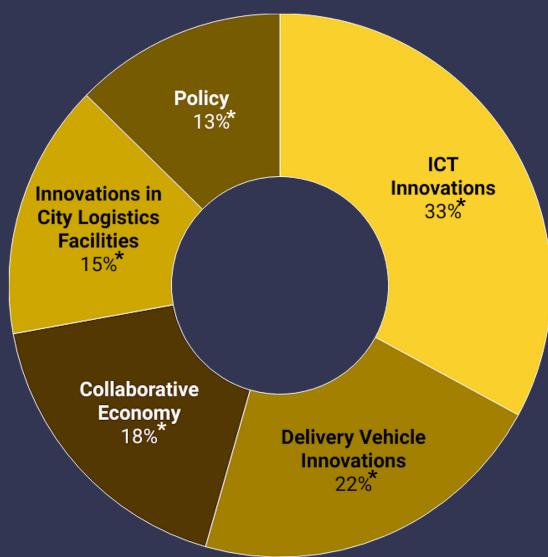


INNOVATIVE AND SUSTAINABLE URBAN DELIVERY

Cities around the globe face major last mile delivery (LMD) challenges as a result of surging online commerce activity, increased parcel delivery demands, lack of parking capacity, and severe traffic congestion particularly in inner city areas. Although a number of innovative solutions have been proposed to address these challenges, their full impacts are still not well understood due to the lack of comprehensive field studies and real-world data on their performance.

This research aims to identify and evaluate new solutions for commercial urban deliveries to meet the demand of last-mile and surging e-commerce markets. The research adopts a traffic simulation approach to test the feasibility of agreed solutions and evaluate their impacts in reducing emissions and enhancing customer experience.



This project identified five main themes among a wide range of current and emerging city logistics interventions.

- **ICT Innovations:** Applications of advanced technologies
- **Vehicle Innovations:** Adoption of vehicles with less emissions or more flexibility
- **Policy:** Regulatory restrictions to limit traffic in high density areas
- **Collaborative Economy:** Sharing of resources to optimise solutions and reduce costs
- **Innovations in City Logistics Facilities:** Design and usage of facilities for logistics and delivery activities

* Percentages indicate the proportion of scientific papers on the topic that addressed each theme over the past two decades

EXAMPLES OF NOVEL SUSTAINABLE SOLUTIONS FOR URBAN LOGISTICS

OFF-PEAK DELIVERY

This strategy can benefit urban road networks and ease traffic congestion, as fewer delivery vehicles would be on the road during peak hours

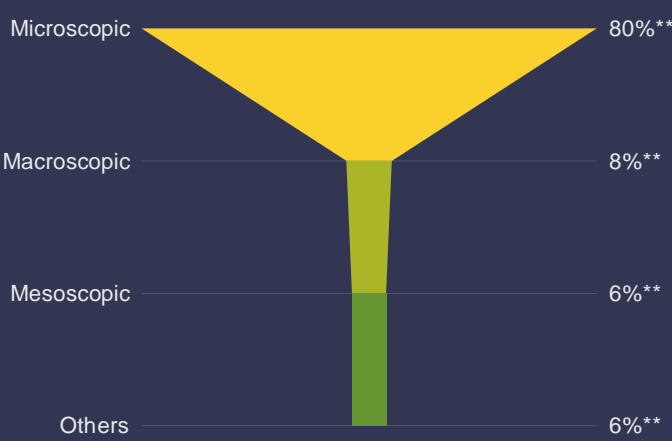
EV DELIVERY

Using electric vehicles for delivery holds promise for decarbonising freight transport and reducing emissions

BIKE DELIVERY

Cargo bikes can travel effectively in densely populated areas due to their flexibility, and can replace heavy trucks or vans in LMD

MODELLING AND EVALUATION VIA MULTI-SCALE TRAFFIC SIMULATION



Modelling Techniques

Traffic simulation techniques are widely used to model and evaluate the impacts of urban mobility interventions. They are particularly useful to understand feasibility of new solutions that have not been implemented yet.

Simulation Scales

The majority of previous studies have used microscopic simulation focusing on small networks with high levels of detail, with a smaller number also using macro or mesoscopic simulations.

** Percentages indicate the proportion of scientific papers on the topic that used each simulation approach over the past two decades

Research Methodology

- Collection of freight data from existing service providers or via new field data collection
- Adaptation of AIMSUN traffic simulation models, e.g., DynaMel
- Integration of emissions and pollutant models
- Testing and evaluation of both stand-alone and combined interventions
- Evaluation criteria: emissions, congestion levels, and cost-effectiveness
- Stakeholder consultations and surveys to identify barriers for large scale adoption

