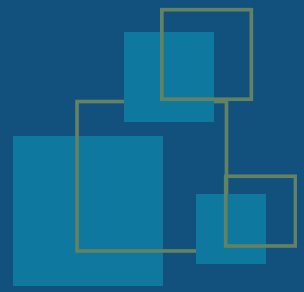


WORK HEALTH AND SAFETY RESEARCH HORIZON SCAN, SCOPING REVIEW AND EVIDENCE GAP MAPPING PROJECT



Scoping review and case study findings: Changing nature of work

A report prepared for Safe Work Australia



About this project

This project was commissioned by Safe Work Australia, and it maps the existing landscape of work health and safety and workers' compensation research across the five Safe Work Australia *Research and Evaluation Strategy* initial priority areas to provide a data driven understanding of the current evidence base, gaps, and emerging research areas.

This report was developed with guidance from an Expert Working Group of experts from across work health and safety research and related areas. The Academy of the Social Sciences in Australia and the Australian Academy of Technological Sciences and Engineering gratefully acknowledges the Expert Working Group for their contributions.

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Introduction

This report is part of a series of five reports presenting the consolidated findings from a scoping literature review, horizon scan, and evidence gap mapping undertaken by the Academy of the Social Sciences in Australia for Safe Work Australia (SWA) as part of the 2025 Horizon Scan & Evidence Gap Mapping Project. Each report in the series focuses on one of five research priority areas from SWA's *Research and Evaluation Strategy*, supported by a case study looking into a known and related driver of change for Work Health and Safety (WHS) in Australia over the coming decade.

The purpose of the project is to ensure future research development, policy and regulatory decisions are evidence informed. To achieve this, each report brings together the results from three integrated research methods. A scoping literature review that maps the depth, breadth and characteristics of Australian WHS and workers' compensation research for a research priority area, a horizon scan which, using a case-study based approach, evaluates research related to a known driver of change to examine how it is manifesting in relation to WHS research, and an evidence gap mapping that integrates insights from the scoping literature review and the horizon scan to show where the evidence is absent, sparse, or misaligned between the evidence base, priority area and case study.

Together, these methods help us understand what evidence currently exists, how it is distributed across research priority areas and case studies, and how well positioned the Australian research evidence base is to respond to future WHS challenges. The following sections present a summary of key findings that integrates insights from the scoping literature review, horizon scan, and evidence gap mapping. The remainder of the report then unpacks these findings in detail.

Research Priority Area	Case Study	
P1: Psychosocial harm prevention and recovery	C1: Psychological injury and increasing time off work	
P2: Advances in technology	C2: GenAI and work design	
P3: Shifting mindsets around WHS fundamentals	C3: Respect@Work	
P4: Effectiveness of systems and frameworks	C4: Electrification and emerging hazards	
P5: Changing nature of work	C5: Algorithmic management in gig platforms	✓

The changing nature of work

This report focuses on the research priority area of the changing nature of work identified in SWA's *Research and Evaluation Strategy*.

Research related to this priority area focuses on what evolving forms of work mean for the fit, coverage, and effectiveness of Australia's WHS and workers' compensation systems. The research seeks to understand whether existing regulatory and compensation arrangements need to adapt as work structures, employment relationships, and business models change. The priority area scope includes non-standard work arrangements such as gig work, platform work, labour hire, casualisation, and fragmented or multi-party work arrangements. It emphasises examining gaps in WHS coverage, complexity in identifying duty holders, barriers to prevention and enforcement, and inequities in access to workers' compensation and return-to-work supports.

The changing nature of work represents a defined but comparatively narrow component of the Australian WHS evidence base. The scoping review identified 157 publications within the 7,027-record dataset as directly relevant to this priority area (collectively referred to as P5). Publication output has increased over time, consistent with broader growth trends across WHS research, indicating sustained attention to evolving work arrangements.

However, taxonomy-based analysis shows that research activity is concentrated around a limited set of established topics. Terms such as on demand work, remote work, and heat stress account for a large proportion of tagged publications. These topics are typically examined through their impacts on worker health, injury and recovery, rather than through analysis of employment structure or regulatory fit.

In contrast, many taxonomy terms directly associated with fragmented, platform-mediated, or multi-party employment arrangements appear infrequently or not at all. Of the 62 priority area-specific taxonomy terms operationalised, 31 were not associated with any publication in the dataset. Concept clustering further indicates that the literature is organised around pathways linking work organisation, worker exposure, harm, and compensation response, rather than around distinct categories of emerging employment forms. Together, these findings suggest that research relevant to changing work arrangements is present, but is not widespread and focused around a small number of well-established themes.

Algorithmic management in gig platforms

The case study of algorithmic management in gig platforms (designated C5) was selected for horizon scanning to highlight the platformisation and algorithmic control of labour as a known and emerging driver of change impacting WHS in Australia over the next three to five years. Research on algorithmic management in gig platforms examines how digital labour platforms use algorithmic systems to allocate work, set performance expectations, monitor behaviour, and apply incentives or penalties to workers. Examples include food delivery and rideshare platforms where work is organised and governed through digital systems rather than human supervisors.

