periods of change (57.0%)
- Improved work-life balance (45.3%)
- Financial support or time off to attend training (45.3%)



Annex C: Landscape Review Findings

Current State of AV Deployment

This section covers a condensed version of our review of global and local research aimed at identifying research gaps, key lessons and best practices related to AV-driven labour transitions. Key insights and best practices were distilled from current research on managing AI-driven labour transitions.

Global Trends

Early adoption of AVs for public use can be seen worldwide in various industries such as public transportation and ride hailing. The potential for driverless technology and the adoption of AVs is huge and is set to expand rapidly in the next few years, transforming how people understand mobility and reshaping urban life (Gavanas, 2019; Milakis et al., 2017). Consequently, AVs are projected to play a pivotal role in shaping the development of smart cities and future transportation systems (Nikitas et al., 2017).

China and the United States are poised to lead the global deployment of robotaxis—fully autonomous taxis with no human drivers—within the ride-share and public transportation sectors. Large-scale fleets are projected to operate in 40 to 80 cities by 2035 (World Economic Forum, 2025). In the U.S., the number of robotaxis is expected to grow more than twentyfold, rising from 1,500 to 35,000 units by 2030 (Goldman Sachs, 2025). Meanwhile, China has already seen widespread adoption with 2,300 robotaxis currently operating in 30 cities (Liu, 2025).

While not as extensively adopted as in China, key players in other Asian countries such as Japan and Singapore have been actively conducting AV trials for several years. In Japan, for example, plans have been unveiled for an autonomous ridesharing service to address manpower shortage of taxi drivers within the nation (The Straits Times, 2024). Similarly, in the public transportation space, roboshuttles and robobuses have been deployed in China and Singapore to ply certain routes within the city (Lam, 2025; WeRide, 2025). Beyond China and the United States, Europe is emerging as the next biggest market, focusing largely on autonomous shuttle deployments, while the Middle East is positioning itself as an early adopter in the global AV landscape (World Economic Forum, 2025).

AV and Workforce Transport in Singapore

AV Development and Deployment in Singapore

Singapore has become a key testbed for various AV pilot programmes, aiming to strategically integrate AVs into the nation's public transport system as part of its broader vision to become a smart city (Land Transport Authority [LTA], n.d.; Lim & Lam, 2025). As a result, the city-state emerged as one of the first few nations ready for AV adoption, in a 2019 KPMG Autonomous Vehicle Readiness Index. AV trials have been conducted since the 2010s, including the public trials of self-driving cars in 2016 and the first on-demand autonomous shuttle trial tested on public roads (Grab, 2016; ST Engineering, 2019). Since then, various autonomous shuttles have been trialled in Singapore, ranging from a

13-seater roboshuttle that shuttles students and staff to an airport shuttle for airport workers (SATS, 2024).

In 2025, following the successful completion of numerous trips, Southeast Asia's first robobus without a safety operator on board was launched at Resorts World Sentosa (WeRide, 2025). This milestone built on Singapore's growing experience with AV deployment and marked another step forward in public transport innovation. The rollout of autonomous shuttles and buses has since gained momentum, with a new autonomous shuttle service slated to launch in Punggol in the second quarter of 2026 (Liam, 2025). Grab and WeRide will operate two routes and one route respectively within Punggol, providing residents with first-mile-last-mile connectivity to key amenities and transport hubs (LTA, 2025)—aligned with long term plans to integrate alternative transport modes into the city's public transport system. Autonomous shuttles are currently more prevalent than autonomous buses due to their smaller seating capacity (Chelvan, 2025a).

On Labour Implications

As Nikitas et al. (2021) point out, the future of AV extends beyond technological advancements, reflecting and affecting broader legal, ethical, educational and economic dimensions of society. Subsequently, considerable effort must be made in exploring the impacts of these broader dimensions in relation to AV deployment in Singapore.

