CROSS-DOMAIN PLANNING



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Beyond Movement: Rethinking Mobility Through a Cross-Domain Lens



Walking and cycling influence more than how people move through a city. They can support healthier lifestyles, strengthen social connections and contribute to more vibrant public spaces.
Image: National Parks Board

Mobility interventions can shape outcomes far beyond transport, from health and environmental quality to public life and economic vitality. A cross-domain approach can help cities make these wider effects, co-benefits and trade-offs more visible—and use them to inform more integrated planning and decision-making.

Urban challenges are increasingly interconnected, with their causes and consequences spanning multiple domains. Climate change intersects with public health; ageing populations with accessibility and mobility; environmental quality with housing, economic activity and neighbourhood liveability. Decisions taken in one part of the urban system can have consequences—intended or otherwise—across several others.

This makes many of today's urban challenges difficult to address through a single-sector lens. Understanding these interactions is becoming increasingly important for cities seeking to improve liveability as a whole, rather than address individual outcomes in isolation. Mobility provides a particularly useful starting point for examining this shift.

Mobility has always been fundamental to how cities work. It connects people to jobs, schools, services and one another, and enables people and goods to move efficiently through urban areas. But its role is increasingly understood to extend well beyond movement.

A street is not simply a corridor for movement: it is also public space, environmental infrastructure, a setting for social interaction and part of a neighbourhood economy. Walking, cycling and public transport contribute not only to mobility objectives, but also to cleaner air, healthier communities, more inclusive public spaces and more vibrant neighbourhoods.

As the role of mobility expands beyond movement, how can cities better understand and communicate the wider value of sustainable mobility interventions?

This was the starting point for *Creating Liveable Cities: A Cross-Domain Approach to Sustainable Mobility*—CLC's research collaboration with Barcelona-based Center for Innovation in Transport (CENIT), a unit specialising in urban transport and mobility solutions, under the International Centre for Numerical Methods in Engineering (CIMNE). The cross-domain framework developed as part of the research starts from a simple premise: interventions in one area can generate co-benefits, trade-offs and ripple effects across social, economic, environmental and health domains.

> Its value is not in resolving every relationship or calculating a single score but in structuring complexity: making connections, gaps, assumptions and potential tensions sufficiently visible for practitioners to examine them more deliberately.

Seeing the Whole Picture

Cities already measure many aspects of mobility and urban performance—including travel time, congestion, accessibility, emissions, air quality, safety, public space use and economic activity—which can provide valuable evidence about how a place or intervention is performing. The challenge is not an absence of evidence, but its fragmentation: cities often measure these impacts individually, but struggle to understand what they mean together for the people and places affected.

Consider a relatively simple intervention to reduce through traffic on a neighbourhood street. Fewer vehicles may improve road safety and reduce noise and air pollution. A calmer street may encourage walking and cycling. If road space is subsequently reallocated, it may make room for seating, play or greenery—giving people more reason to spend time outside, which can, in turn, support local businesses.

Each effect tells us something about how the street is performing, but considered together, they show how the interventions can influence neighbourhood liveability beyond transport performance. However, the effects may not all be beneficial—improvements in one dimension of liveability can create pressures in another, underscoring the need to consider co-benefits and trade-offs together.

This is why simply measuring more indicators is not enough. The challenge is to bring evidence from different domains together and connect it to the outcomes a city has set out to achieve.