From a WHS and workers' compensation perspective, algorithmic management reshapes how work is designed, how risks are created or intensified, and how responsibility for those risks is distributed. Key features include real-time performance monitoring, automated task

allocation, dynamic pricing, customer rating systems, and limited transparency in decision-making processes. These features can affect work intensity, exposure to psychosocial and physical risks, and the capacity of existing WHS and compensation frameworks to identify duty holders and enforce protections.

The case study of algorithmic management in gig platforms provides a focused lens on a structurally significant and emerging driver of change. The horizon scan identified six publications within the 7,027-record dataset that directly address algorithmic management in platform-mediated work. All were published from 2022 onwards, indicating recent and emerging research attention.

Taxonomy tagging shows that gig work and on demand work are present within these records, alongside limited cross-tagging with other priority areas such as workload (represented in the psychosocial harm prevention and recovery priority area), algorithmic management (represented in the advances in technology priority area) and audits (represented in the effectiveness of systems and frameworks priority area). Topic clustering reveals a highly concentrated evidence base organised around platform governance mechanisms, driving and delivery work, fatigue and road safety outcomes. The dominant topics are linked to specific sectors and operational practices rather than broader regulatory or system-level evaluation.

Comparison with the scoping literature review indicates that while non-standard work appears within the broader dataset, algorithmic management as a mechanism of work organisation is rarely the primary object of WHS research. Where related issues arise, they are typically examined indirectly through workload, fatigue or psychosocial harm, rather than through explicit analysis of platform governance or regulatory fit. The case study functions as a targeted exploration of the priority area. It highlights how platform-mediated and algorithmically coordinated work is beginning to enter the WHS evidence base but is marginal relative to more established topics.

Evidence gap mapping

Evidence gap mapping integrates findings from the scoping review and the horizon scan to identify patterns of absence, sparsity and alignment.

At the level of absence, numerous taxonomy terms associated with contemporary and complex employment arrangements show no explicit coverage within the dataset. Terms relating to labour hire and subcontracting, complex supply chains, multiple job holding, independent contracting and regulatory complexity were not identified in titles or abstracts. This absence does not imply a complete lack of research, but indicates limited visibility of these concepts within the retrieved WHS evidence base.

Sparsity is evident in relation to both the broader priority area and the case study. Within this domain, research activity is concentrated around a small number of established topics, with limited depth across newer or structurally complex forms of work. For the case study, only six publications were identified. While this constrains our capacity to assess the impact of algorithmic management of gig work, it validates this as an emerging driver of change with the potential to impact WHS in Australia.

The primary alignment gap concerns how changing work arrangements are conceptualised within the evidence base. The scoping review literature tends to examine non-standard work through discrete arrangements or exposure categories. The horizon scan highlights

overlapping, fluid and digitally mediated forms of work organisation characterised by algorithmic coordination, fragmented responsibility and dynamic task allocation. Taxonomy analysis shows limited integration between concepts capturing employment structure, work intensity and WHS outcomes. As a result, while relevant concepts are present, they are not consistently combined in ways that reflect the structural complexity of contemporary work arrangements that we might expect in cases such as algorithmic management.

Taken together, the findings suggest that the evidence base provides a strong foundation for understanding established manifestations of changing work, but offers a limited basis for anticipating how platformisation and algorithmic management may reshape WHS risks and regulatory effectiveness as work arrangements continue to evolve.

Key findings

The evidence base addressing the changing nature of work in Australian WHS research is present but comparatively narrow in scope. The scoping review identified 157 publications directly relevant to this priority area, with increasing publication volume over time. However, taxonomy analysis indicates that research activity is concentrated around a limited set of established themes, including on demand work, remote work and heat stress. These topics are typically examined in relation to worker exposure and health outcomes, rather than as expressions of broader structural transformation in employment arrangements.

A substantial proportion of priority area-specific taxonomy terms show no explicit coverage within the dataset. Terms relating to labour hire, subcontracting chains, multi-party employment arrangements, multiple job holding and regulatory complexity do not appear in titles or abstracts. While related concepts may be embedded indirectly within other research domains, they are not consistently articulated as discrete objects of WHS analysis.

The case study of algorithmic management in gig platforms highlights this structural concentration. Only six publications directly address algorithmic management in platform-mediated work, all appearing in recent years. These publications focus primarily on sector-specific contexts such as driving and delivery, and on operational concerns such as fatigue and road safety. Explicit examination of platform governance mechanisms, fragmented responsibility, or regulatory fit remains limited. Where platform work intersects with WHS concerns, it is more often addressed indirectly through workload or psychosocial risk constructs than through analysis of employment structure.

Taken together, the findings indicate that the Australian WHS evidence base provides a foundation for understanding established manifestations of changing work, but offers only limited insight into how complex, digitally mediated and multi-party employment arrangements reshape accountability, risk allocation and regulatory effectiveness. The primary evidence gap therefore concerns complexity in how work is organised, governed and regulated. While relevant concepts are present across the dataset, they are rarely combined in ways that reflect the organisational and governance complexity of contemporary work arrangements.

