Data collection framework for understanding UFT and sustainable planning solutions

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NOVELOG Project Coordinator

NEW COOPERATIVE BUSINESS MODELS FOR CITY LOGISTICS

CERTH/HIT
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1) Sustainable urban planning in EU & role of NOVELOG

2) Data collection framework & data capture techniques.

3) Participatory Planning & Data for Understanding UFT

4) Data needed for planning & assessing UFT measures

5) Conclusions
EU GUIDELINES FOR SUSTAINABLE URBAN MOBILITY PLANS - SUMPS

• Participatory planning
• Vision-Objectives-Measures
• Infra & Behavior change
NOVELOG Objectives

SUMP ----→ Sustainable Urban Logistics Plan

PILOTS ---→ Integrated Planning Process

DATA collection ---→ UFT Knowledge generation

NON RESPONSIBILITY -→ Multi-stakeholders Engagement

NOVELOG Tools for guiding SULP development & implementation
NOVELOG’S identity

1 Consulting companies
2 Transport operators & supply chain owners
3 Association/Networks institutions
4 Local development agencies
5 Research and academic institutes
6 Regional/City authorities
7 Transport operators & supply chain owners
8 Consulting companies
9 Local development agencies
10 Research and academic institutes
11 Regional/City authorities
What we learned through stakeholder cooperation from 12 NOVELOG cities

- Different Cities
- Different Priorities & needs
- Different Maturity
- Different Mix of Measures
- The same objective: more sustainable & liveable city
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2) Data collection framework & data capture techniques.
## Data Availability for planning

<table>
<thead>
<tr>
<th></th>
<th>Urban Passenger Transport</th>
<th>Urban Freight Transport</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic data form ITS</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Mode choice &amp; behavior</td>
<td>✓</td>
<td>Non applied</td>
</tr>
<tr>
<td>O-D Demand Data</td>
<td>✓</td>
<td>sensitive</td>
</tr>
<tr>
<td>Vehicle Occupation rate</td>
<td>✓</td>
<td>fragmented</td>
</tr>
<tr>
<td>Data on service</td>
<td>✓</td>
<td>(✓)</td>
</tr>
</tbody>
</table>

We plan for passengers & Manage for freight
Today view ……Data for UFT measures feasibility

- Surveys – pilots implementations – regulations
Tomorrow view ..... Data for innovative measures adoption & actors cooperation

- More Bundling, Intermodality & Microdistribution in urban areas
Data Collection Framework

Pillar 1
Profile of major supply chains served in the urban area under study

Pillar 2
• Mapping of urban freight and service trips activity

Pillar 3
Organizational and legal framework

Pillar 4
Procedural and technological methods and innovations
Conceptual layout of the Framework

Tier 1: Basic data to be collected
  Dataset

Tier 2: Methods for data analysis
  Methods

Tier 3: Data elaborations
  Collections

Tier 4: Use of collections

Pillar 1
Profile of major supply chains served in the urban area under study.

Pillar 2
Mapping of urban freight and service trips activity.

Pillar 3
Organizational and legal framework

Pillar 4
Procedural and technological methods and innovations

Data collection framework and data capture
Identification of DATA needed for:
- The supply chains
- Goods and services
- City structure
- Policies, measures, methods & techniques

Identification of involved actors, behaviour & needs

Map
- Urban freight trips and activities
Data for UFT planning

Collecting methods:
Stakeholder Platform (SP-mean values), Survey (S), ITS, Simulation (SM)

- type of suppliers (manufacturers, wholesalers, etc.) (SP, S)
- type of agreement for delivery/collection from supplier (SP, S)
- who organises delivery/collection of goods (SP, S)
- who resolves delivery/collection problems (SP, S)
- type of delivery/collection operator (own account, logistics company, carrier, express courier, etc.) (SP, S)
- no. of deliveries/collections (S)
- size/type of delivery/collection (S)
- type of delivery packaging used (S)
- quantity of goods delivered/collected (S)
- frequency of delivery/collection of goods (S)
- who sets delivery/collection time (S)
- time taken to carry out deliveries (SP, S)
- whether staff from establishment need to be present (S)
- whether signature is required (SP, S)
- whether goods have to be checked by receiver (S)