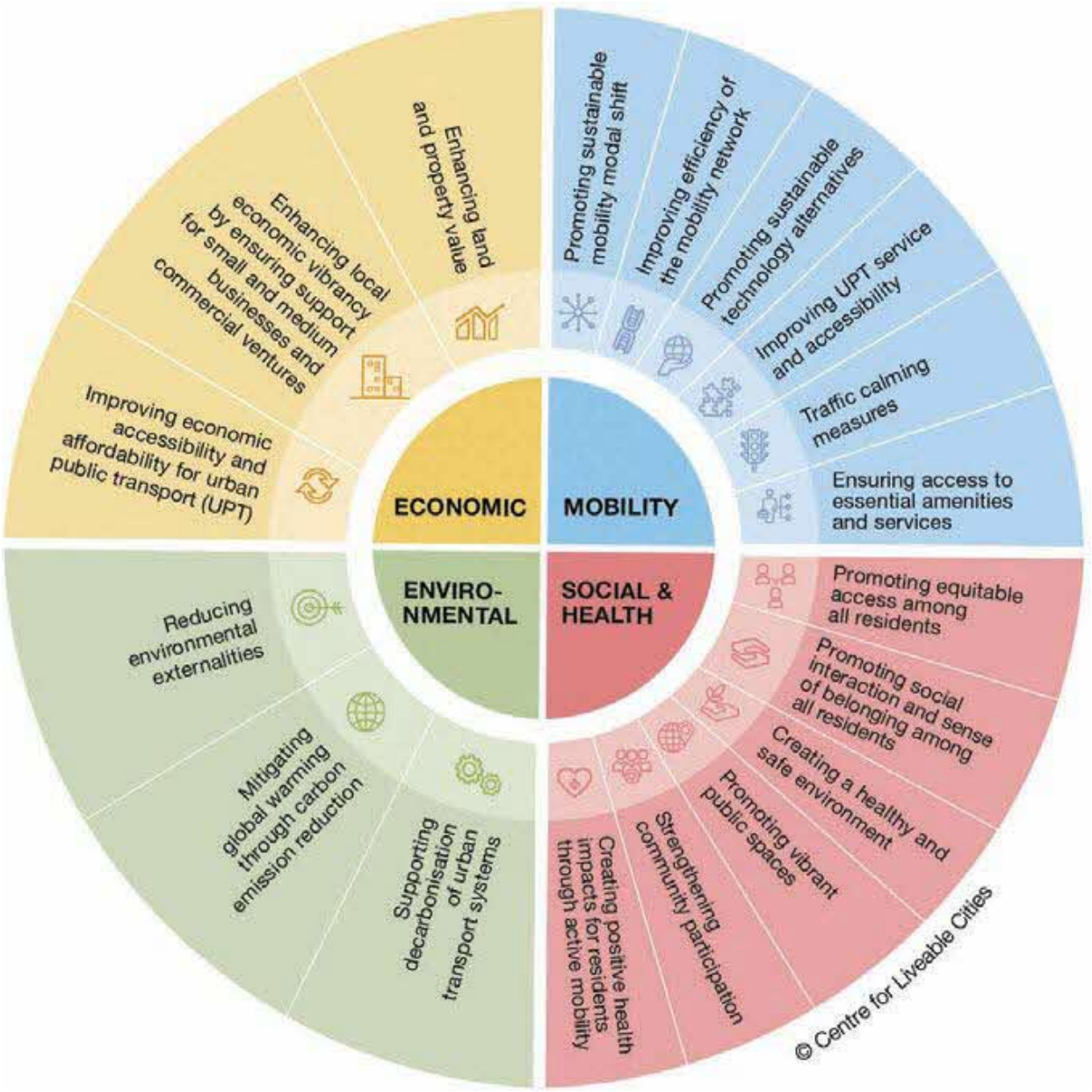
A Cross-Domain Lens

The cross-domain framework offers a way to bring different dimensions into a common view. It examines how sustainable mobility initiatives can affect liveability across four interconnected domains: mobility, environmental, social and health, and economic. Each domain encompasses more specific outcomes, indicators and metrics that can be adapted to an intervention's scale, context, priorities and available evidence.

The aim is not to measure everything or reduce different dimensions of liveability to a single score, but to provide a structured way to retain a multidimensional view of performance. Rather than viewing an intervention primarily through the sector that delivers it, the framework encourages cities to consider:

- What does the intervention aim to achieve?
- How do the intervention outcomes extend across different dimensions of liveability?
- How can evidence and priorities be brought together to inform planning and decision-making?

Its value is not in resolving every relationship or calculating a single score, but in structuring complexity: making connections, gaps, assumptions and potential tensions sufficiently visible for practitioners to examine them more deliberately.



The cross-domain framework representing potential desired outcomes from sustainable mobility initiatives across the four pillars.
Image: Centre for Liveable Cities

Interpreting Superblocks Through a Cross-Domain Lens

As part of CLC's research collaboration with CENIT, the framework was applied to Barcelona's Superblocks to explore what a cross-domain approach could reveal in practice.

The Superblocks rethink the role of neighbourhood streets by reducing through traffic and reclaiming road space for walking, cycling, greenery and public life. They combine interventions ranging from traffic management and access restrictions to street space reallocation, public space activation, greening and active mobility infrastructure.

