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Achieving the desired sustainable travel behaviour change: Insights from practitioners

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1 Introduction

There is an increasing global emphasis on strategies and policies that reduce emissions and promote sustainable lifestyles, as reflected in the proliferation of national net-zero pathways. Achieving meaningful changes in travel behaviour, however, is complex and depends on a nuanced understanding of the psychological, social, and policy factors shaping transport choices. Interventions that achieve long-term, systemic behaviour change must therefore adopt a cross-sectoral perspective where progress in one domain reinforces others (Cleland et al., 2023, De-Toledo et al., 2022). Although the literature on sustainable transport behaviour change is growing, limited attention has been given to evaluating systemic effects (Bamberg et al., 2011, Arnott et al., 2014). Nelson et al. (2025) synthesised the main theoretical approaches to behavioural change within sustainable transport to support integrated policy design. Building on this foundation, the present paper reports insights from round table discussions with stakeholders involved in developing and implementing policies, pilot projects, and mobility initiatives that foster active and public transport use while reducing car kilometres and emissions. Its main contribution is a comprehensive, evidence-based conceptual framework for travel behaviour change that integrates established and emerging constructs to guide systemic transformation in sustainable transport practices.

2 Literature context

There is a substantial and expanding body of literature emphasising the importance of applying behaviour change (BC) theories to understand and influence travel behaviour. Scholars have systematically examined how these theories can inform transport interventions and policy design. Andersson et al. (2018) bridged the gap between Transport Demand Management (TDM) and practical measures such as personalised travel plans (PTP) (Chatterjee, 2009), aligning them with theoretical frameworks including the Diffusion of Innovations (DOI) (Rogers, 2010), Theory of Planned Behaviour (TPB) (Ajzen, 1991), Transtheoretical Model (TTM) (Prochaska and Clemente, 1982), and Gamification (Wells et al., 2014). De-Toledo et al. (2022), in a scientometric review of more than 300 studies, confirmed that grounding transport policy and intervention design in BC theory enhances their effectiveness.

Arnott et al. (2014) found that interventions lacking a theoretical foundation often fail to achieve long-term modal shifts. Similarly, Nelson et al. (2025) highlighted the need for integrating different intervention types under a cohesive framework to achieve systemic, non-marginal change. Their findings support segmentation strategies that tailor interventions to distinct populations and contexts. This view is reinforced by Cheshmehzangi and Thomas (2016), who identified the influence of socio-cultural factors and community dynamics on individual travel decisions. Land-use design also plays a crucial role where mixed-use developments and compact neighbourhoods have encouraged active travel modes such as walking and cycling (Cao et al., 2007). These relationships underline the socio-ecological nature of mobility

behaviour (Buehler and Pucher, 2021). Segmenting travellers based on psychological and attitudinal characteristics, rather than demographics alone, is also vital (Fan et al., 2023). Frameworks such as TPB, DOI, and segmentation theory (Anable, 2005), together with the Stages of Change model (Sunio et al., 2018), offer structured ways to design more nuanced policies. It is important to note that long-term behaviour change in sustainable mobility depends on shifting attitudes and beliefs through voluntary, context-sensitive interventions complemented by supportive regulatory mechanisms such as congestion charging. Hence, to be effective behaviour change strategies should combine theoretical grounding with local relevance, advancing social equity and environmental sustainability while addressing persistent transport challenges.

3 Methodology

This study adopted a qualitative approach to collect perspectives from key stakeholders involved in developing and delivering sustainable travel behaviour change initiatives. It incorporated the design and facilitation of roundtable discussions (RTDs), application of reflexive thematic analysis, and synthesis of findings into a conceptual framework that illustrates behavioural mechanisms influencing sustainable travel choices. Four RTDs were conducted - three homogeneous groups (Government, Industry, and Transport Service Providers) and one international mixed group - to capture local and global perspectives (Table 1). Participants were identified through purposive sampling, ensuring representation across sectors and organisational scales. Each RTD lasted approximately two hours and explored existing interventions, capacity-building needs, and feedback on new initiatives. Two supplementary interviews were conducted with key stakeholders unable to attend. All sessions were recorded, transcribed, and anonymised for analysis. Data were analysed using reflexive thematic analysis (Braun and Clarke, 2019), enabling an iterative and interpretive understanding of behavioural influences. NVivo (version 15) supported inductive coding and theme development, while divergent views were documented as analytically significant.