Scoping literature review

This scoping review drew on the full dataset of 7,027 records (see Appendix 1) to provide an overview and synthesis of the WHS research landscape for the research priority area of changing nature of work. The 153 records screened by the AI panel form a focused subset of this dataset which was compared and contrasted with the full dataset to understand priority area research and taxonomy coverage.

Tagging results

A total of 62 taxonomy terms were operationalised from the P5 taxonomy to tag the 7,027 records in the full dataset. Of those terms, 31 appeared in the title or abstract of at least one publication, while 32 terms did not appear on any publications (see Appendix 3 for a list of terms and their frequency).

A total of 259 tags were applied to records in this priority area, but only 45 of those tags were from the P5 taxonomy. The number of records tagged with P5 taxonomy terms (648) was significantly greater than those tagged in the priority area (45), indicating that many publications reference P5-related concepts without being screened for this priority area.

Appendix 3 presents the distribution of P5 taxonomy terms assigned to records in the datasets, ordered by total publication count. It shows that a small number of taxonomy terms account for a large proportion of publications and a long tail of terms with relatively few or no tags associated. The most frequently observed P5 taxonomy terms were *on demand work* (221), *heat stress* (64), *remote work* (48), *rural work* (37), *regional work* (30). Together, these relatively highest-frequency terms account for the majority of P5 taxonomy-tagged publications, with *on demand work* being significantly more frequent than any others.

In contrast, many taxonomy terms were associated with a small number of publications. Sixteen taxonomy terms appeared on fewer than ten publications, and many appeared only once or twice. This comprised a diverse set of terms, such as *gig work*, *FIFO work*, *underemployment*, *isolated work*, *outsourcing*, and *roster design*.

Thirty-one taxonomy terms were not associated with any publications, indicating an absence of explicit or clear coverage for these concepts within the dataset. Absence in this context refers to terms not being identified in publication titles and abstracts. This does not directly imply the absence of research on these subjects, but it shows that research on them is hard to identify and/or not present in the dataset use for analysis. Examples include terms such as *crowd work*, *short term contracts*, *shadow or black economy*, and *independent contractors*.

Screened record categories

	P1	P2	P3	P4	P5	Unscreened	Multi***	Total**
P1	2079	140	625	183	138	1843	678	4330
P2	63	232	49	24	28	388	66	718
P3	68	40	77	41	19	183	58	370
P4	130	144	226	97	29	477	126	977
P5	150	37	55	26	45	406	71	648
Total*	2490	593	1032	371	259	3297	999	7043

Table 1: A matrix showing the number of tags applied to screened records across the 7027-record dataset. P5 tags are highlighted. The Y-axis is priority area tags and X-axis is the screened record categories, e.g. cell P5/P5 shows the number of P5 tags applied to P5 screened records. The table also includes columns with the number of unscreened records that were tagged, the number of tags that were counted multiple times (Multi) and the total tags applied. Figures reflect total tag counts, tagging is not exclusive, and a term might appear on records in each priority area. Records can also be screened into more than one priority area – hence tag counts are higher than the number of records in the dataset.

* Total tags on P1, P2, P3 etc. records, **Total P1, P2, P3 tags on all records. ***The number of terms that are counted more than once.

Patterns over time

Time-based analyses of the 153 screened records show consistent growth in output across the period covered by the dataset (Table 2), with higher volumes observed in more recent years and consistent year-on-year growth over the fifteen-year period. The growth fits with the broader pattern of growth seen across WHS research in Australia over this time period. Figure 1 shows the top ten terms over the period, and the number of publications tagged in the full dataset. This highlights the consistent and stable growth of research on key P5 topics seen within the dataset. Coverage of P5 terms increases over time and is significantly greater than the number of publications specifically classified as P5, suggesting the taxonomy has a much broader scope than the priority area itself.

