New cooperative business models and guidance for sustainable city logistics

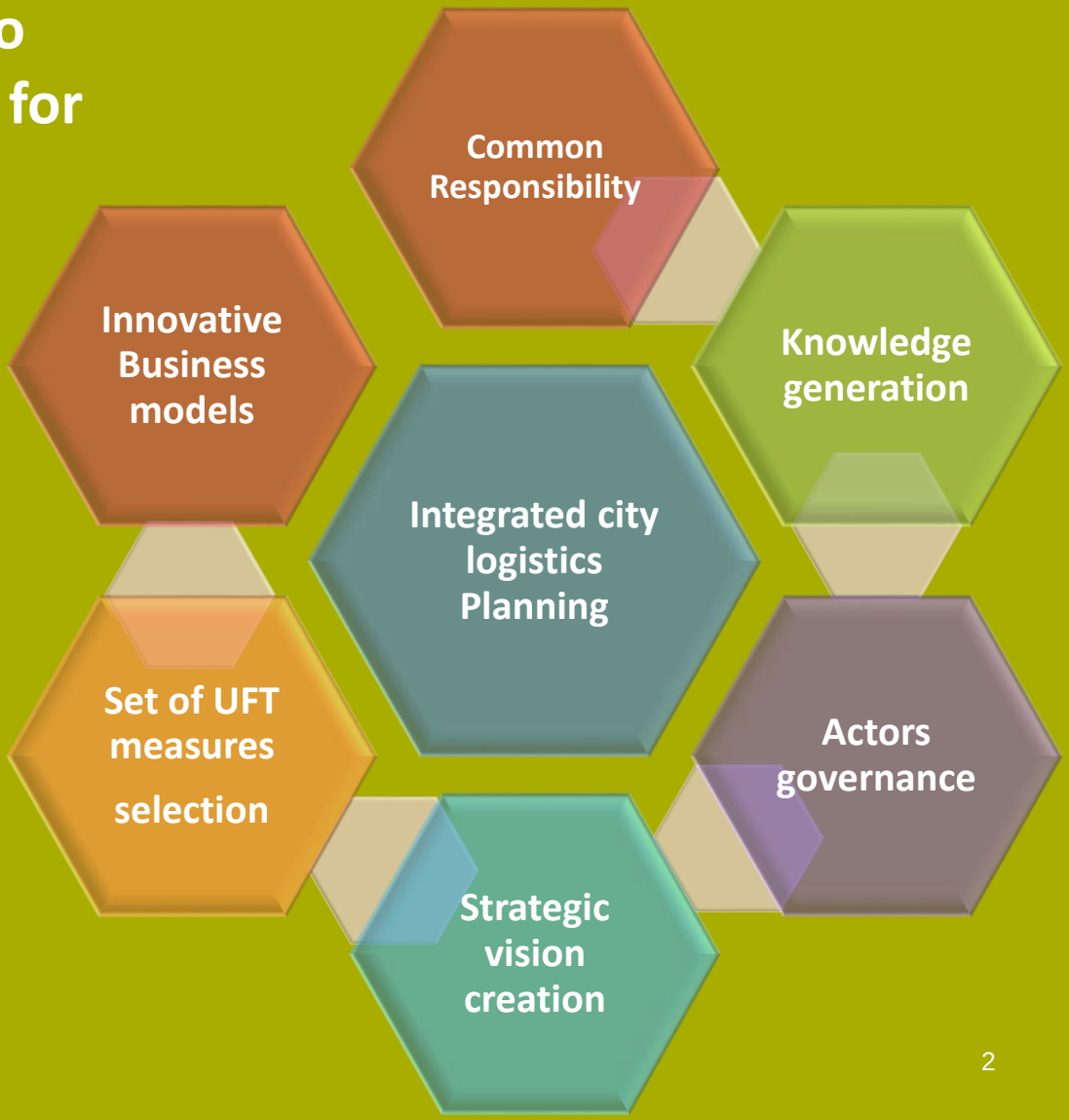
Georgia Ayfadopoulou
Project Coordinator
Centre for Research & Technology Hellas (CERTH)
Hellenic Institute of Transport (HIT)

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 636626"

Objectives vs Challenges (1)

Provide practical approach to local Authorities & Industry for adopting innovative & sustainable city logistics solutions

Support the change & achieve paradigm shift in UFT planning



novelog

Objectives vs challenges (2):

Implementing Integrated Approach in 12 cities

- Different countries
- Different Priorities & Needs
- Different levels of Maturity
- Different Mixture of Measures