- type of establishment (S)
- size of establishment (S)
- employees at establishment (S)
- size of warehousing space at establishment (S)
- other warehousing space out of establishment (S)
- no. of deliveries/collections (considering all types of goods as a whole) (S)
- delivery/collection frequency (considering all types of goods as a whole) (S)
- size/type of delivery/collection (considering all types of goods as a whole) (S)
- whether vehicles based at establishment (S)
- deliveries/home deliveries made by vehicles at the establishment (S)

Basic Method for data collection for Pillar 1: SURVEY → Establishment / Commodity flow Survey
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3) Participatory planning process & Data for Understanding UFT
Stakeholder’s Platform Mixture for UFT decision making

<table>
<thead>
<tr>
<th>Stakeholder’s Category</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Chain Stakeholders</td>
<td>25%</td>
</tr>
<tr>
<td>(Transport Operators, Freight Forwarders, Retail chains, Shop owners e.t.c.)</td>
<td></td>
</tr>
<tr>
<td>Public Authorities</td>
<td>25%</td>
</tr>
<tr>
<td>(Local % National government e.t.c.)</td>
<td></td>
</tr>
<tr>
<td>Other Stakeholders</td>
<td>38%</td>
</tr>
<tr>
<td>(Industry % Commerce Associations, Research % Academia, Consumer Associations e.t.c.)</td>
<td></td>
</tr>
<tr>
<td>Experts</td>
<td>12%</td>
</tr>
</tbody>
</table>

- The platforms should be **institutionalized**
- Responsibility of **coordination** to the city
- **Neutral partner** for arguments creation
- Small to medium **Size** $\rightarrow$ medium to high efficiency
Tools for managing the SULP Implementation

Facilitate interaction & consensus among stakeholders regarding the current & future state of their UFT environment

All UFT measures are not applicable to all cities: assess the applicability of certain UFT measures to certain types of cities

Assess the impact of a wide spectrum of UFT measures in real-life environments

Guide implementers of UFT measures on the most appropriate business models for their successful introduction & sustainable operation
NOVELOG Tools

New Cooperative Business Models and Guidance for Sustainable City Logistics

12 NOVELOG cities

WHERE ARE THE CITY CASES

Pilots
- Athens
- Turin
- Graz
- Rome
- Barcelona
- Mechelen

Case studies
- Gothenburg
- Venice
- Copenhagen
- Pisa
- London (LBBD)
- Bologna
- Reggio Emilia

Register your City

enter city name

4 NOVELOG tools

Services

UC Tool
- Understanding your City

Toolkit
- City Impact

Evaluation Tool
- City Evaluation

Guidance Tool
- Guide

Dashboard
The UFT environment definition dimensions:

**Factors Influencing the development**

1. **Economy & demographics**
   - GDP per city inhabitant
   - Fuel cost
   - Urban population share (% of total regional population)
   - City’s population share of over 65 years old
   - Household size
   - Retail establishment size
   - Taxation cost
   - Tourism (visitors)
   - Fleet maintenance

2. **Ecology & social responsibility**
   - Demand for environmentally-friendly products
   - Demand for ethical sourcing
   - Demand for local sourcing
   - Demand for reduced waste

3. **Logistics solutions**
   - Green delivery solutions
   - Collaborative delivery solutions
   - New business models

4. **New technologies**
   - Internet of Things (IoT)
   - Big data & advanced analytics
   - Driverless delivery vehicles

5. **Consumer requirements**
   - Same day (or next hour) delivery
   - Knowledge of what happens to the e-data they provide
   - Information about products & their social & environmental impact

---

**City UFT Characteristics (CCs)**

1. Vehicle size/type
2. Number of deliveries/collections
3. Quantity of goods delivered/collected
4. Time of day of delivery/pick up
5. Time to carry out deliveries/collections
6. Loading/unloading activities
7. Journey length
8. Journey speed
9. Empty running
10. Environment-friendly distribution
11. Loading/unloading on street space management
12. Loading activities: docking / rendezvous with the truck supplier / load of the boat / load factor
13. Delivering activities: round trip delay

---

Minimum Data for understanding UFT
Description and purpose of the tool (1)

UCT Line 1
Which are the factors influencing UFT (now and in the future)?
How will my UFT look in the future?