Viewed through the cross-domain framework, these interventions can be mapped against the wider outcomes they may influence beyond mobility.

Considering these interventions together reveals several insights that can inform planning and decision-making.

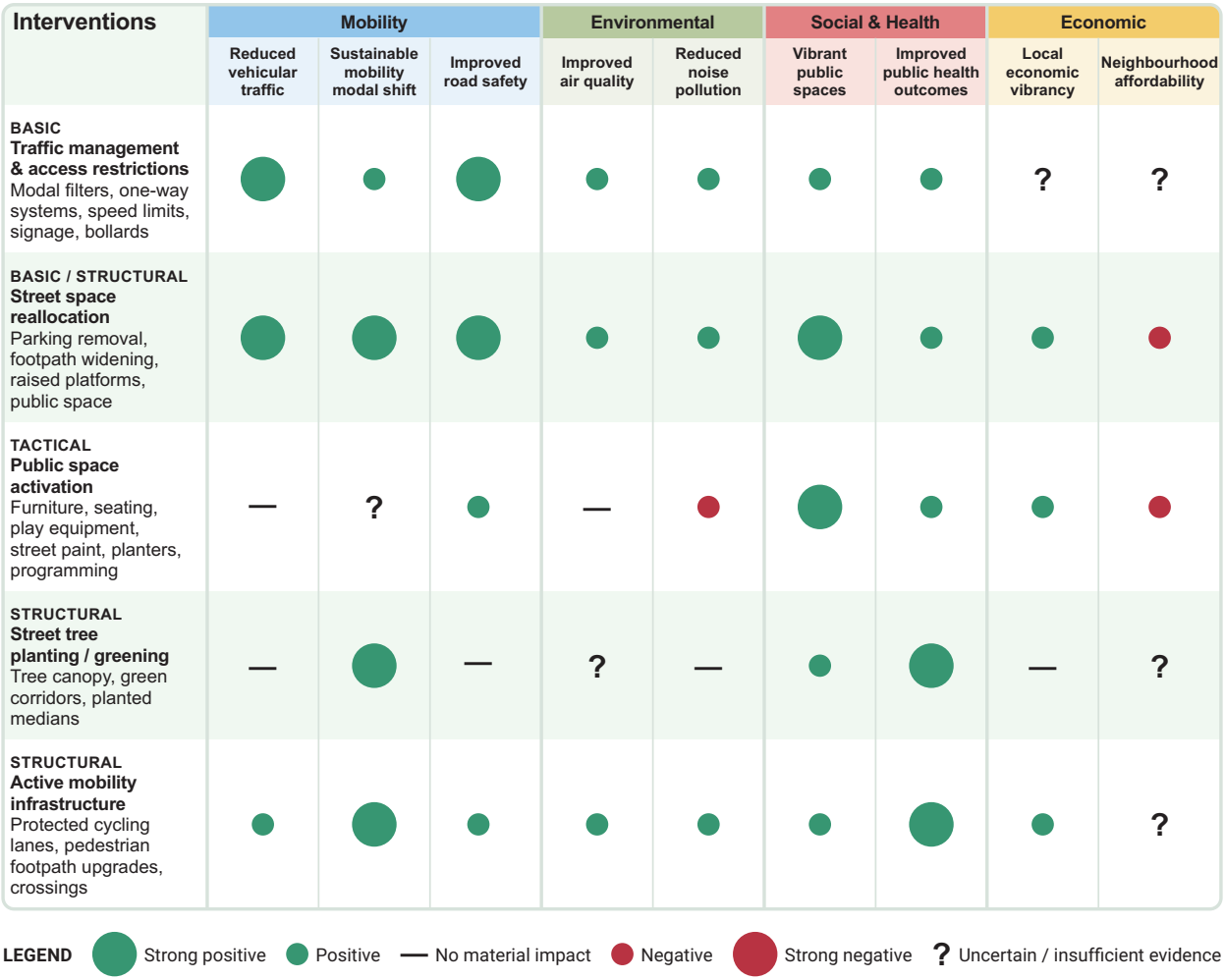
1. One Intervention Can Support Multiple Outcomes

An intervention introduced for one purpose can generate multiple outcomes across several dimensions of liveability. For example, reallocating road space to walking and cycling can improve mobility and safety while also reducing traffic-related emissions and noise, supporting physical activity and creating opportunities for more vibrant public spaces.