- The same objective: **A more sustainable & liveable city**

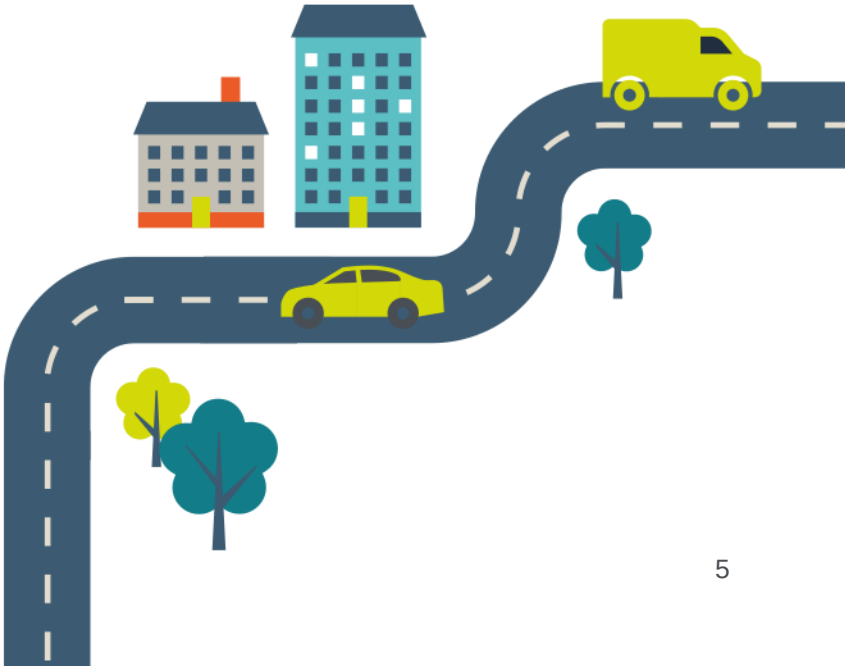
novelog

Consortium identity

Research & Academia (8)	CERTH, HELLENIC INSTITUTE OF TRANSPORT CERTH / HIT, UNIVERSITY of THESSALY, CENTRO DI RICERCA PER IL TRASPORTO E LA LOGISTICA, newrail, SAPIENZA UNIVERSITÀ DI ROMA, Venice International University, CENIT CENTER FOR INNOVATION IN TRANSPORT, istituto sui trasporti e la logistica fondazione, AKADEMIA MORSKA SZCZECIN
Regional/ City authorities (11)	RegioneEmilia-Romagna, London Borough of Barking & Dagenham, CITY OF ATHENS, ATHENS DEVELOPMENT AND DESTINATION MANAGEMENT AGENCY, CITY OF COPENHAGEN, GRAZ, MECHELEN mobilità, ROMA, Ajuntament de Barcelona, CITTA' DI TORINO, City of Gothenburg
Industrial actors (4)	RENAULT, TRAINOSE, DAPPOLONIA, synergy Engineering Solutions
Association/ Networks /Consultants (5)	POLIS, IRU Projects, ERTICO ITS EUROPE, BIM, Panteia Research to Progress

novelog

Project Outcomes to city logistics community



novelog

1. Real implementations: 12 Cooperative UFT solutions

- **24h delivery**
  - Home deliveries: LSPs, S&R
  - E-commerce system for small shops: LSPs, S&R
- **ITS for UFT monitoring**
  - ITS for sustainable access control :LSPs, IP,PA
  - ITS for data collection in Planning: LSPs, IP,PA
- **Consolidation**
  - Urban consolidation centres: LSPs, IP,PA
  - Microconsolidation - Lockers introduction: LSPs, S&R
  - Actors cooperation initiative for increased load factor in vehicles: LSPs
- **Intermodality**
  - Urban Transhipment facilities & mobile depots: LSPs, IP,PA
  - Rail Road combination for reducing no of vehicles :LSPs, IP,PA
- **Micro distribution**
- Cargo bikes for B2B and B2C: LSPs
- Electric vehicles for mobile collection & delivery: LSPs
- **Use of Public Transport for freight delivery**: PA, LSPs S/R

novelog

Logistics Services Providers: **LSP,s** **Shipper/receiver (S/R),**

Public agency (PA) **Infrastructure provider (IP),**

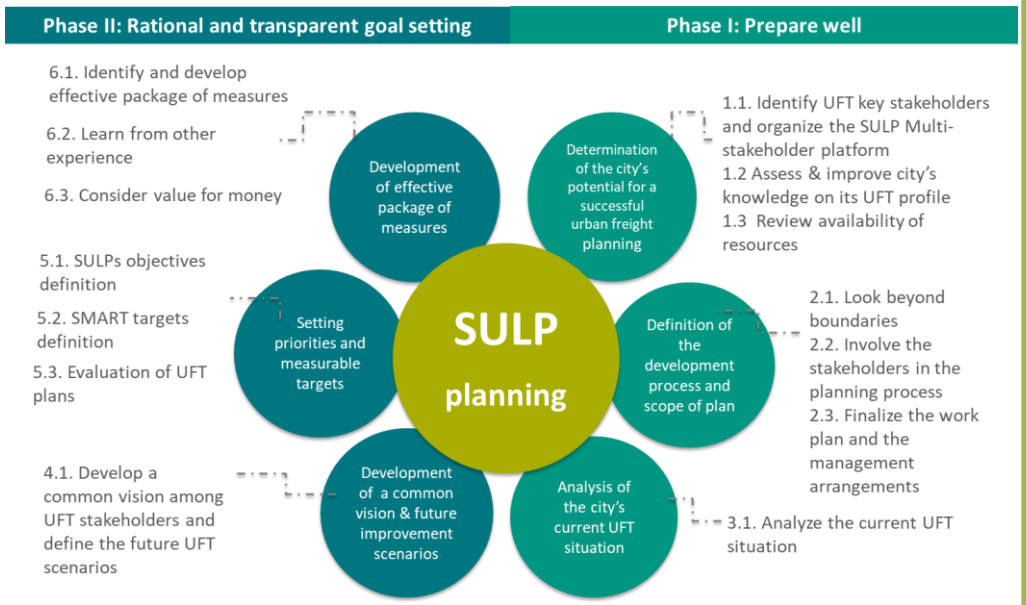
Example of industrial stakeholders participation to NOVELOG implementations: Turin