UCT Line 2
If I want to influence a specific CC today and in the future, on which InFs should I focus?

Minimum Data for understanding UFT

Experts
Stakeholders
Understanding Cities Tool outcome

InFs = Influencing Factors
CCs = City Characteristics
Current state of the NOVELOG cities UFT (city examples)

Number of deliveries per establishment per week
- 6-10 - Barcelona, LBBDD, Turin
- 16-40 - Copenhagen

Share of deliveries between 07:00-10:00
- 61-80% - Copenhagen
- 21-40% - LBBDD, Turin
- 41-60% - Venice
- <20% - Turin, Venice

Empty running
- 20-30% - Copenhagen

Average vehicle dwell time-minutes per delivery
- 11-20 min - LBBDD
- 5-10min – Pisa, Turin

Average size of goods delivered per drop
- 1 pallet - Barcelona
- < ½ pallet - Copenhagen
- ½ pallet - Turin
Main operational parameters for describing the UFT

Minimum set of data for understanding a city's UFT

- Number of deliveries/collections
- Time of day of delivery/pick up
- Empty running
- Time to carry out deliveries/collections
- Type & quantity of goods delivered/collected

No of vehicle & Vehicle size/type
- Loading/unloading activities
- Environment-friendly distribution

Journey speed
- Journey length

No of cities: 12
No of stakeholders: 174
Main factors influencing UFT per stakeholder category

- Supply chain stakeholders & logistics experts consider User requirements as the most influencing factor category, while public authorities consider 'Logistics solutions' and 'Economy & demographics' as the most influential ones.

- New technologies have not been considered as influential as one would expect (consensus results vary from average to little importance).

- No very high ratings have been given, possibly reflecting the opinion that a multitude of factors interact at the same time and no separate one is considered as the absolutely critical.
Highlights: Supply chain stakeholders vs Public Authorities – Most influencing factors today & in the future?

- Economy & demographics
- Ecology & social responsibility
- Logistics solutions
- New technologies
- Consumer requirements

- Supply Chain Stakeholders
- Public Authorities

1: Not important at all
2: Of little importance
3: Of average importance
4: Very important
5: Extremely important

Economy & demographics
Logistics solutions
Ecology & social responsibility
New technologies
Consumer requirements
## City’s UFT identity & VISION

### Turin, Italy

### Main factors influencing the city’s UFT (in order of significance)

<table>
<thead>
<tr>
<th>Today</th>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Consumer requirements for same day (or next hour) delivery</td>
<td>1. Consumer requirements for same day (or next hour) delivery</td>
<td>1. Consumer requirements for Information about products &amp; their social/environmental impact</td>
</tr>
<tr>
<td>2. Green delivery solutions</td>
<td>2. Internet of Things</td>
<td>2. Internet of Things</td>
</tr>
<tr>
<td>5. Consumer requirement for knowing what happens to the digital data they provide</td>
<td>5. Green delivery solutions</td>
<td>5. Green delivery solutions</td>
</tr>
</tbody>
</table>

### The city’s main UFT characteristics

<table>
<thead>
<tr>
<th>Today</th>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Number of deliveries per establishment per week</td>
<td>6-10</td>
<td>± 5%</td>
</tr>
<tr>
<td>2. Time to carry out deliveries (mins)</td>
<td>5-10</td>
<td>± 5%</td>
</tr>
<tr>
<td>3. Average size of goods delivered per drop</td>
<td>½ pallet</td>
<td>± 5%</td>
</tr>
<tr>
<td>4. Share of trips undertaken by environmental-friendly means (EVs, cargo-bikes)</td>
<td>n/a</td>
<td>+5-15%</td>
</tr>
<tr>
<td>5. Empty running</td>
<td>&lt;20%</td>
<td>± 5%</td>
</tr>
<tr>
<td>6. Average round trip length (kms)</td>
<td>31-40</td>
<td>+5-15%</td>
</tr>
</tbody>
</table>
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4) Data needed for planning and assessing UFT measures
NOVELOG Tools

12 NOVELOG cities

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Novelog Services

4 NOVELOG tools

- UC Tool
  Understanding your City
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  City Impact
- Evaluation Tool
  City Evaluation
- Guidance Tool
  Guide

Dashboard
When to use the Toolkit

1. City looking for suitable City Logistics Solutions for implementation
   - City Selects Parameters (not measures) and searches the database of the Toolkit for suitable measures

2. City wanting to validate that the measure they wish to implement is suitable
   - City Selects Parameters (incl. measures) to view impacts from the implementation of the specific measure in other cities.