Table 1. Details of the Round Table Discussions

Round Table Discussion	Number of participants	Local / International	Composition
RTD 1	10	Local (NSW, QLD)	Peak Body/Industry
RTD 2	4	Local (NSW, SA)	Government/Researchers
RTD 3	9	Local (QLD, NSW, VIC, SA)	Transport Service Providers/Industry
RTD 4	6	International (Australia, Finland, Netherlands, Norway)	Researchers/Industry/Transport service providers

4 Results and discussion

This section presents the key findings from the roundtable discussions (RTDs) and situates them within the TPB (Ajzen, 1991) and the Socio-Ecological Model (SEM) (Kilanowski, 2017, Bronfenbrenner, 1986). The conceptual framework developed (Figure 1) illustrates the dynamic interrelationships between attitudes, social norms, perceived behavioural control, which determine intention, as shaped by stakeholder experience and contextual factors.

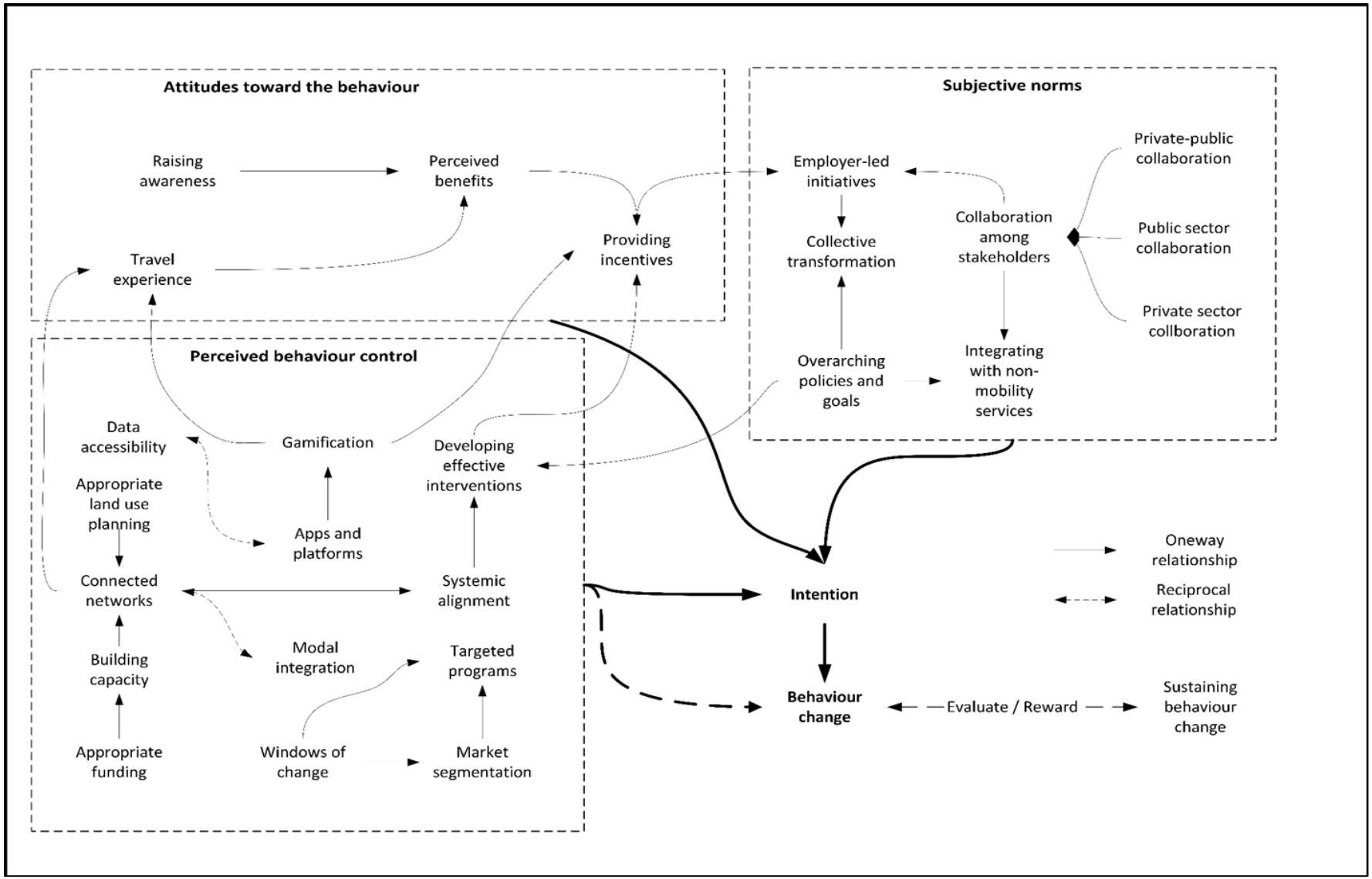

Figure 1. Conceptual illustration of the constructs that leads to travel behaviour change

Attitudes

Travel experience, *raising awareness*, *providing incentives* and *perceived benefits* emerged as the key themes that shape travel attitudes. Participants agreed that people adopt and sustain new travel habits when they are perceived as enjoyable, convenient, safe, and aligned with personal or collective goals. Positive *travel experience*, such as reliable transport and safe, well-designed walking and cycling routes strengthen intrinsic satisfaction, and emerged as a key driver of lasting change. *Raising awareness* and *perceived benefits* were also seen as critical in shaping attitudes. For example, initiatives like Queensland's 10,000 Steps programme, UK Prescription Bikes, and Melbourne's workplace cycling schemes normalised sustainable travel by linking it to health and convenience. *Providing incentives* has consistently proven important in encouraging behavioural change, particularly when these incentives offer direct, immediate benefits. While health and environmental concerns play a role, financial incentives, convenience, and time savings are often more persuasive. This aligns with the propositions of the SEM, which suggests that interventions operating across multiple levels, such as individual, interpersonal, and societal, are more effective than those focused on a single level.