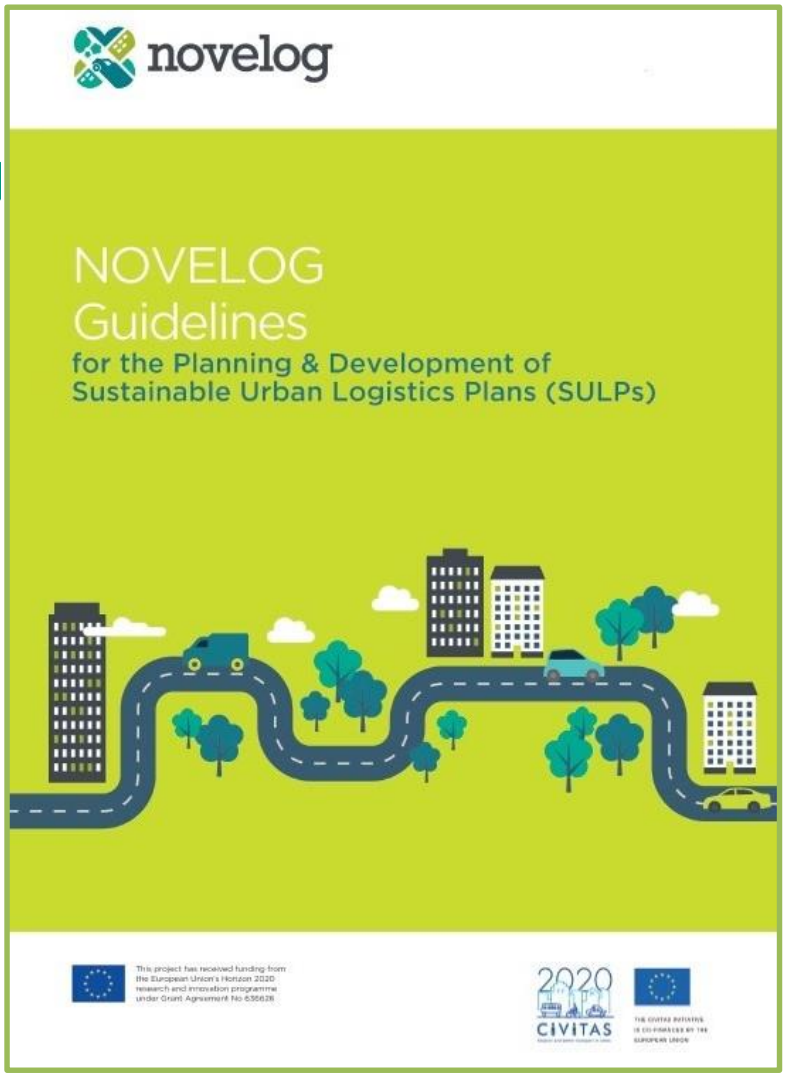
- The **City of Turin** and **RINA Consulting** as partners of the Novelog Project
- The main logistics operators:

(50 vehicles = 80% of the totals)

- The main technological operators:

2. SULP's Guidance process





Need for Sustainable Logistics Plans Development Similar to that of SUMPs

novelog

3. Data Collection Framework for UFT

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

Applied Organizational and legal framework

Pillar 4

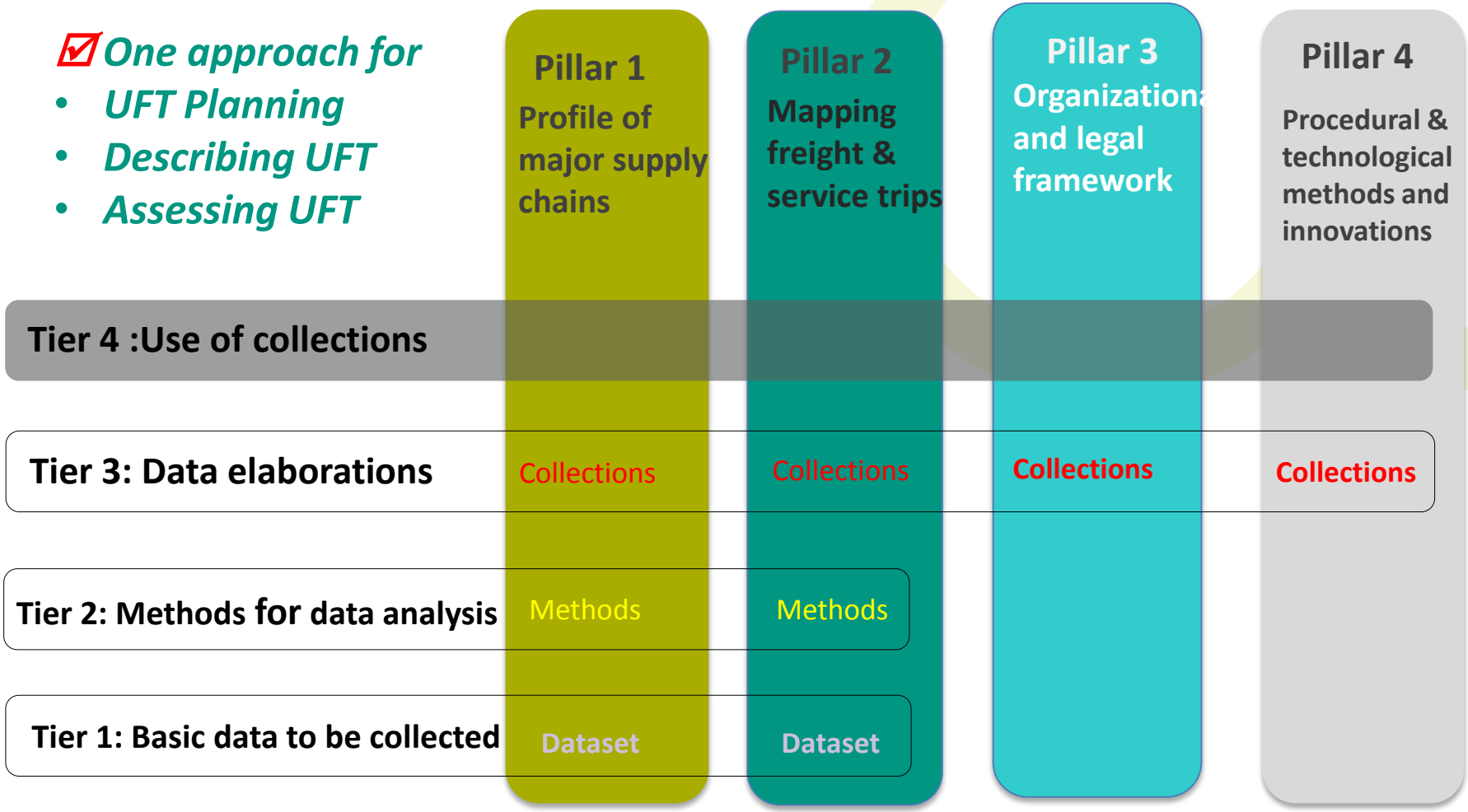
Procedural and technological methods and innovations used