3. Data Entry
   - Using the tool to enrich the database with results from measures and/or interventions implemented in other cities
NOVELOG Toolkit:

The Tool enabling a city to identify measures, typology and impacts, in an accessible and repeatable fashion.

List of Suitable Measures and Interventions customized for Each City
NOVELOG City Typology for UFT measures selection

- Why (Dimension)
  - Problems (Parameter)
  - Objectives (Parameter)

- Where (Dimension)
  - City Morphology (Parameter)
  - UFT Logistics Profiles (Parameter)

- Who (Dimension)
  - UFT Markets (Parameter)
  - Key stakeholder (Parameter)

- What (Dimension)
  - Measures (Parameter)

- How (Dimension)
  - Nature of Implementation (Parameter)
  - Nature of business model

NOVELOG Deliverable 4.1. “Integrated inventory of urban freight policies and measures, typologies and impacts”) pp 5 of 120
NOVELOG Toolkit: relates city typology & measures

Why? (Problem & Objectives)
Where? (City Morphology, UFT Logistics Profile)
Who? (UFT Markets, Key Stakeholders)
How? (Nature of Implementation)

Toolkit’s Database
## Toolkit Results

<table>
<thead>
<tr>
<th>Gas &amp; electric vehicles focusing on real time information</th>
<th>Mobile depot implementation</th>
<th>design and implementation of a demonstration system for</th>
<th>Intelligent truck Parking (inter-urban)</th>
<th>Mobility master plan including freight</th>
<th>E tram to collect goods such as bulky waste</th>
<th>Delivery Service Plan</th>
<th>Use of environmentally friendly vehicles (EVF)</th>
</tr>
</thead>
</table>

**Environmental impacts**
- CO2 emission
- Noise pollution

**Economic & Energy impacts**
- Costs
- Energy Consumption

**Social impacts**
- No. of Accidents
- Service Level

**Transport and Mobility Impacts**
- Traffic reduction
- Vehicle Kms
- Load Factor

## Impact Results Sample

<table>
<thead>
<tr>
<th>Impact</th>
<th>Very good</th>
<th>Good</th>
<th>Neutral</th>
<th>Bad</th>
<th>Very bad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category</td>
<td>Very good</td>
<td>Good</td>
<td>Neutral</td>
<td>Bad</td>
<td>Very bad</td>
</tr>
</tbody>
</table>
12 NOVELOG cities

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  Guide

Dashboard
NOVELOG UFT measures impact assessment

6 types of measures proposed by CIVITAS Initiative 2015

UFT Impact Assessment of each measure:

Logistics Sustainability Index (not to be confused with Logistics Performance Index (LPI) developed by the World Bank)

Sustainability indicators include:
- CO₂
- Noise pollution
- Energy consumption
- Accident rate
- Traffic reduction
- Service level (link to LPI)

Source: "Smart choices for cities. Making urban freight logistics more sustainable", CIVITAS Policy Note, CIVITAS Initiative 2015
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4) CONCLUSIONS
Conclusions

• **Data Collection Framework** is needed for normalizing applied methods and techniques

• **Stakeholder’s Cooperation** is crucial for UFT planning and Data collection

• Collecting data is **not enough** for creating knowledge for planning and assessing UFT

• The less important factors for understanding UFT were found to be the most easily measurable → **Heavy data collection** is needed for proper planning

• **Intelligent Transport Systems** are crucial & necessary tools for Data collection

• However, **methods for analyzing** the data need to be further elaborated

• A methodology for developing a plan for **sustainable urban logistics** is needed to be concluded and the cities should be guided for this.
THANK YOU