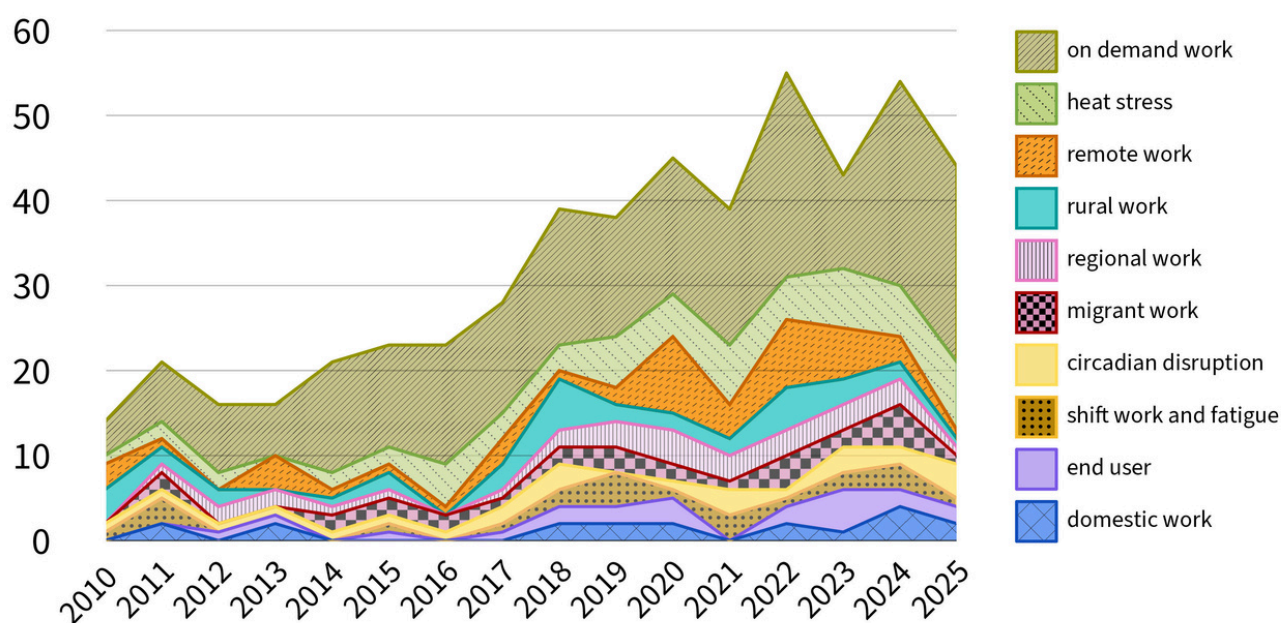


Figure 1: Stacked area chart of the top ten terms by year and number of publications tagged in the full dataset.

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Pubs	3	1	3	5	6	6	9	7	11	11	9	19	25	6	16	16
Tags	14	21	16	16	21	23	23	28	39	38	45	39	55	43	54	44

Table 2: Table showing the number of P5 publications, and records with P5 tags by year of publication.

High-level concept clusters derived from VOSviewer

To complement taxonomy-based tagging, high-level concept clusters were generated using VOSviewer¹ based on co-occurrence of key terms in titles and abstracts within the P5 screened dataset. This approach provides an inductive, data-driven view of how concepts are organised in the dataset, enabling comparison between emergent research themes and the deductively defined P5 taxonomy.

The P5 concept network shows that emerging and non-standard forms of work enter WHS research primarily through how workers experience exposure, job demands, and harm, rather than through employment categories alone. The most frequent concept, *workers*, sits within a distinct cluster focused on worker exposure, job demands, and psychosocial harm, positioning workers as subjects of strain, accidents, and mental health impacts. In contrast, *employment* and related concepts cluster separately around regulatory and legal frameworks. *Workers' compensation* and *return-to-work* anchor a large system-response cluster concerned with injury recovery and institutional processing of harm. *Workplace organisation and governance* form another layer, linking organisational context to both regulatory structures and worker outcomes. Overall, the network is structured around pathways from work organisation and regulation, through worker exposure and harm, to compensation and recovery systems, rather than around specific job types such as gig, migrant, or remote work.

The clusters are presented in Table 3, and Table 4 lists the top 5 concepts. The cluster/concept network is visualised in Appendix 4 Figure 2.

#	Cluster	Concepts	Description
1	Injury, compensation, and recovery systems.	68	This cluster captures how work-related harm is processed once it occurs, focusing on injury, recovery, and institutional response pathways.
2	Workplace organisation and institutional response.	49	This cluster centres on workplaces as organised and governed settings.
3	Employment, regulation, and legal frameworks.	48	This cluster reflects the legal, regulatory, and contractual dimensions of work.

¹ Nees Jan van Eck and Ludo Waltman, "Software Survey: VOSviewer, a Computer Program for Bibliometric Mapping," *Scientometrics* 84, no. 2 (2010): 523–538, <https://doi.org/10.1007/s11192-009-0146-3>.

#	Cluster	Concepts	Description
4	Health system and service contexts.	26	This cluster focuses on how work and employment conditions intersect with healthcare systems and service provision.
5	Socioeconomic insecurity and access to care.	25	This cluster links employment instability with socioeconomic conditions and access to support.
6	Worker exposure, job demands, and psychosocial harm.	24	This cluster centres on workers as exposed subjects within work systems.
7	Future workforce, risk, and policy responses.	13	This cluster reflects forward-looking and adaptive perspectives on work and risk.

Table 3: The clusters resulting from VOSviewer analysis, number of concepts included, and summary descriptions.

Concept	Occurrences	Cluster
Workers	43	6
Workers' compensation	19	1
Return to work	19	1
Workplace	16	2
Employment	16	3

Table 4: The top five concepts by the number of occurrences, and their associated cluster.

Sources and contributing organisations

The P5 evidence base shows a moderate to high level of concentration across publication sources (Table 5), organisations (Table 6), and authors (Table 7). The most prominent journals are clustered around occupational health, rehabilitation, and public health, indicating that research on non-standard and vulnerable work is primarily examined through injury recovery, health outcomes, and system response rather than labour-market or management perspectives.

Organisational output is strongly concentrated, with Monash University acting as a dominant hub, producing substantially more publications than any other institution. A small group of authors accounts for a large share of the literature. This author concentration aligns closely with the organisational pattern, reinforcing the presence of stable research centres and collaborative teams. Overall, the structure of the literature supports depth and continuity in the priority area.