novelog

Conceptual layout of the Framework

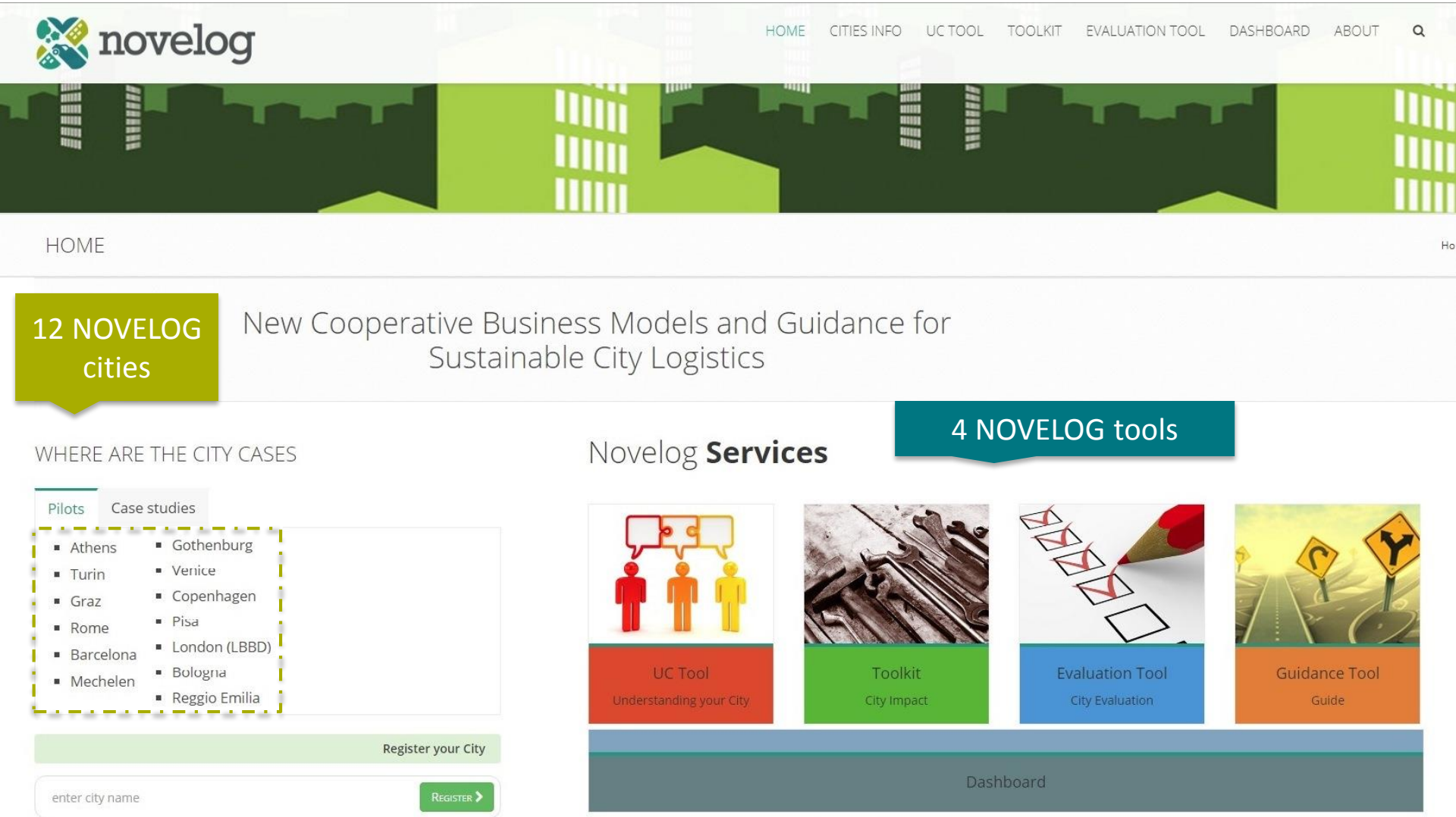
☑ *One approach for*

- *UFT Planning*
- *Describing UFT*
- *Assessing UFT*



novelog

4. Tools for assisting UFT planning



novelog

www.uct.imet.gr

Tools for NOVELOG integrated planning approach

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

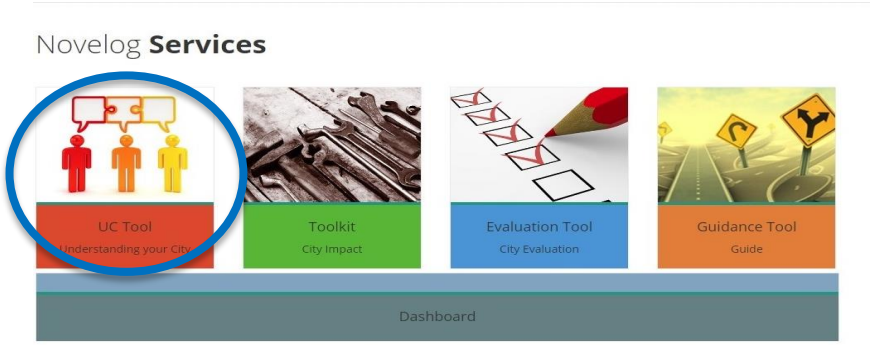
All UFT measures are not applicable to all cities: **assess the applicability of certain UFT measures** to certain types of cities