Susskind (2020) cautions that advancements in technology may render human labour obsolete, leading to “structural-technical unemployment”—a persistent state in which the labour market fails to provide adequate employment opportunities to meet the demand. The adverse effects of automation might lead to downward social mobility where workers are either downgraded within their current roles or transitioned to lower-tier positions in other industries (Nissim & Simon, 2021). Crucially, these displaced workers may struggle to transition into new industries, as reskilling and upskilling often demand significant time and money—resources they may lack (Nissim & Simon, 2021).

At present, majority of research on AVs centres on the technology, infrastructure, safety, efficiency and user perspectives, while the broader labour implications for workers—both globally and within Singapore—remain largely overlooked and underexamined (Frisoni et al., 2016; Pande & Taeihagh, 2023; Waring et al., 2020). Dubljević et al. (2022) note that previous studies largely prioritise expert opinions, often overlooking the lived experiences of drivers who are most likely to be affected by AV deployment—resulting in a significant gap in the literature.

Workforce Perceptions and Readiness Towards AV Adoption

A study on the workplace impact of AI and AV technologies revealed a disconnect between policy intentions and industry readiness, highlighting concerns about a skills gap needed in the transition to a more AV oriented workforce (Waring et al., 2020). This aligns with Pettigrew et al. (2018) who emphasise the necessity of labour market planning that accounts for the effects on both adjacent and non-driving occupations, especially for vulnerable groups. It is increasingly vital for employers and the government to engage with and prepare workers who may be affected by AV deployment, ensuring they understand its implications for workforce and the industry, and processes in place to support a smooth transition (Pettigrew et al., 2018). Concerns have emerged regarding career prospects and the perception that driving jobs are easily replaced—fuelling a broader sense of job devaluation (Dubljević et al., 2022; Pettigrew et al., 2018). More

specifically, Dubljević et al. (2022) found that drivers expressed concerns about their feedback being excluded from all stages of public policy implementation in the transition to integrate AVs as part of the transport system.

Consequently, while concerns regarding job displacement and career prospects have been studied, concrete labour policies and strategies to enable fair, inclusive and locally relevant workforce transitions remain lacking (Wang et al., 2023). There has been no comprehensive study conducted in Singapore on the impact of AV technology on transport workers' career pathways in the transport sector.

Reskilling and Redeployment Opportunities

Mass automation is expected to result in job displacement especially in driving-related professions where AV technologies can account for workforce shortage while improving efficiencies (Petersen et al., 2023), raising concerns about career progression and unemployment. At present, there are more than 60,000 taxi and PHV drivers and around 10,000 public bus drivers in Singapore (KPMG, 2021). The introduction of AV technologies will consequently see a significant impact on these drivers, with vehicle operations identified as one of the key skillsets affected (KPMG, 2021).

Nonetheless, certain groups of drivers are anticipated to be more at risk than others, highlighting the need for targeted support measures. Yankelevich et al. (2018) note that AV adoption is likely to disproportionately affect drivers with lower educational attainment, whereas those who are better educated or possess technical skills may benefit from new opportunities. Additionally, workers in driving-related professions often have fewer transferable skills, making it more difficult for them to pivot to other job roles (Yankelevich et al., 2018).

Apart from education level, older workers face a greater risk of being displaced. Singapore is currently experiencing an ageing workforce in the transport sector, whereby a majority of public bus drivers and taxi drivers are aged 55 and above in addition to declining replacement rates (KPMG, 2021). In contrast, PHV drivers tend to be the youngest among the three groups, where PHV is viewed as a transitional job or a flexible option that aligns with one's lifestyle choices. Consequently, it is crucial to consider several training and reskilling pathways to successfully transition workers into new roles or sectors. This can include initiatives for ongoing professional development or skills upgrading, aimed at equipping individuals with new skillsets to bridge the gap between their current roles and new responsibilities (Costello, 2017). Beyond skills upgrading, Wang et al. (2023) also emphasise the need for organisational and governmental support, such as unemployment benefits and financial assistance (in particular for older workers).