Source Title	Publications
Journal of Occupational Rehabilitation	7
Occupational and Environmental Medicine	5
BMC Public Health	5
Australian Health Review	4
Occupational Medicine	3

Table 5: The top five publication sources by the number of associated publications.

Organisation	Publications
Monash University	36
University of Melbourne	12
The University of Sydney (USYD)	12
UNSW Sydney (UNSW)	8
RMIT University (RMIT)	8

Table 6: Top five affiliated organisations noted on publications, by number of publications they are listed on.

Author	Publications
Alex Collie	14
Tyler Jeremiah Lane	10
Shannon Elise Gray	9
Peter Matthew Smith	6
Venerina Johnston	3

Table 7: Top five authors, by the number of publications they are listed on.

Summary of taxonomy-based evidence coverage

The taxonomy-based analysis shows that research relevant to P5 is unevenly distributed across concepts associated with the changing nature of work. A small number of taxonomy terms account for a large proportion of publications, with *on demand work*, *remote work*, and *heat stress* dominating coverage. These terms reflect work arrangements and exposures that have become more visible within WHS research over time and are often examined through their effects on worker health, injury, and recovery.

In contrast, many concepts directly associated with non-standard employment arrangements and labour market structure appear infrequently or not at all. Taxonomy terms relating to gig and platform work, outsourcing, labour hire, and underemployment are represented by only a small number of publications, while a substantial number of terms associated with contemporary work arrangements such as independent contracting, telework, multiple job holding, and complex supply chains are absent from the dataset. This pattern indicates that while the literature engages with selected aspects of the changing nature of work, it does so without systematic coverage across the full range of employment forms captured in the taxonomy.

The taxonomy also reveals that many publications reference related concepts without being classified as primary evidence for the priority area. This suggests that changing work arrangements often appear as contextual features within studies focused on other topics, rather than as the central object of analysis. Together, these patterns indicate that the evidence base is anchored around a limited set of well-established themes, with more recent or structurally complex forms of work remaining at the margins of WHS and workers' compensation research attention.

Horizon scan

The horizon scan was conducted following a case-study based deductive approach that recognises existing research on the future of work health and safety and known drivers of change. Drivers of change identified by leading international institutions and global WHS research programs were used as an organising frame for the horizon scan and to help manage its scope. These drivers represent well-established and emerging trends on the global WHS horizon. A case study approach was then used to examine how these identified drivers are manifesting within the Australian WHS research evidence base. Case studies were selected through literature review and in consultation with SWA and the project's Expert Working Group (EWG).

Case Study	Drivers of change	Rationale	Time frame	Publications	Publishing	Status
Algorithmic Management in Gig Platforms	Platformisation and algorithmic control of labour	Continues to define new employment models and psychosocial risk profiles over the next decade, as platform work and algorithmic control expand	Medium (3–5 yrs)	6	Since 2022	New

This section presents the results of analysis for the case study of algorithmic management in gig platforms, which reflects the platformisation and algorithmic control of labour. It was selected for this priority area to provide a specific focus on research relevant to the changing nature of work, particularly research addressing non-standard employment, digital labour platforms, and psychosocial risk in precarious work contexts. This emerging driver of change is reshaping employment relationships and work organisation, driving shifts in job control, employment security, and the distribution of WHS risks among workers in vulnerable contexts such as young, migrant, and precariously employed workers.

Overview of results

The case study dataset comprises 6 publications identified through the AI screening method described in Appendix 1. Publications related to the case study were identified from the full dataset of 7,027 records and analysed using the results of taxonomy term tagging and bibliometric analysis.

Across these 6 records, all were tagged with at least one taxonomy term from the full taxonomy of 304 terms (Table 8). The most frequently observed taxonomy terms within case study records were *gig work* (3 publications), and *on demand work* (2). A number of terms were present from other priority areas, such as *workload*, *algorithmic management* and *audits* (Table 9).

Measure	Number of publications
Publications in the case study	6
Publications with ≥ 1 taxonomy tag in the matrix	6
Publications with no taxonomy tags in the matrix	0

Table 8: Summary of the publications included in the case study and taxonomy tagging results

Taxonomy term	Priority Area	Publications
Gig work	P5	3
On demand work	P5	2
Workload	P1	2
Algorithmic management	P2	1
Audits	P4	1

Table 9: Top five taxonomy terms by the number of publications tagged, using the full taxonomy of 304 terms.

Patterns over time

Time-based analyses show that the publications were authored in more recent years. This aligns with the recent emergence of the driver and the emerging status of research into algorithmic management and gig platforms (Table 10).

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Freq	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	2

Table 10: The number of publications per year in the case study dataset.

High-level concept clusters from VOSviewer

System-generated concept clusters derived from VOSviewer provide a complementary, high-level overview of concept co-occurrence. The concept network shows a highly concentrated and narrowly scoped evidence base focused on platform-based driving and gig transport work. Concepts cluster around three tightly linked domains: platform governance and evaluation mechanisms, the work demands and fatigue associated with driving, and the structural features of gig and platform labour. The most frequent concepts (drivers, gig workers) sit at the intersection of platform structures and road safety outcomes. These results are presented in Tables 11 and 12, and visualised in Appendix 4 Figure 3.