Seeing these connections broadens how cities understand the value of an intervention. The same measure may be relevant to mobility, environment, health and planning objectives, even where those outcomes sit beyond the immediate scope of the agency delivering it. Bringing them into a common view can support a more integrated conversation about what success looks like.



A cross-domain view of Barcelona's Superblocks shows benefits reaching well beyond mobility—into health, social connection and public life.
Image: Ajuntament de Barcelona



How different interventions within Barcelona's Superblocks may influence outcomes across the four domains, based on published evidence.
Image: Centre for Liveable Cities

> Looking across domains also draws attention to effects that might be missed when an intervention is assessed only against its domain objectives.

The aim is not for every intervention to perform equally across every domain, but to understand its wider contribution in relation to the outcomes a city has prioritised.

2. Cross-Domain Thinking Can Reveal Tensions and Trade-offs
Looking across domains also draws attention to effects that might be missed when an intervention is assessed only against its domain objectives.

A street transformation may make a neighbourhood safer and more attractive, and encourage more walking, cycling and social interaction, but also contribute to greater demand for the area, placing pressure on housing or commercial affordability.

Making these interactions visible prompts a different set of questions: Who benefits? Who may bear unintended costs? What complementary measures may be needed to balance trade-offs, and what should be monitored as the intervention evolves?

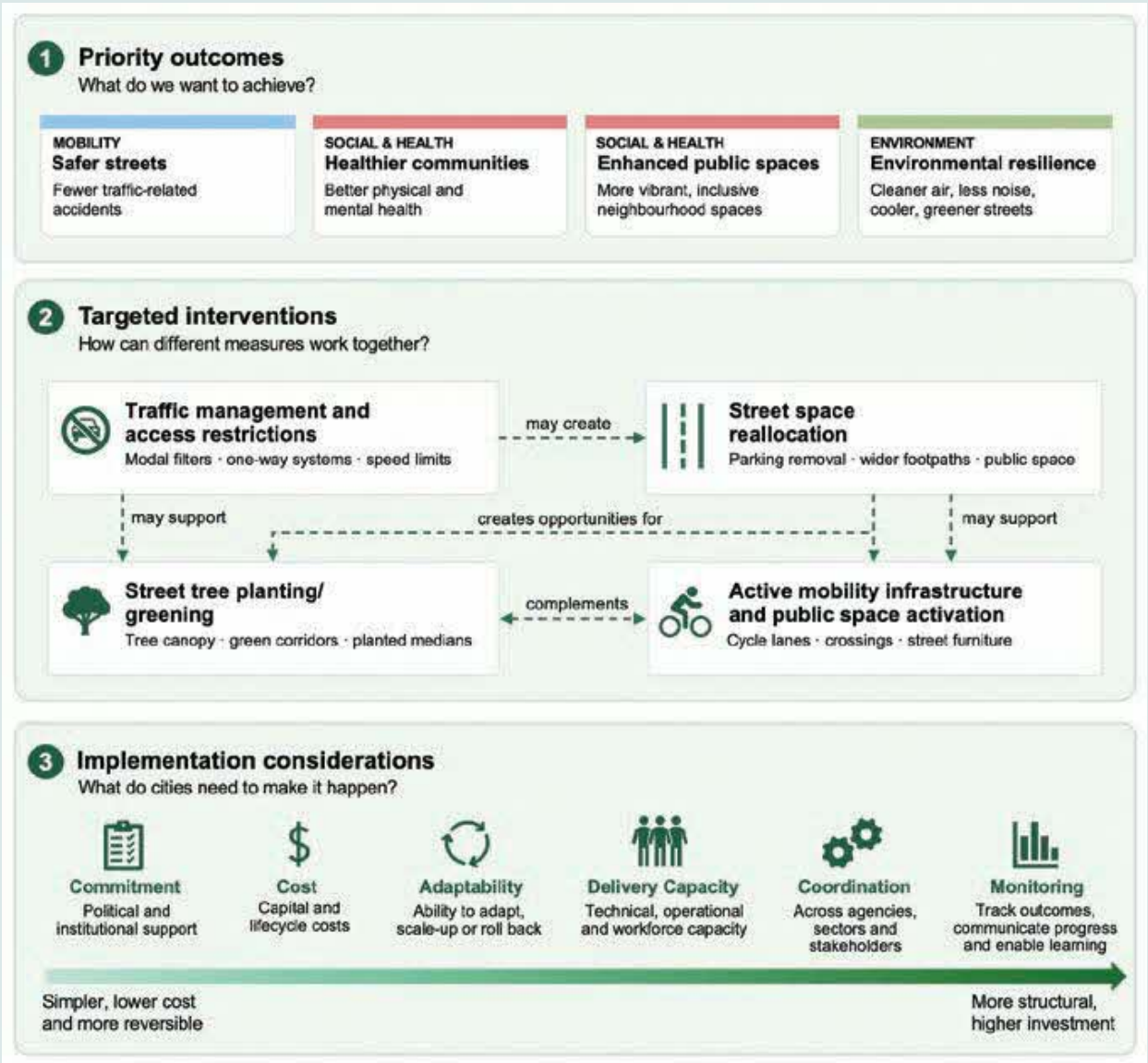
These questions can also bring housing, equity and other considerations into a decision that might otherwise be framed primarily around mobility.