While the deployment of AVs will result in the displacement of certain roles and functions, it is also anticipated that new roles will emerge within these sectors (Spencer, 2018). KPMG's land transport jobs and workforce study (2021), for one, expected six new job roles to emerge across the Electric Vehicle (EV) and AV sectors, which include Data Analyst, EV Technician, Charging Infrastructure Electrician, AV Onboard Safety Operator, AV Maintenance Technician, AV Fleet Manager. However, while all six roles will impact the transport sector, only two—AV Onboard Safety Operator and AV Fleet Manager—are directly linked to traditional driving roles. The role of an AV Onboard Safety Operator will focus on customer service, service reliability and passenger safety while that of an AV Fleet Manager will be to perform remote diagnostics of potential AV fleet issues, in addition to route planning (KPMG, 2021).

It is also encouraging to note that the role of technology, while seen as a factor for job displacement, can also be seen as a job leveller. Costello (2017) highlights how technology such as automated features can help in assisting older drivers—enabling them to remain in their roles longer, without the immediate concern of job displacement. Additionally, drivers can also make use of their experience in service excellence, crisis management and workplace safety management to transition into more customer service or operations-oriented roles. While there are opportunities for reskilling and redeployment into adjacent roles for taxi drivers, PHV drivers, and public bus drivers, there is still a gap in understanding drivers' attitudes and concerns, as well as in ensuring availability of suitable jobs and structured career transition pathways so that affected drivers are not left behind.

Lessons and Best Practices for Managing Labour Transitions

Changing Role of Unions and Present Challenges

Scholars underscore the critical role of unions in advocating for worker interests and voices which can lead to a positive transition for affected workers (Nissim & Simon 2021)—playing an instrumental role in the design of an emerging new AI-driven labour market, which currently lacks adequate worker representation. Nissim and Simon's (2021) study on the future of labour unions in the face of automation and AI highlight key areas that unions can focus on such as (i) advocating for employee health, safety and ethics, (ii) managing dignified retirement, and (iii) facilitating reskilling and upskilling.

For instance in reskilling and upskilling, unions can partner with organisations and governments to create programmes that can help build skills and ease the transition into new roles or industries for these workers. Hyman (2007) also highlights that for unions to remain relevant, they must adopt strategic approaches and present themselves as learning organisations that support worker development. In the case of Singapore, the government, working in tandem with organisations and NTUC regularly advocate for worker reskilling and upskilling through initiatives such as SkillsFuture—providing Singapore citizens with credits to take part in various government-funded training courses to upgrade or acquire new skills (SkillsFuture, n.d.). More recently, a collaboration between transport operator SMRT, NTUC, and the National Transport Workers Union was initiated to upskill workers technologically in a bid to improve the safety and reliability of bus and rail systems (Loi, 2025).

Advancing Tripartite Collaboration for Autonomous Transition

Pettigrew et al. (2018) emphasise the importance of clear communication from governments and employers to workers regarding the anticipated roll-out of AVs, expected changes, individual and industry-level impacts, and the measures in place to manage the transition and minimise anxiety linked with job insecurity. Achieving a just transition will require strategic collaboration among key stakeholders—making it timely for unions to partner with organisations and governments to conceptualise, plan, and implement supportive measures (Bratanova et al., 2026; Pettigrew et al., 2018; Schrotten et al., 2020).

In their 2025 study on just technological transitions, Pronello and Fedeli examined the global social impacts of digitalisation and automation on the transport workforce,

advocating for policies grounded in a participatory approach that actively involves both stakeholders and workers. The authors highlighted four key areas for intervention: continuous skill development, smart employment regulations, preventive labour market policies, and social dialogue—forming the foundation of a policy agenda built on a framework of 11 interconnected policies. Several policies were introduced to promote strong union participation, including the formation of joint bilateral committees aimed at fostering effective collaboration between unions and the organisation. Other policy recommendations include appointing a dedicated company-level role to address matters related to wage restructuring, working hours, and conditions, as well as introducing a system to incentivise both workers and organisations that develop structured skills plans for reskilling, upskilling, and lifelong learning.

Consequently, through encapsulating a stakeholders' approach, comprising investors, managers, workers, consumers, the local community, public health, the environment and others, this endorses a broader and more holistic perspective which does not focus on just shareholder revenue as the main goal of the corporation (Nissim & Simon, 2021). Collins (2018) holds the view that unions should draw out the human aspect and the contribution that workers make to the labour market, in contrast to viewing workers as disposable in a bid to cut labour costs.