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

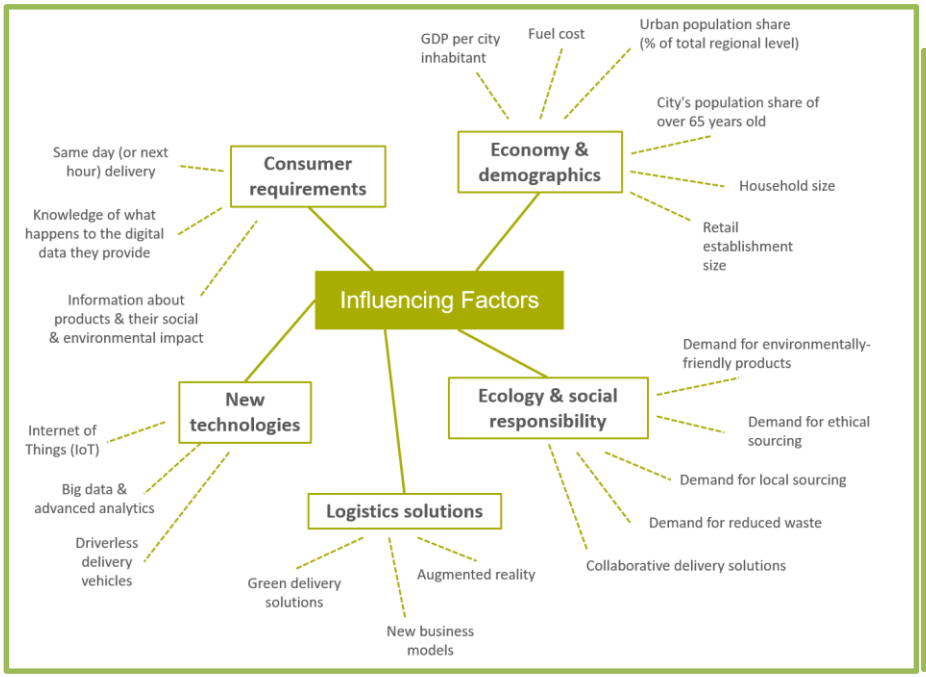
Guide implementers of UFT measures on the most appropriate **business models** for their successful introduction & sustainable operation

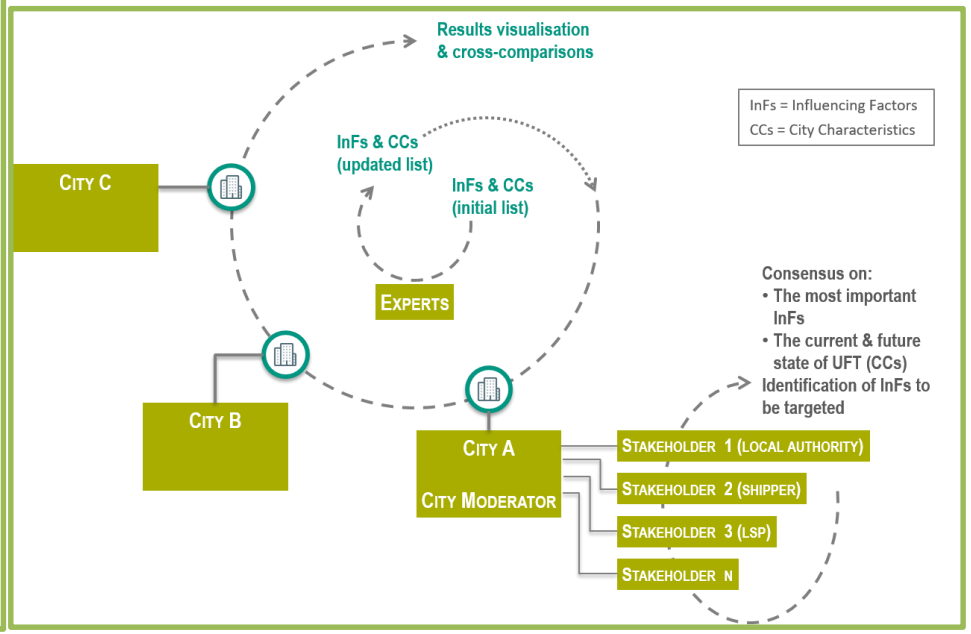
novelog

NOVELOG-UCT: Understanding cities' UFT tool



1. **Stakeholders Governance Platform**
2. **Web DELPHI & PROMHTHEE for consensus building**
3. **Dashboard for UFT comparison and benchmarking**