3. Some Interventions Work Better Together

A cross-domain view can help cities consider interventions not only as individual measures, but as parts of a wider strategy. Different interventions may play different roles: one may create the conditions for change, while another builds on those conditions to extend the benefits across other dimensions of liveability.

For example, traffic management can reduce through traffic and create opportunities for street space to be used differently. Reallocating that space for active mobility infrastructure and public spaces gives people more reason to walk or cycle and spend time outside—supporting sustainable mobility as well as everyday social interaction.

Individually, these interventions serve different purposes. But together, they can achieve multiple outcomes.



Starting from priority outcomes, cities can identify interventions that work together as a strategy, then weigh the commitment, cost, adaptability, delivery capacity, coordination and monitoring involved.
Image: Centre for Liveable Cities

Looking across these relationships can help planners identify how different measures might work together, where they may be complementary and where gaps remain in the wider strategy.

4. Outcomes Need to Be Tracked Over Time

The outcomes of an intervention may not all be immediately visible. Travel behaviour may change gradually, people and businesses may adapt to new street conditions, and wider social or economic effects may emerge only over time.

Longitudinal monitoring can help cities understand these changing relationships rather than relying on a single before-and-after assessment. By revisiting outcomes as evidence accumulates, cities can identify emerging co-benefits or trade-offs and adjust interventions where needed.

From Cross-Domain Insights to Implementation

Considering interventions as part of a wider strategy also raises a practical question: cities may see value in several complementary measures, but may have limited resources or implementation capacity. Given these constraints, how should cities decide what to implement, and at what level of commitment?

Interventions vary not only in the outcomes they may influence, but also in the funding, delivery capacity and coordination required to implement them. They can range from simpler, lower-cost and more readily reversible measures, through tactical interventions involving greater physical change and delivery effort, to more structural interventions requiring substantial investment and coordination.

Considering implementation levels alongside cross-domain outcomes can help cities structure discussions about where to begin, which measures may need to be considered together and where more substantial intervention is warranted. These choices will also depend on enabling conditions such as institutional coordination, stakeholder support, delivery capacity and ongoing monitoring.

Towards Outcomes-Based Planning

Making cross-domain relationships clearer does not remove the complexity of decision-making or prescribe a universal answer, but helps make enough of that complexity visible to support better decision-making.

Instead of beginning only with which interventions should be implemented, cities can ask questions such as:

- What outcomes are we trying to achieve?
- Which interventions need to be considered together to support them?
- What do we know so far?
- What should we monitor?

Used early and iteratively, the framework offers a shared language for revisiting these questions as evidence, priorities and conditions change. By bringing cross-domain outcomes into the same conversation, it can broaden how the value of an intervention is understood and what counts as success.

As urban challenges become increasingly interconnected, this represents a shift from viewing interventions primarily through individual projects or sectors towards considering how they contribute to the wider outcomes cities seek to achieve.

That means asking not only how well an intervention performs, but how it contributes to making the city more liveable—and for whom.

For more details on the cross-domain framework and its application, visit the CLC Knowledge Hub or *https://go.gov.sg/clcbook-sustainablemobility*.