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www.novelog.eu
BACK UP SLIDES
NOVELOG Cooperation scheme
Issues on data availability & collection

In most cities, city planning and data collection are mainly focused on passenger transport. The most important reasons are:

1. urban freight transport is a complex system, made up of numerous activities, and it is necessary to collect data from a large quantity of economic agents
2. shippers and transport operators do not want to share information of their operations.
3. local authorities are not able to understand what kind of data is needed and
4. collecting and updating urban freight data can be too expensive for local authorities.
Understand the city’s UFT journey

1. Data Collection Framework
2. Decision support
   NOVELOG Tools
3. Real cases testing
   NOVELOG UCT
   NOVELOG Toolkit
   - Main Factors influencing the UFT environment
   - Minimum set of data for understanding UFT
   - Current and expected future state of Novelog citie’s UFT environment
   - Implementation challenges

7 Pilots
5 Case studies
To facilitate the interaction and consensus building among the various stakeholders of Urban Freight Transport (UFT) in:

• identifying key influencing factors of their UFT environment
• assessing the current and exploring the future state of their UFT
• identifying the main factors that influence certain UFT city characteristics

But more importantly, to serve as an ongoing participatory platform on UFT issues.
Answers to key UFT challenges (1)

1. UFT embeds conflicts
   - UCT facilitates *consensus building* among the various stakeholders of the UFT environment, covering both the influencing factors and their impact (today and in the future)

2. UFT is highly context-specific & dynamic
   - UCT guides stakeholders and provides results *at the city level* (i.e. context-specific) while it facilitates *inter-city comparisons*
   - UCT enables stakeholders to select the influencing factors (InFs) which are the most relevant for their city and add *new ones as these emerge*. They can also provide their views on specific issues (e.g. specific city characteristics) in *different time horizons*
Answers to key UFT challenges (2)

3. UFT is multi-faceted
   - UCT ensures that **stakeholder-specific views** on certain aspects of the UFT remain visible and **are not hidden in the consensus**

4. UCT results rely on stakeholder participation
   - The UCT is being operationalised as **part of the city multi-stakeholder organisational platforms**, therefore ensuring stakeholder involvement
   - User interaction with the UCT is designed for becoming increasingly **simpler as we move towards its end-users** (admin -> city moderator -> city stakeholder)
   - UCT is **fully customisable**
Description and purpose of the tool (2)

Results visualisation & cross-comparisons

InFs & CCs (initial list) → InFs & CCs (updated list) → EXPERTS → CITY A

CITY A

CITY B

CITY C

Minimum Data for understanding UFT

Consensus on:
- The most important InFs
- The current & future state of UFT (CCs)
- Identification of InFs to be targeted

InFs = Influencing Factors
CCs = City Characteristics

Description and purpose of the tool (2)

Minimum Data for understanding UFT

Consensus on:
- The most important InFs
- The current & future state of UFT (CCs)
- Identification of InFs to be targeted

InFs = Influencing Factors
CCs = City Characteristics

24/10/2017 46
Turin’s NOVELOG pilot:

Sharing of public transport reserved lanes
Booking of loading/unloading docks
Limited Time Zones entrance

DATA Collected:
- Number of shipments
- Avg. distance of a drive
- Number of load/unload stops
- Distance traveled per type of vehicle
- Fuel type per vehicle type
- Avg. emission produced per vehicle type
- Number of accidents
- Total veh-km
- Number of vehicles performing illegal movements
- Total number of units

Data collection methods:
- 20 vehicles involved in the pilot where the on board units (OBU)
- CAN BUS on board of PT selected sample of buses
- Parking sensors
Which is the expected future state of the NOVELOG cities UFT environment?