novelog

UFT comparison & benchmarking

Number of deliveries per establishment per week

6-10 - *Barcelona, LBBD, Turin*

16-40 - *Copenhagen*

Share of deliveries between 07:00-10:00

61-80% - *Copenhagen*

21-40% - *LBBD, Turin*

41-60% - *Venice*

Empty running

20-30% - *Copenhagen*

<20% - *Turin, Venice*

Average vehicle dwell time-minutes per delivery

11-20 min- *LBBD*

5-10min – *Pisa, Turin*

Average size of goods delivered per drop

1 pallet - *Barcelona*

< ½ pallet - *Copenhagen*

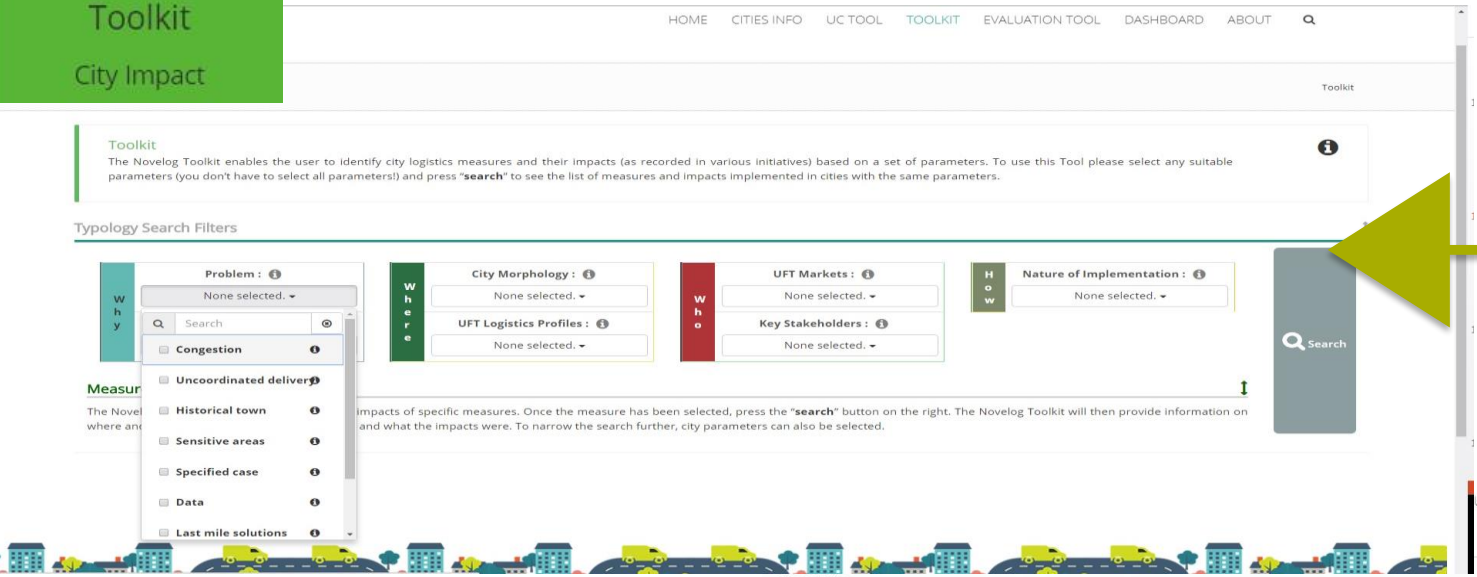
½ pallet - *Turin*

novelog

NOVELOG Toolkit :relates city typology & measures

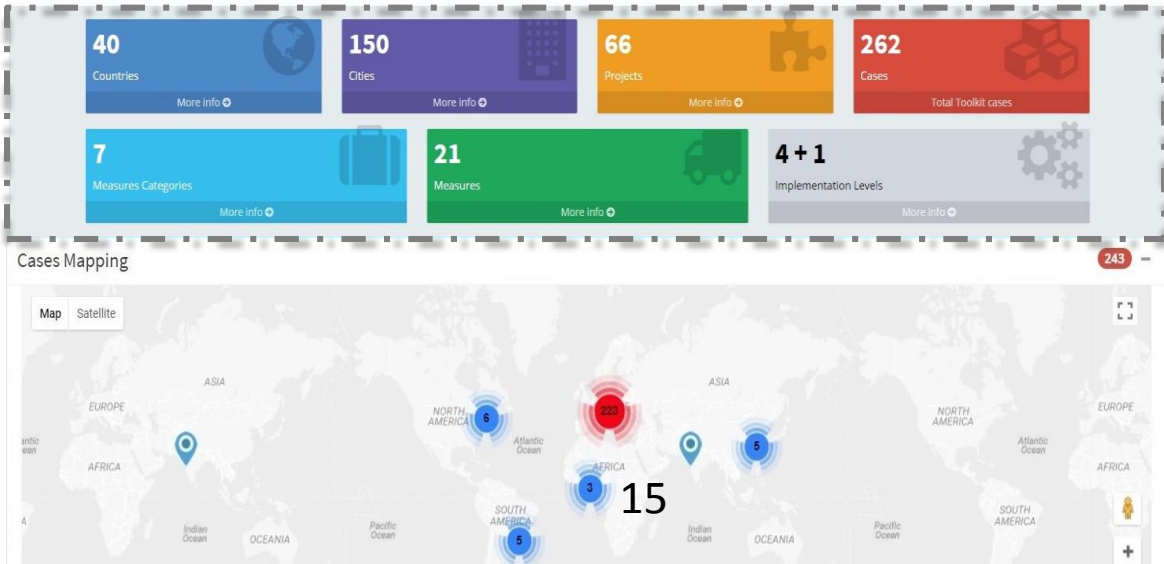
Toolkit

City Impact



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

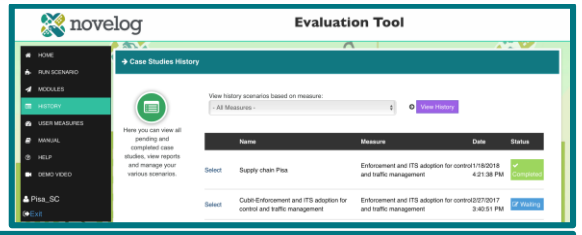
Database of all previous UFT measures implementations

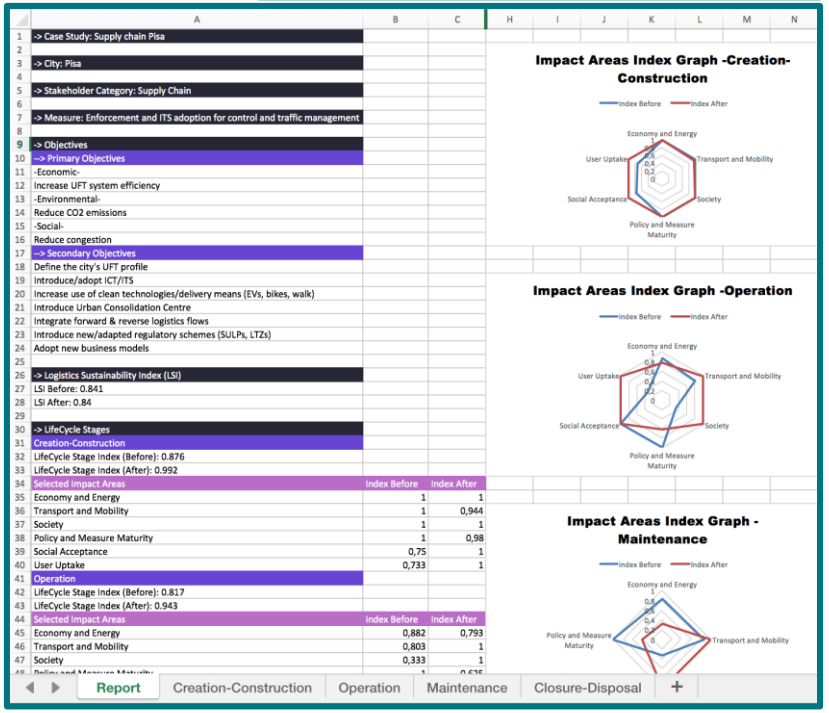


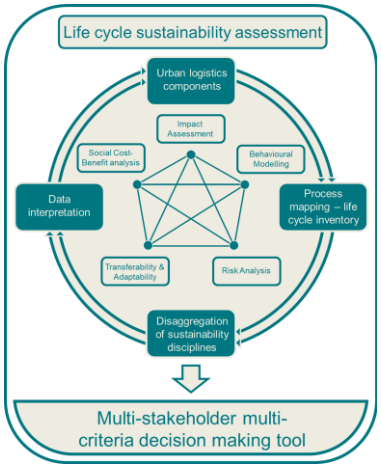
novelog

NOVELOG-EVALOG: Assessing impacts of UFT measures

1. **EX-POST & EX-ANTE evaluation of UFT measures in a city**
2. **Electronic library of alternative methodologies for quantifying evaluation indicators.**
3. **Life cycle analysis**
4. **UFT sustainability Index**