Subjective norms

The RTDs underscored the importance of social and institutional influences in driving behaviour change. Participants emphasised that *collective transformation*, *overarching policies and goals*, and *employer led initiatives* play significant roles in shaping what is considered "normal" or desirable travel behaviour. Consistent and overarching policy direction at the national, state, and local levels was deemed essential to embed shared values and ensure continuity across initiatives. Effective partnerships such as *public–private collaborations, inter-agency cooperation,* and cross-sectoral initiatives such as *integrating with non-mobility service providers*, were described as essential for scaling up sustainable transport interventions. Employers, in particular, were highlighted as key agents of change: workplace initiatives such as public-transport subsidies, flexible hours, and end-of-trip facilities encourage employees to choose low-carbon commuting.

Perceived behaviour control

Perceived behavioural control was tied to physical, digital, and institutional conditions shaping travel choices. Participants highlighted *modal integration* to create *connected networks,* enabled by *appropriate land use planning and funding,* including mixed-use, higher-density development near transport hubs to cut car dependency. *Data accessibility* underpins digital integration, empowering *apps and platforms* such as MaaS, where gamification boosts uptake. Progress depends on *building capacity* (physical and institutional), including infrastructure delivery, leadership, skills, and inter-organisational coordination, which drives durable *systemic alignment.* Initiatives like ODIN PASS and Walk My Street show how open data and incentives strengthen engagement. Finally, *windows of change* are crucial for *developing effective interventions* via *targeted programs* and *market segmentation*; for example, when a new rapid-transit line opens, target new residents and first-year students with free trail passes, a first-month fare cap and a 'commute without parking' stamp cards, and short gamified challenges to cement sustainable habits.

Intention

The integration of attitudes, norms, and perceived control determines the strength of behavioural intention. Participants highlighted that interventions must combine personal motivation with institutional support to sustain commitment. Regular evaluation, transparent communication, and visible progress indicators such as reductions in car use or increases in active-mode share are necessary for reinforcing positive behaviour. Workplace travel

programmes and social recognition schemes were cited as effective tools for maintaining long-term engagement. When sustainable transport aligns with convenience, enjoyment, and collective values, it transitions from a choice to a habit.

Figure 1 illustrates the themes that emerged under the four key constructs namely, attitudes, subjective norms and perceived behaviour and intention, indicating their interrelationships indicating the need for action across individual, social, and systemic levels. Sustainable mobility arises when interventions align motivation, context, and system design within a shared policy vision. Positive attitudes, supportive environments, and intrinsic satisfaction underpin lasting engagement, while awareness campaigns and incentives normalise sustainable choices. Enhancing perceived behavioural control through infrastructure, digital tools, and institutional capacity empowers individuals to act on intentions. Differences across RTDs showed complementary priorities: private-sector participants emphasised funding alignment, while public and academic groups focused on social and environmental values. Overall, Figure 1 underscores that sustainable behaviour change requires an evidence-based ecosystem where aligned policies, responsive institutions, and positive experiences reinforce one another to achieve sustainable mobility.

5 Conclusion

This paper integrates behavioural theory and stakeholder insight to propose a conceptual framework for sustainable travel behaviour change. We conducted four roundtable discussions across government, industry, transport service providers, and international experts, supplemented by two interviews, and used reflexive thematic analysis to synthesise findings into the framework. Anchored in the TPB and set within a socio-ecological lens, the framework shows how attitudes, subjective norms, perceived behavioural control, and intention interact across individual, social, and system levels. Lasting change requires coordinated packages: positive travel experiences and salient benefits; normative support through policy coherence, partnerships, and employer programs; and enhanced control via modal integration, land-use coordination, open data accessibility powering MaaS and other apps and platforms, and capacity-building across institutions. The timing of interventions is critical, and windows of change targeted through segmentation can convert trial into habit when paired with incentives and clear progress indicators. While priorities differed across RTDs, participants converged on voluntary, informed change backed by consistent funding and robust evaluation. The framework offers practical guidance for cross-sector design and delivery. Future work should test causal pathways, develop indicators for systemic alignment, and quantify direct and system-level impacts over time.

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