Conclusion

Human labour can be seen as complementary to AI, resulting in a smarter, safer and more efficient transportation system. Tripartite collaboration among unions, platform operators, and the government will therefore remain crucial to ensuring that workers are supported through the transition and that their interests are represented as AVs are progressively deployed. Drawing on the approaches discussed above, key areas for tripartite collaboration include:

- Preventive labour market policies i.e. measures in place to manage the transition and minimise anxiety linked with job insecurity while advocating for employee health, safety and ethics.
- Facilitating reskilling and upskilling and continuous learning i.e. targeted initiatives specifically designed to support potential drivers affected by AV deployment in transitioning to adjacent roles or new industries.
- Ongoing social dialogue to amplify workers' voices and exchange of information across organisations and across borders which includes clear communication from governments and employers to workers regarding the anticipated roll-out of AVs, expected changes, individual and industry-level impacts.
- Inclusion of a strong union participation, including the formation of joint bilateral committees aimed at fostering effective collaboration between unions and the organisation.

References

- Bratanova, A., Mason, C., Evans, D., Schleiger, E., Grimberg, E., Walker, G., Pham, H., & Bulled, K. (2026). Truck drivers and automation: A methodology for identifying and supporting workforce transition in the Australian road freight sector. *Transport Policy*, 176, 103907. <https://doi.org/10.1016/j.tranpol.2025.103907>
- Bredgaard, T., Larsen, F., & Madsen, P. K. (2008). Flexicurity: In Pursuit of a Moving Target. *European Journal of Social Security*, 10(4), 305-323.
- Business Wire. (2021, March 1). *Venti Technologies to provide autonomous prime movers for PSA Corporation Limited in Singapore*. <https://www.businesswire.com/news/home/20210301005013/en/Venti-Technologies-to-Provide-Autonomous-Prime-Movers-for-PSA-Corporation-Limited-in-Singapore>
- Chelvan, V. P. (2025a, February 20). *Self-driving public buses to be tested from mid-2026 on service 191 and 400 as part of trial*. The Straits Times. <https://www.straitstimes.com/singapore/transport/self-driving-buses-to-be-tested-from-mid-2026-on-public-bus-routes-around-marina-bay-one-north>
- Chelvan, V. P. (2025b, March 05). *Task force recommends capping run times, extending drivers' meal breaks to improve bus safety*. The Straits Times. <https://www.straitstimes.com/singapore/politics/task-force-recommends-capping-run-times-extending-drivers-meal-breaks-to-improve-bus-safety>
- Chelvan, V. P. & Hamzah, A. (2026, July 09). *Cabbies, private-hire drivers welcome support package, but salaries, job flexibility are key concerns*. The Straits Times. <https://www.straitstimes.com/singapore/transport/cabbies-and-private-hire-drivers-welcome-support-package-but-salaries-job-flexibility-are-key>
- Chng, S., & Cheah, L. (2020). Understanding autonomous road public transport acceptance: A study of Singapore. *Sustainability*, 12(12), 4974. <https://doi.org/10.3390/su12124974>
- Collins, H. (2018). *Artificial intelligence: Against humanity's surrender to computers*. Polity Press.
- Costello, B. (2017). *Truck driver shortage analysis 2017*. American Trucking Associations.
- Dahl, G. B., Løken, K. V., & Mogstad, M. (2014). Peer effects in program participation. *American Economic Review*, 104(7), 2049–2074. [10.1257/aer.104.7.2049](https://doi.org/10.1257/aer.104.7.2049)
- Dawson, N., Williams, M.-A., & Rizoïu, M.-A. (2021). Skill-driven recommendations for job transition pathways. *PLOS ONE*, 16(8), e0254722. <https://doi.org/10.1371/journal.pone.0254722>
- Dubljević, V., Douglas, S., Milojevich, J., Ajmeri, N., Bauer, W. A., List, G., & Singh, M. P. (2022). Moral and social ramifications of autonomous vehicles: A qualitative study of the perceptions of professional drivers. *Behaviour & Information Technology*, 42(9), 1271–1278. <https://doi.org/10.1080/0144929X.2022.2070078>