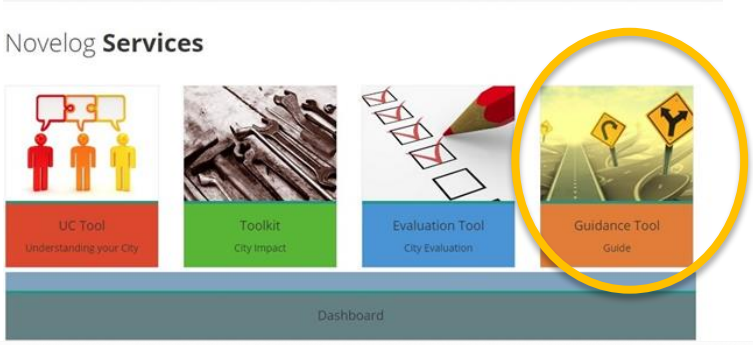


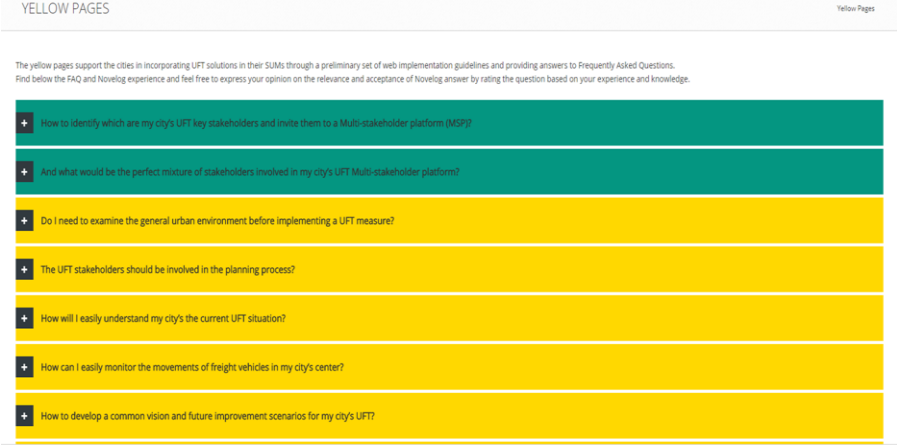


novelog

NOVELOG-Guidance Tool for Cooperative business Models

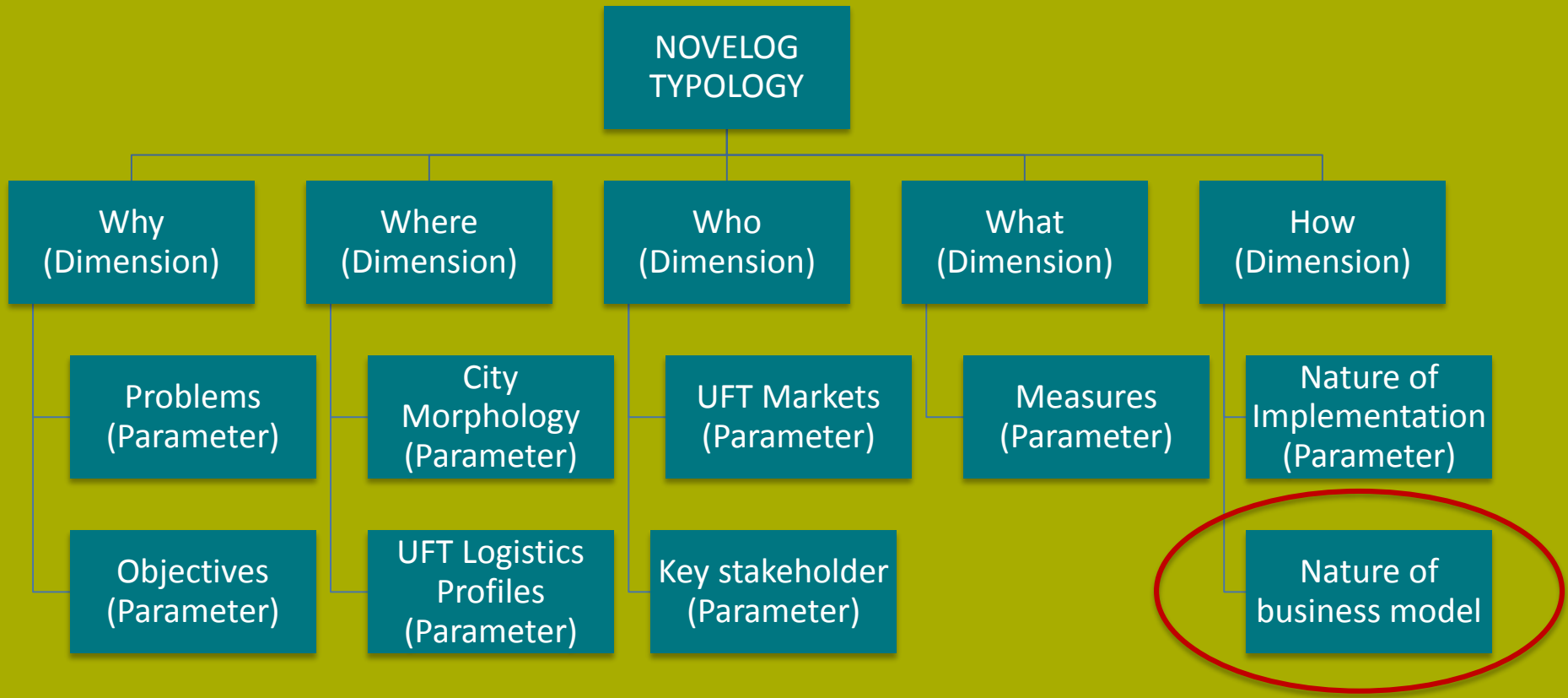
1. **Dedicated Business Models for UFT measures**
2. **Multi-stakeholders Platform mixture, organization & operation**
3. **Yellow Pages for commonly asked questions for UFT**





