



Systematic Review

Combining Resilience and Sustainability in Urban Mobility: A Scoping Review and Thematic Analysis

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Abstract

The need to address long-term sustainability goals while ensuring short-term resilience to unexpected disruptions is placing an increasing challenge on urban mobility systems. This study organizes an analytical framework that compares and integrates the concepts of sustainability and resilience in urban mobility. A scoping review and thematic analysis were conducted to identify and compare the definitions, dimensions, and operational features of these two paradigms. The results reveal that, although they are conceptually distinct, sustainability and resilience share subjects of analysis, including multimodality and diversity of transport modes, the impacts of climate change, and social equity issues. However, they also present tensions between the dimensions of efficiency and redundancy, speed of recovery and sustainability of implemented solutions, and new vulnerabilities introduced by sustainable technologies. These synergies and trade-offs underscore the necessity of an integrated, systemic and holistic approach to urban mobility planning. The study emphasizes that building resilient and sustainable urban mobility requires coherent policies across government levels, technical capacity, public engagement, and comprehensive indicators. Recommendations for future research include developing integrated metrics and planning tools to support evidence-based decision-making.

Keywords: urban mobility; resilience; sustainability; integrated planning



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Paper Overview:

The paper “Combining Resilience and Sustainability in Urban Mobility: A Scoping Review and Thematic Analysis” explores how cities can design transportation systems that are not only environmentally sustainable but also resilient, capable of withstanding shocks such as pandemics, floods, or rapid urbanization pressures. It systematically reviewed global studies and proposed a conceptual framework that merges sustainability and resilience into one integrated model for urban mobility planning.

Key Framework Pillars

The study identifies four interlinked dimensions that define resilient-sustainable mobility systems:

1. Environmental Sustainability – shifting to low-carbon transport, promoting active mobility (walking, cycling), and prioritizing green infrastructure.
2. Social Equity & Accessibility – ensuring mobility access for all, especially vulnerable groups.
3. Technological Adaptability – embedding smart mobility technologies (IoT, AI, digital twins) that support adaptive management and predictive planning.
4. Systemic Resilience – strengthening networks against disruptions through

redundancy, flexibility, and multi-modal connectivity.

These pillars are unified through governance and data integration, making the framework actionable for city authorities and consultants.

Why it matters locally:

Urban mobility in Gulf cities including Bahrain, Saudi Arabia, and the UAE is evolving rapidly under national visions such as Saudi Vision 2030 and Bahrain’s National Urban Strategy. However, much of the mobility planning remains focused on sustainability targets (e.g., emissions, electrification) without a deep emphasis on resilience.

This framework offers a strategic lens to balance both:

- How can Riyadh or Manama ensure transport resilience against heatwaves or sudden demand shifts?
- How can smart data systems pre-empt congestion or infrastructure failure?
- How can active mobility be promoted in climates facing high temperatures?

Solutioners Perspective

At Solutioners, we view this dual-approach as essential for Smart & Sustainable City design. By localizing the framework:

- “Resilience” can be adapted to address Gulf-specific risks — heat stress, water scarcity, and oil-based urban transitions.
- “Sustainability” can align with Vision 2030’s carbon-neutral and livability objectives.
- Together, they support evidence-based transport planning frameworks that combine data, design, and policy insight.

Key Takeaway:

The next generation of mobility planning must move beyond sustainability alone and embed resilience as a measurable design and governance principle.