- European Parliament & Council of the European Union. (2024). *Directive (EU) 2024/2831 of the European Parliament and of the Council of 23 October 2024 on improving working conditions in platform work*. Official Journal of the European Union, L, 2024/2831. <https://eur-lex.europa.eu/eli/dir/2024/2831/oj/eng>
- European Transport Workers' Federation (n.d.). *No automation and digitalisation without negotiation*. ETF. <https://www.etf-europe.org/activity/no-automation-and-digitalisation-without-negotiation/>
- Federal Transit Administration. (n.d.). *Workforce development initiative*. U.S. Department of Transportation. Retrieved on 2026, August 12, from: <https://www.transit.dot.gov/research-innovation/workforce-development-initiative>
- Frisoni, R., Dall'Oglio, A., Nelson, C., Long, J., Vollath, C., Ranghetti, D., & McMinimy, S. (2016). *Research for TRAN Committee – Self-piloted cars: The future of road transport?* (IPOL_STU(2016)573434). Policy Department B: Structural and Cohesion Policies, European Parliament. https://www.europarl.europa.eu/RegData/etudes/STUD/2016/573434/IPOL_STU%282016%29573434_EN.pdf
- Gavanas, N. (2019). Autonomous road vehicles: Challenges for urban planning in European cities. *Urban Science*, 3(2), 61. <https://doi.org/10.3390/urbansci3020061>
- Goldman Sachs. (2025, July 3). *The autonomous vehicle market is forecast to grow and boost ridesharing presence*. <https://www.goldmansachs.com/insights/articles/autonomous-vehicle-market-forecast-to-grow-ridesharing-presence>
- Grab Holdings Limited. (2016, September 23). *nuTonomy and Grab launch partnership to expand public trial of on-demand self-driving car service in Singapore*. <https://www.grab.com/sq/press/tech-product/nuTonomy-grab-launch-partnership-expand-public-trial-demand-self-driving-car-service-singapore/>
- Grab Holdings Limited. (2025, July 8). *Grab and A2Z pilot autonomous shuttle bus in Singapore*. <https://www.grab.com/sq/press/others/grab-and-a2z-pilot-autonomous-shuttle-bus-in-singapore/>
- Hoque, K., & Bacon, N. (2011). Assessing the impact of Union Learning Representatives on training: evidence from a matched sample of ULRs and managers. *Work, Employment and Society*, 25(2), 218-233.
- Hyman, R. (2007). How can trade unions act strategically? *Transfer: European Review of Labour and Research*, 13(2), 193–210. <https://doi.org/10.1177/102425890701300204>
- Hyman, B., Kovak, B. & Leive, A. (2024). Wage Insurance for Displaced Workers. NBER Working Paper No. 32464. <https://doi.org/10.3386/w32464>
- International Transport Forum. (2023). *Adapting (to) automation: Transport workforce in transition*, International Transport Forum Policy Papers, No. 122, OECD Publishing, Paris.