#	Cluster	Concepts	Description
1	Platform governance, safety practices, and evaluation	33	This cluster centres on how platform-mediated work is organised and governed at the operational level.
2	Work demands, fatigue, and road safety outcomes	22	This cluster focuses on the lived conditions of work-related driving.
3	Gig economy structures and platform labour	15	This cluster captures the structural features of platform-based work, including gig work, digital labour platforms, on demand work, labour platforms, and fairness considerations.

Table 11: The clusters resulting from VOSviewer analysis, number of concepts included, and summary descriptions.

Concept	Cluster	Occurrences
Drivers	2	3
Gig workers	3	3
Gig work	3	2
Road	2	2
Road safety	2	2

Table 12: Table showing top 5 concepts and the associated cluster.

Comparison of scoping literature review and horizon scan results

Comparison between the scoping literature review and the horizon scan highlights a difference in how changes in work arrangements are represented in the evidence base. The scoping review is dominated by research on a limited set of established topics, including on demand work, remote work, and heat-related exposures, which are typically examined through their impacts on worker health, injury, and recovery. These topics reflect forms of work that have become sufficiently established to attract sustained WHS research attention and are often addressed within familiar frames.

In contrast, the horizon scan surfaces a broader and more heterogeneous set of developments associated with the changing nature of work, visible in the VOSviewer clustering analysis. These include platform-mediated labour, algorithmic management, fragmented employment relationships, labour hire and outsourcing arrangements, and increasing work intensity and insecurity. Many of these topics appear only weakly, or not at all, in the scoping review, despite their growing prominence in policy and labour market discussions.

The horizon scan suggests that research addressing these developments is emerging and may be present in adjacent disciplines, including labour studies, sociology, economics, and industrial relations, rather than within the core WHS literature. As a result, many issues relevant to worker health and safety in changing work arrangements are being examined indirectly, without explicit consideration of WHS frameworks or regulatory concepts.

Overall, the comparison indicates that while the scoping review captures selected manifestations of changing work, it does not reflect the full range of developments highlighted by the horizon scan.

Signal scanning

Signals were identified using the horizon scanning questions and criteria specified in the horizon scanning methodology, with selection criteria focusing on changes in volume or concentration of research activity; shifts in conceptual emphasis; recombination or co-occurrence of concepts; boundary-crossing across domains or priority areas; and consolidation or dispersion of the evidence base. The signals identified in Table 13 do not, in themselves, constitute evidence gaps. Rather, they provide structured inputs for evidence gap mapping to follow.

Signal	Measure	Insight
Work arrangements go beyond established categories	Low frequency or absence of taxonomy terms relating to labour hire, outsourcing, and complex contracting in literature review, and the prominence of these concepts in horizon scan.	The horizon scan shows employment relationships that extend beyond the forms of non-standard work. This suggests that changes in how work is organised are occurring in new ways and may not yet be captured by WHS research.
Platform-mediated and algorithmically managed work emerge at the margins of WHS research	Sparse tagging of gig and platform work in the scoping review. The appearance of platform and algorithmic management concepts in horizon scan outputs.	Platform-mediated work and algorithmic management are distinct features of contemporary work arrangements. However, they are not well represented in the WHS evidence base, indicating that their implications for WHS are being examined elsewhere, such as outside traditional WHS research settings.
Shifting exposure profiles linked to work intensity and insecurity	Horizon scan references to work intensity, insecurity, and multiple job holding, and the limited co-occurrence of these concepts with WHS outcome tags in the scoping review.	Emerging evidence suggests that changes in work intensity and employment stability may be altering patterns of exposure to WHS risks. These shifts are not yet well integrated into the existing literature, which tends to focus on discrete hazards rather than broader changes in how work is structured and experienced.
Expansion of work beyond fixed locations and schedules	Strong horizon scan emphasis on flexible, remote, and mobile work arrangements, and selective and uneven coverage of these topics in the scoping review.	The horizon scan highlights ongoing expansion of work conducted across varied locations and schedules. While some aspects of remote and flexible work are well represented in the scoping review, emerging patterns suggest a wider range of work arrangements that challenge established assumptions about where and when work-related risks arise.

Table 15: Table of horizon scanning signals.

Evidence gap mapping

This evidence gap mapping brings together results from the scoping review and the horizon scan case study to systematically document gaps in the evidence base, drawing on patterns in taxonomy tagging, temporal patterns of publication, and concepts and clusters emerging from VOSviewer.

Three kinds of evidence gaps were observed in results from the scoping literature review and horizon scan case study:

- **Absence:** taxonomy terms or concept areas with no explicit coverage;
- **Sparsity:** concepts represented by very small numbers of publications relative to the size of the evidence base; and
- **Alignment:** mismatches between conceptual centrality (as indicated by system-generated concept clusters) and explicit taxonomy coverage.