<table>
<thead>
<tr>
<th>Category</th>
<th>Not Favourable</th>
<th>Favourable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of deliveries per establishment per week</td>
<td>&gt;15% decrease</td>
<td>±5%</td>
</tr>
<tr>
<td>Share of deliveries between 07:00-10:00</td>
<td>&gt;15% decrease</td>
<td>±5%</td>
</tr>
<tr>
<td>Avg vehicle dwell time-minutes per delivery</td>
<td>5-15% increase</td>
<td>&gt;15% decrease</td>
</tr>
<tr>
<td>Avg size of goods delivered/collected per drop</td>
<td>5-15% increase</td>
<td>&gt;15% increase</td>
</tr>
</tbody>
</table>

Cities: Copenhagen, LBBD, Turin, Barcelona, Rome, Pisa, LBBD.
Data for UFT planning

Collecting methods: Stakeholder Platform (SP-mean values), Survey (S), ITS, Simulation (SM)

- type of suppliers (manufacturers, wholesalers, etc.) (SP, S)
- type of agreement for delivery/collection from supplier (SP, S)
- who organises delivery/collection of goods (SP, S)
- who resolves delivery/collection problems (SP, S)
- type of delivery/collection operator (own account, logistics company, carrier, express courier, etc.) (SP, S)
- no. of deliveries/collections (S)
- size/type of delivery/collection (S)
- type of delivery packaging used (S)
- quantity of goods delivered/collected (S)
- frequency of delivery/collection of goods (S)
- who sets delivery/collection time (S)
- time taken to carry out deliveries (SP, S)
- whether staff from establishment need to be present (S)
- whether signature is required (SP, S)
- whether goods have to be checked by receiver (S)

Pillar 1: Profile of major supply chains served in the urban area under study.

- type of establishment (S)
- size of establishment (S)
- employees at establishment (S)
- size of warehousing space at establishment (S)
- other warehousing space out of establishment (S)
- no. of deliveries/collections (considering all types of goods as a whole) (S)
- delivery/collection frequency (considering all types of goods as a whole) (S)
- size/type of delivery/collection (considering all types of goods as a whole) (S)
- whether vehicles based at establishment (S)
- deliveries/home deliveries made by vehicles at the establishment (S)

Basic Method for data collection for Pillar 1: SURVEY → Establishment / Commodity flow Survey
# Data for UFT planning

## Data collection framework and data capture

### Pillar 2

#### Mapping of urban freight and service trips activity

**Collecting methods:**

- Stakeholder Platform (SP)
- Survey (S),
- Technology (ITS)
- Simulation/Calculation (SC)

<table>
<thead>
<tr>
<th>Data/Method</th>
<th>SP</th>
<th>S</th>
<th>ITS</th>
<th>SC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of operator</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type and number trips</td>
<td>V</td>
<td>V</td>
<td>V</td>
<td>V</td>
</tr>
<tr>
<td>Type/size/weight of vehicle</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time of day</td>
<td>V</td>
<td>V</td>
<td>V</td>
<td>V</td>
</tr>
<tr>
<td>Journey time</td>
<td>V</td>
<td>V</td>
<td>V</td>
<td>V</td>
</tr>
<tr>
<td>Variation by day of week</td>
<td>V</td>
<td>V</td>
<td>V</td>
<td>V</td>
</tr>
<tr>
<td>Variation during year</td>
<td>V</td>
<td>V</td>
<td>V</td>
<td>V</td>
</tr>
<tr>
<td>Driving time; stationary time</td>
<td>V</td>
<td>V</td>
<td>V</td>
<td>V</td>
</tr>
<tr>
<td>Type &amp; quantity goods of carried and delivered/collection</td>
<td>V</td>
<td>V</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Type of establishments/land use served**

- * * *

<table>
<thead>
<tr>
<th>Data/Method</th>
<th>SP</th>
<th>S</th>
<th>ITS</th>
<th>SC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of vehicle round (single / multi-drop; deliveries / collections)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of stops per round</td>
<td>V</td>
<td>V</td>
<td>V</td>
<td>V</td>
</tr>
<tr>
<td>No. of rounds per day</td>
<td>V</td>
<td>V</td>
<td>V</td>
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City Logistics key projects reviewed & Measures identified

5 types of measures

1. Stakeholders’ engagement
2. Regulatory measures
3. Market-based measures
4. Land use planning & infrastructure
5. New technologies
6. Eco-logistics awareness raising
First Impact Assessment outcomes from 10 Novelog cities

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‘without co-operation and understanding amongst stakeholders it is not possible to implement long term solutions to urban logistics problems’


Thank you