- Kok, Y. (2025, September 20). *First self-driving shuttles launched in Punggol; passenger service to start in 2026*. *The Straits Times*. <https://www.straitstimes.com/singapore/transport/first-self-driving-shuttles-launched-in-punggol-passenger-service-to-start-in-2026>
- KPMG. (2019). *2019 autonomous vehicles readiness index*. <https://assets.kpmg.com/content/dam/kpmg/xx/pdf/2019/02/2019-autonomous-vehicles-readiness-index.pdf>
- KPMG. (2021). *Land transport job & workforce study*. https://www.lta.gov.sg/content/dam/ltagov/industry_innovations/industry_transformation_map/Land_Transport_JTM/Workforce%20Study_MOM.pdf
- Lam, N. (2025, May 16). *Adoption of autonomous vehicles is one race Singapore is not keen on winning*. CNA. <https://www.channelnewsasia.com/today/big-read/big-read-self-driving-vehicles-5116971>
- Land Transport Authority (2025a). *Annual Vehicle Statistics 2024: Motor Vehicle Population by Vehicle Type (MVP 01-1)*. Singapore: Land Transport Authority. https://www.lta.gov.sg/content/dam/ltagov/who_we_are/statistics_and_publications/statistics/pdf/MVP01-1_MVP_by_type.pdf
- Land Transport Authority. (2025b, October 2). *LTA awards contract for the pilot deployment of autonomous buses on two public bus services*. https://www.lta.gov.sg/content/ltagov/en/newsroom/2025/10/news-releases/lta_wards_contract_pilot_deployment_autonomous_buses.html
- Land Transport Authority. (2025c, September 20). *New autonomous shuttle services to be progressively deployed in Punggol*. <https://www.lta.gov.sg/content/ltagov/en/newsroom/2025/9/news-releases/new-autonomous-shuttle-services-to-be-progressively-deployed-in-.html>
- Land Transport Authority. (2026, February 25). *Autonomous vehicles*. Land Transport Authority. Retrieved August 12, 2026 from: https://www.lta.gov.sg/content/ltagov/en/industry_innovations/technologies/autonomous_vehicles.html
- Lane, M., Conlon, G., Peycheva, V., Mantovani, I., & Chan, S. (2017). *An economic evaluation of the National Careers Service*. Department for Education. London Economics.
- Liam, E. (2025, September 20). *First autonomous shuttle service in Punggol to open to public by second quarter of 2026*. CNA. <https://www.channelnewsasia.com/singapore/first-autonomous-shuttle-services-punggol-grab-comfortdelgro-5357911>
- Lim, C., & Lam, K. (2025, July 1). *Autonomous vehicle operators eye expansion amid Singapore's driverless push*. CNA. <https://www.channelnewsasia.com/singapore/autonomous-vehicles-driverless-buses-operators-eye-expansion-5213056>
- Liu, Y.-L. (2025, August 12). *China's vision for a driverless future is miles ahead of everyone else's*. Rest of World. <https://restofworld.org/2025/china-ai-powered-self-driving-cars/>

- Loi, E. (2025, November 6). *SMRT, NTUC partner to upskill 200 contractors with AI*. The Straits Times.
- Milakis, D., van Arem, B., & van Wee, B. (2017). Policy and society related implications of automated driving: A review of literature and directions for future research. *Journal of Intelligent Transportation Systems*, 21(4), 324–348. <https://doi.org/10.1080/15472450.2017.1291351>
- Ministry of Manpower. (2025, June 3). Chart: Training indicators. <https://stats.mom.gov.sg/Pages/Training-Indicators-Chart.aspx>
- Ministry of Transport. (2026, July 7). *More options for taxi and private hire car drivers as Singapore prepares for the future of mobility*. <https://www.mot.gov.sg/news-resources/newsroom/-more-options-for-taxi-and-private-hire-car-drivers-as-singapore-prepares-for-the-future-of-mobility/>
- Nikitas, A., Kougias, I., Alyavina, E., & Njoya Tchouamou, E. (2017). How can autonomous and connected vehicles, electromobility, BRT, Hyperloop, shared use mobility and mobility-as-a-service shape transport futures for the context of smart cities? *Urban Science*, 1(4), 36. <https://doi.org/10.3390/urbansci1040036>
- Nikitas, A., Vitel, A.-E., & Cotet, C. (2021). Autonomous vehicles and employment: An urban futures revolution or catastrophe? *Cities*, 114, 103203. <https://doi.org/10.1016/j.cities.2021.103203>
- Nissim, G., & Simon, T. (2021). The future of labor unions in the age of automation and at the dawn of AI. *Technology in Society*, 67, 101732. <https://doi.org/10.1016/j.techsoc.2021.101732>
- OECD (2023), *Evaluation of Active Labour Market Policies in Finland, Connecting People with Jobs*, OECD Publishing, Paris, <https://doi.org/10.1787/115b186e-en>.
- Oei, P. Y., Brauers, H., & Herpich, P. (2020). Lessons from Germany's hard coal mining phase-out: policies and transition from 1950 to 2018. *Climate Policy*, 20(8), 963–979. <https://doi.org/10.1080/14693062.2019.1688636>
- Pande, D., & Taeihagh, A. (2023). Navigating the governance challenges of disruptive technologies: Insights from regulation of autonomous systems in Singapore. *Journal of Economic Policy Reform*, 26(3), 298–319. <https://doi.org/10.1080/17487870.2023.2197599>
- Petersen, B. K., Chowhan, J., Cooke, G. B., Gosine, R., & Warrian, P. J. (2023). Automation and the future of work: An intersectional study of the role of human capital, income, gender and visible minority status. *Economic and Industrial Democracy*, 44(3), 703–727. <https://doi.org/10.1177/0143831X221088301>
- Pettigrew, S., Fritschi, L., & Norman, R. (2018). The potential implications of autonomous vehicles in and around the workplace. *International Journal of Environmental Research and Public Health*, 15(9), 1876. <https://doi.org/10.3390/ijerph15091876>
- Pronello, C., & Fedeli, E. (2025). Just technology transition: A policy agenda to minimise the social impacts of digitalisation and automation on the transport workforce. *Transportation Research Interdisciplinary Perspectives*, 34, 101670. <https://doi.org/10.1016/j.trip.2025.101670>