Absence

The most pronounced evidence gaps for the priority related to forms of work that fall outside the limited set of non-standard arrangements most commonly examined in the literature. While the scoping review shows strong coverage of selected topics such as on demand work, remote work, and heat exposure, there is an absence of research explicitly addressing more fragmented employment arrangements, including labour hire, outsourcing, complex contracting chains, and multi-employer work structures. These forms of work are visible in the horizon scan but are largely absent from the dominant themes of the scoping review.

For the case study, this absence is particularly evident in relation to platform-mediated and algorithmically managed work. Although these arrangements are increasingly discussed, they rarely appear as the focus of research within the evidence base. As a result, there appears to be limited evidence examining how changing contractual relationships, diffuse responsibility, and mediated work allocation intersect with WHS risks and protections.

Sparsity

Where the literature does engage with emerging forms of work, the volume and depth of evidence are limited. Within the priority area evidence base, research addressing changing work arrangements is concentrated around a small number of well-established topics, with relatively few studies extending analysis to newer or more complex configurations of work. This results in sparse coverage of issues such as multiple job holding, work intensification, and employment insecurity, despite their prominence in the horizon scan.

For the case study, the sparsity of evidence constrains the ability to identify consistent patterns or to assess variability across industries, worker groups, or employment arrangements. Existing studies tend to focus on isolated aspects of changing work, such as flexibility or location, without examination of how multiple features of contemporary work arrangements interact to shape exposure to WHS risks.

Alignment

A further gap concerns the alignment between how changing work is framed in the priority area evidence base and the developments highlighted through the horizon scan. Much of the scoping review literature conceptualises changing work in relation to discrete arrangements or exposures, often treating non-standard work as a bounded category. In contrast, the horizon scan suggests that changes in work organisation are increasingly characterised by overlapping and fluid arrangements, including fragmented employment relationships, algorithmic coordination, and variable work locations and schedules.

The taxonomy analysis indicates limited integration between concepts capturing work structure, employment conditions, and WHS outcomes. This suggests that while relevant concepts are present in the evidence base, they are not being combined in ways that reflect the complexity of contemporary work arrangements.

Appendix 1: Data and screening

This section reports on the method and approach followed to conduct the horizon scan, scoping literature review and evidence gap mapping.

The dataset of 7,028 WHS research publications (see Note below) was screened for records relevant to the research priority area of changing nature of work and the case study of algorithmic management in gig platforms. Screening was conducted by a panel of four large language models (LLMs) which included ChatGPT 4.1 Mini, Claude 3 Haiku, Gemini 2.5 Flash and Grok 4.1 Fast Reasoning.²

The LLMs were asked to classify records using titles and abstracts into three categories using a schema, primary research, secondary research or irrelevant, and to provide confidence scores to justify their decisions (See Appendix 2 for instructions given). This information was used to calculate inter-panel agreement which led to records being labelled as green (high confidence and agreement), amber (intermediate) or red (low confidence and agreement). In most cases records categorised as primary, where the panel showed a high level of confidence and agreement (green records), were selected. In this case, amber records were included due to the low number of records categorised as primary by the panel, and in the case study secondary sources were also included to give more breadth to the analysis.

The panel identified 153 records (Table 1) potentially relevant to the changing nature of work priority area and 6 records (Table 2) relevant to algorithmic management in gig platforms case study. These records were checked by human reviewers for relevance. These records were not excluded but identified for the purpose of comparison and audit. There can be a high level of ambiguity and interpretation when deciding if a record, based on its title and abstract, is a primary, secondary or irrelevant source of evidence for a priority focus area or case study.

Results were then tagged with taxonomy terms and described using bibliometrics. The results of this analysis are presented and discussed in the scoping literature review, horizon scan and evidence gap mapping.

² Zhilong Zhao and Yindi Liu, *A Confidence–Diversity Framework for Calibrating AI Judgement in Accessible Qualitative Coding Tasks* (Guangzhou: School of Journalism and Communication, South China University of Technology, 2025). <https://doi.org/10.48550/arXiv.2508.02029>.

	Green	Amber	Red
Primary	33	120	25
Secondary	5	111	18
Irrelevant	5119	1485	112

Table 15: Model ratings and risk matrix for the priority area in the set of 7,028 records (Green – low risk, Amber – medium risk, Red – high risk).

	Green	Amber	Red
Primary	0	3	1
Secondary	1	2	1
Irrelevant	6026	992	2

Table 16: Model ratings and risk matrix for the case study in the set of 7,028 records (Green – low risk, Amber – medium risk, Red – high risk).

Note: Tables 15 and 16 contain an extra record, which was removed after screening was completed, making the total 7,027.

Appendix 2: Schema and instructions

This appendix presents the instructions provided to large language model (LLM) panel members when reviewing records, and the specific categorisation schemes that were used.

