Developing Urban Goods Movement (UGM) Data in the GTHA: A Framework

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Project Sponsor: METROLINX
Background

Project Objectives

• Develop a coordinated UGM data collection and data management plan
• Data to support performance measurement and modelling
• Ultimate purpose of informing UGM-related public policy
Freight data collection is not...
My view of freight data collection...
Freight Data in the Toronto Area

- About 10 roadside interview sites
- Small establishment surveys in 2 of the 6 regions in the Toronto Area.
- Truck GPS data from 3rd party data provider
- A patchwork of business registries and employer surveys
- Several traffic counting systems (some producing conflicting results)
- National data sources (TCOD, CVUS)
Data Framework
Performance Measurement

Why Important?

Monitoring the freight system to identify changes due to:

- Changes in background conditions (urban growth, changes in the economy, business practices or technology)
- Changes in policy / infrastructure

Classes of Performance Indicator

• Economy / Productivity
• Commodity / Service Flow
• Commercial Vehicle Movements
• Road Network Performance
• Intermodal Performance
• Environmental and Social Impact
Data Framework
Performance Measurement Recommendations

Continued data collection:
• Road performance using counting systems and GPS data from 3rd party providers
• Roadside truck intercept survey (MTO Commercial Vehicle Survey)

New data collection:
• Consolidated tracking of all establishments
• Commercial travel survey of establishments
• Enhance the cordon count program (e.g. consistency between regional and provincial counts)
• Additional roadside truck intercept surveys at intermodal terminals/airports
Data Framework
Model Development

Existing GGH Model - Aggregate Truck Trip-Based Model

Recommended Phase I - Upgraded Truck Trip-Based Model

Recommended Phase II - Tour-based Microsimulation Model

Recommended Phase III - Agent-based Microsimulation Model

Operational
Partially operational
Experimental

Invest in a program of model improvement over time.
Start collecting data now to support future model upgrades.
Data Framework

Model Development Data Recommendations

Inputs for Model Development

• Track business establishments
• Commercial travel survey of establishments
• Roadside intercept surveys, at “gateways” and intermodal terminals
• Records of major fleets with scheduled deliveries (couriers, public sector)

Model Calibration and Validation

• Enhance data collection for light commercial vehicles
• Enhance the cordon count program (24 hours, consistency between counts in regions and province)

Investment in Knowledge of the System

• Partner with very large firms
• Invest in research towards understanding behaviour
Data Management

Data security – Private data must not be compromised

Data availability – Non-private information should be shared broadly.

Mutual benefit – Data sharing should be reciprocated

Ease of use – Data sharing should be convenient, timely and cheap.

Access control - Differential access for different data users

Flexibility – Of data representations, to suit many uses.

Documentation of use– To articulate benefits of data collection (i.e. ROI).

Recommended Platform – MTO iCorridor System
Implementation of Framework

Commercial travel survey of 1000 small/medium firms

- Database for modelling, links commercial vehicle activity to establishment attributes
- Captures some aspects of performance measurement, including truck and commodity flows
- 22% response rate
- Online, mail, telephone

Survey includes three components

- Questions about the establishment
- Shipments for 1 day
- Private fleet truck activity for 1 day
Implementation of Framework

Extensive interviews with 12 large retail firms

- Establishment Information
- Acquired shipment database and driver logs for 1 day
- Supply chain interview
  - Number and location of vendors and customers
  - Vendor selection
  - Green Supply Chain Management Practices
  - Transportation practices (modes, outsourcing to 3rd Party Logistics firms)
  - Inventory practices
Supply Chain Interview Results

Large retail supply chains have in common:

- Supply chains are global
- Global sourcing can be cost effective, but can cause challenges in inventory management and quality control
- Vendors are selected primarily based on price and quality
- Most product through distribution centres, approx 10% direct vendor to customer
- Demand forecasting looks 6-18 months forward, with quarterly/monthly updates, and methods depend on the product
- Firms emphasize larger shipments, full truckloads/containers to economize
Supply Chain Interview Results

Retail supply chains have major differences:

- Complexity – simple (5 vendors) to complex (hundreds of thousands of vendors)
- Resiliency – multiple vendors for all products or for none of their products
- Inventory – inventory turnover range from 2 turns per year to 32 turns per year
- Environment initiative – 3 views:
  
  Paramount to the firm’s successful operation
  A necessary public relations exercise
  A non-issue

- Outsourcing Logistics to a 3rd Party Logistics Firm – 2 views:
  
  beneficial in reducing cost and allowing company to focus on core competency
  lead to poor service and less customer satisfaction
Take home messages

- Simultaneously plan for data collection, modelling, performance measurement and data management
- Do not expect data sources to fit together nicely, do plan for compatibility if possible
- Similar data can be used to support both modelling and performance measurement
- Plan for data collection that supports a program of model improvement
- Development of behavioural knowledge of the system is crucial
- Learn by listening to logistics managers