- SATS Ltd. (2024, July 17). *SATS, SIA Engineering Company and Changi Airport Group enter into MoU to trial autonomous buses at Changi Airport.*
- Schroten, A., van Grinsven, A., Tol, E., Leestemaker, L., Schackmann, P.-P., Vonk-Noordegraaf, D., van Meijeren, J., & Kalisvaart, S. (2020). *Research for TRAN Committee – The impact of emerging technologies on the transport system* (IPOL_STU(2020)652226). European Parliament. https://www.europarl.europa.eu/RegData/etudes/STUD/2020/652226/IPOL_STU%282020%29652226_EN.pdf
- ScienceDaily (2014, October 26). *First driverless vehicles for public launched in Singapore,* ResearchSEA. <https://www.sciencedaily.com/releases/2014/10/141021100959.htm>
- SkillsFuture Singapore. (n.d.). *Our SkillsFuture story: Empowering every Singaporean to build future-ready skills for fulfilling careers.* <https://www.skillsfuture.gov.sg/>
- Singapore-MIT Alliance for Research and Technology. (2015, October 12). *SMART-NUS driverless car trials launched at one-north.* <https://smart.mit.edu/post/smart-nus-driverless-car-trials-launched-at-one-north>
- Spencer, D. A. (2018). Fear and hope in an age of mass automation: Debating the future of work. *New Technology, Work and Employment*, 33(1), 1–12. <https://doi.org/10.1111/ntwe.12105>
- ST Engineering. (2019, August 20). *First on-demand autonomous shuttle trial opens to public.* ST Engineering. <https://www.stengg.com/en/newsroom/news-releases/first-on-demand-autonomous-shuttle-trial-opens-to-public/>
- Susskind, D. (2020). *A world without work: Technology, automation and how we should respond.* Penguin.
- The Straits Times. (2024, August 27). *Japan to launch self-driving electric taxi service in Tokyo.* <https://www.straitstimes.com/asia/east-asia/japan-to-launch-hands-free-self-driving-ev-taxi-service-in-tokyo>
- The Treasury. (2023). *Working Future: The Australian Government's White Paper on Jobs and Opportunities* [White Paper]. Australian Government.
- Tjoe, L. N. (2025, July 9). *Grab to trial driverless shuttle for staff between Media Circle Office and one-north MRT station.* The Straits Times. <https://www.straitstimes.com/singapore/transport/grab-to-trial-driverless-shuttle-for-staff-between-media-circle-office-and-one-north-mrt-station>
- Van Fossen, J. A., Chang, C.-H., Ford, J. K., Mack, E. A., & Cotten, S. R. (2023). Identifying alternative occupations for truck drivers displaced due to autonomous vehicles by leveraging the O*NET database. *American Behavioral Scientist*, 67(14), 1693–1715. <https://doi.org/10.1177/00027642221127239>
- Wang, S., Mack, E. A., Van Fossen, J. A., Medwid, L., Cotten, S. R., Chang, C.-H., Mann, J., Miller, S. R., Savolainen, P. T., & Baker, N. (2023). Assessing alternative occupations for truck drivers in an emerging era of autonomous vehicles. *Transportation Research Interdisciplinary Perspectives*, 19, 100793. <https://doi.org/10.1016/j.trip.2023.100793>