Scheme P	Changing nature of work
Instruction	Classify each text as Primary, Secondary, or Irrelevant based only on what the TITLE and ABSTRACT explicitly state. The key distinction is whether changing work arrangements and the need for adaptation in safety regulation and/or compensation frameworks is central (Primary), discussed but not central (Secondary), or not present (Irrelevant). This priority area is about how safety regulation and compensation frameworks might adapt to better accommodate changing work arrangements (e.g. gig work, compressed weeks, non-traditional employment, multiple jobs, working from home, complex supply chains, multi-regulated sites).
Primary category	The main focus is on changes in the nature of work AND implications for (or evaluation of) WHS regulatory settings and/or workers' compensation coverage, access, responsibilities, enforcement, or scheme design. The text centrally addresses how existing frameworks fit (or do not fit) new/changed work arrangements, or proposes/assesses adaptations.
Secondary category	Changing work arrangements are clearly present (e.g. gig/platform work, non-standard work, remote work, multiple jobs, complex supply chains), and the text mentions regulatory or compensation implications, but these implications are not the main focus. OR regulation/compensation is present, but the changing nature of work is only background/context.
Irrelevant category	The text does not meaningfully address changing work arrangements together with implications for WHS regulation and/or workers' compensation frameworks. Texts only about general labour markets, general business strategy, or technology with no stated regulatory/compensation framing should be Irrelevant.
Scheme C	Algorithmic management in gig platforms (e.g. Uber Eats, Deliveroo)
Instruction	Classify each text as Primary, Secondary, or Irrelevant based only on what the TITLE and ABSTRACT explicitly state. The key distinction is whether algorithmic management in gig/platform work and its WHS and/or regulatory implications is central (Primary), discussed but not central (Secondary), or not present (Irrelevant). This case study concerns platform-based gig work where algorithmic management affects WHS outcomes, including surveillance, workload intensity, lack of transparency, and fairness in task allocation, and where there are challenges applying traditional WHS frameworks and a need for regulatory adaptation.
Primary category	The main focus is on gig/platform work AND algorithmic management (e.g. app-based allocation, monitoring/surveillance, ratings, automated performance control, opaque decision-making), with an explicit WHS, worker protection, dispute-resolution, regulatory, or compensation framing. Algorithmic management is central to the work organisation described, and WHS/regulatory implications are a main theme.
Secondary category	The text is about gig/platform work OR algorithmic management, and includes some relevant elements (e.g. surveillance, performance pressure, transparency/fairness, applying WHS frameworks to platforms, regulatory adaptation), but these are not the main focus. OR algorithmic management/platform work appears as one example within a broader WHS, technology, or labour market discussion.
Irrelevant category	No substantive focus on algorithmic management in gig/platform work. This includes texts about algorithms/AI with no platform-work setting, or texts about gig work that do not include algorithmic management or WHS/regulatory implications in the title/abstract.

Appendix 3: Tagging results

This appendix lists taxonomy terms for the research priority area, ranking them by the total number of records tagged in the full dataset of 7,027 records and providing a breakdown of tagged records in the priority area and case study datasets.

Rank	Normalised term	P5 records tagged	C5 records tagged	Total tagged
1	on demand work	8	2	221
2	heat stress	2	0	64
3	remote work	8	0	48
4	rural work	1	0	37
5	regional work	0	0	30
6	migrant work	4	0	29
7	circadian disruption	0	0	26
8	shift work and fatigue	0	0	23
9	end user	1	0	22
10	domestic work	2	0	19
11	gender safety	0	0	15
12	extreme weather	0	0	14
13	casual work	1	0	13
14	temporary work	2	0	13
15	migrant labour	2	0	10
16	gig work	6	3	8
17	FIFO work	1	0	8

Rank	Normalised term	P4 records tagged	C4 records tagged	Total tagged
18	underemployment	0	0	7
19	isolated work	1	0	7
20	outsourcing	1	0	6
21	roster design	0	0	6
22	modern slavery	0	0	5
23	bushfire smoke	0	0	4
24	digital platform work	2	1	3
25	demographic change in workforce	1	0	3
26	sleep debt	0	0	2
27	sharing economy	0	0	1
28	temporary agency work	0	0	1
29	casual and temporary employment	0	0	1
30	always on culture	1	0	1
31	telework	1	0	1
32	crowd work	0	0	0
33	app based labour	0	0	0
34	multiple job holding	0	0	0
35	moonlighting	0	0	0
36	portfolio work	0	0	0

Rank	Normalised term	P4 records tagged	C4 records tagged	Total tagged
37	side hustle	0	0	0
38	compressed work weeks	0	0	0
39	compressed schedules	0	0	0
40	flexible hours	0	0	0
41	working from home WFH	0	0	0
42	remote telecommuting	0	0	0
43	labour hire and subcontracting	0	0	0
44	outsourced labour	0	0	0
45	employee like worker	0	0	0
46	complex supply chains	0	0	0
47	global value chains	0	0	0
48	multi regulated sites	0	0	0
49	overlapping jurisdictions	0	0	0
50	regulatory complexity	0	0	0
51	fixed term contracts	0	0	0
52	zero hours contracts	0	0	0
53	shadow black economy	0	0	0
54	non standard employment contracts	0	0	0
55	short term contracts	0	0	0

Rank	Normalised term	P4 records tagged	C4 records tagged	Total tagged
56	independent contractors	0	0	0
57	older workers	0	0	0
58	climate change environmental WHS risks	0	0	0
59	work life boundary blurring	0	0	0
60	digital presenteeism	0	0	0
61	global mobility of work	0	0	0
62	cross border telework	0	0	0
	Total	45	6	648