- Waring, P., Bali, A., & Vas, C. (2020). The fourth industrial revolution and labour market regulation in Singapore. *The Economic and Labour Relations Review*, 31(3), 347–363. <https://doi.org/10.1177/1035304620941272>
- WeRide. (2024, November 20). *WeRide robosweepers enter Marina Bay, marking Singapore's first commercial autonomous sanitation project*. <https://www.weride.ai/posts/x59h568dqk39hodw6ik9x3qf>
- WeRide. (2025, July 17). *WeRide launches Southeast Asia's first fully driverless Robobus operations at Resorts World Sentosa, Singapore*. <https://ir.weride.ai/news-releases/news-release-details/weride-launches-southeast-asias-first-fully-driverless-robobus>
- WILLERS Pte. Ltd. (2020, December 3). *Launch of autonomous vehicle at Jurong Lake Garden*. WILLERS. <https://willers.com.sg/Events/Details/6/npark-av>
- Winter, K., Wien, J., Molin, E., Cats, O., Morsink, P., & van Arem, B. (2019). Taking the self-driving bus: A passenger choice experiment. In *2019 6th International Conference on Models and Technologies for Intelligent Transportation Systems (MT-ITS)* (pp. 1–8). IEEE. <https://doi.org/10.1109/MTITS.2019.8883310>
- Workforce Singapore (WSG). (n.d.). *Annex A: Factsheet on Career & Skills Passport, Celebrating a Decade of Empowering Singaporeans to Upskill and Reskill, and Advance in Their Careers*. Singapore: Workforce Singapore. World Economic Forum. (2025, April). *Autonomous vehicles: Timeline and roadmap ahead* [White paper]. https://reports.weforum.org/docs/WEF_Autonomous_Vehicles_2025.pdf
- Yankelevich, A., Rikard, R. V., Kadylak, T., Hall, M. J., Mack, E. A., Verboncoeur, J. P., & Cotton, S. R. (2018). *Preparing the Workforce for Automated Vehicles*. <https://comartsci.msu.edu/sites/default/files/documents/MSU-TTI-Preparing-Workforce-for-AVs-and-Truck-Platooning-Reports%20.pdf>
- Yong, C. (2021, January 26). *Pay to ride on driverless buses in two areas*. The Straits Times. <https://www.straitstimes.com/singapore/pay-to-ride-on-driverless-buses-in-two-areas>

Research Project Team

National Trades Union Congress

1. Mr Patrick Tay
Director, Strategy
2. Ms Jean See
Director (Designate), Strategy
3. Mr Shawn Seah
Deputy Director, Strategy
4. Ms Pamela Phang
Senior Executive, Strategy
5. Mr Hariharan Nair
Manager, Strategy

Singapore University of Technology and Design

1. Dr Samuel Chng
Research Assistant Professor, Lee Kuan Yew Centre for Innovative Cities
2. Dr Suhaila Zainal Shah
Research Fellow, Lee Kuan Yew Centre for Innovative Cities
3. Dr Sarah Chan
Research Fellow, Lee Kuan Yew Centre for Innovative Cities
4. Ms Ethel Wee
Senior Research Assistant, Lee Kuan Yew Centre for Innovative Cities
5. Ms Oyunbileg Bazar
Research Assistant, Lee Kuan Yew Centre for Innovative Cities

**Every
Worker
Matters**



National Trades Union Congress

NTUC Centre

1 Marina Boulevard Level 10

One Marina Boulevard

Singapore 018989

Tel: +65 6213 8000

Fax: +65 6327 8800

www.ntuc.org.sg