Stakeholder's Category	Proportion
Supply Chain Stakeholders (Transport Operators, Freight Forwarders, Retail chains, Shop owners e.tc.)	**25%**
Public Authorities (Local % National government e.tc.)	**25%**
Other Stakeholders (Industry % Commerce Associations, Research % Academia, Consumer Associations e.tc.)	**38%**
Experts	**12%**

5. Methodology for Transferability through NOVELOG City Typology for selecting UFT measures.

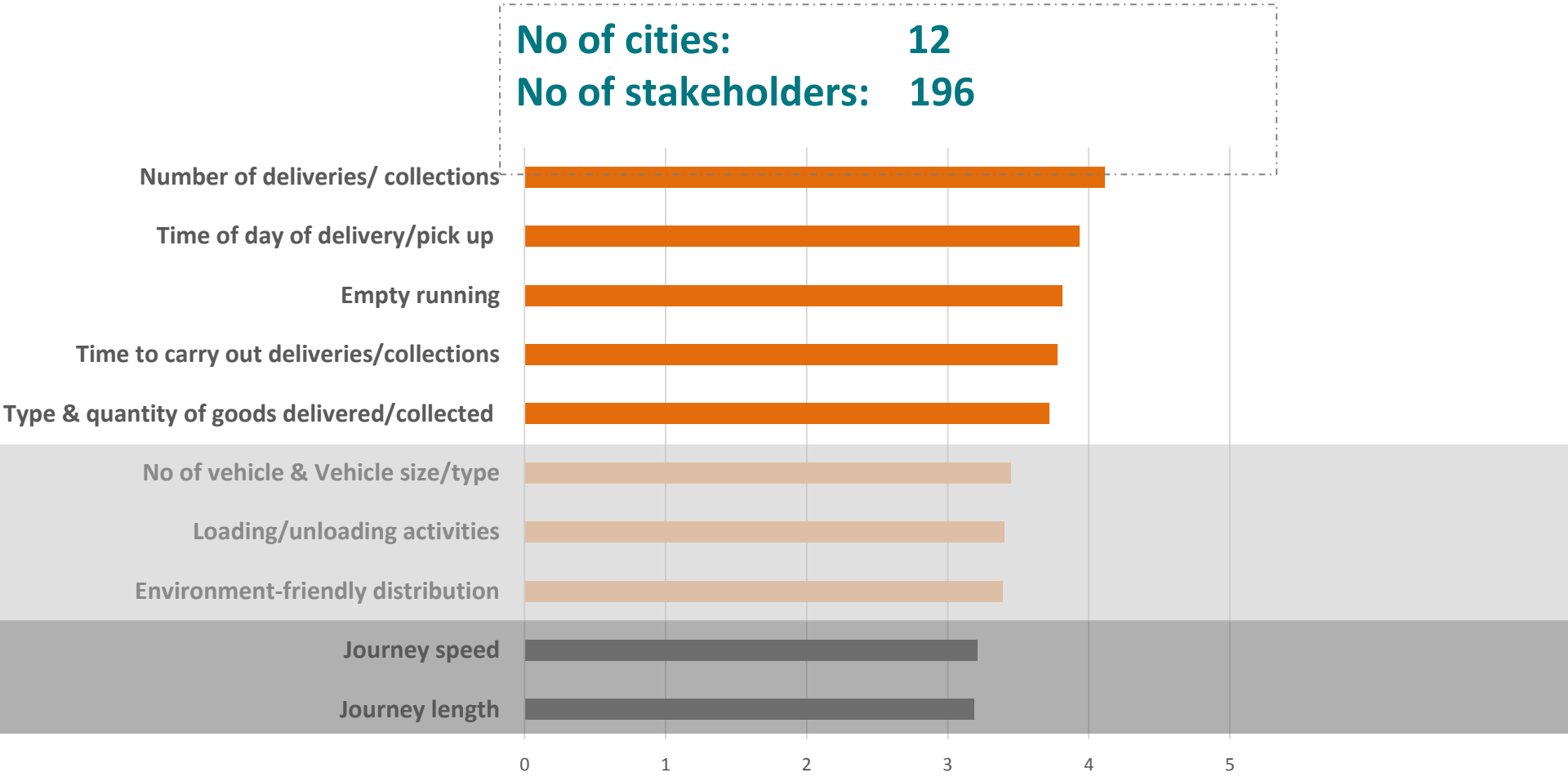


NOVELOG Deliverable 4.1. "Integrated inventory of urban freight policies and measures, typologies and impacts") pp 5 of 120

6. Appropriate Business Models for viable city logistics measures

Consolidation scheme	Customer (offering)	Value proposition	Reduced value proposition	Revenue stream	Cost structure
Urban consolidation centre (UCC)	LSP (UCC services)	Green branding Responsiveness to delivery (due to proximity) Value-added services	Additional fixed costs Additional handling	Subscription model	Existing UCC to be renovated Operational costs
	LSP (EV rental solutions)	Green branding EV rental (and recharging)	Additional transport costs	Subscription model	Purchase of vehicles and charging system
Micro-consolidation centre (MCC)	LSP (Light goods delivery)	For receivers – higher availability and therefore convenience Reduced transport cost Access to restricted area Pick-up point for parcels	Additional handling	Long-term contract with LSP No extra cost to receiver Charged for parcel pick-up	Investment and operational costs for MCC Real estate (provided by municipality) Investment and operational cost for cargobike deliveries ICT fleet management system
	(Other) LMO (Bicycle servicing)	Bicycle repair, recharge,	None (additional service)	Per use	
	City council (Delivery/transport data)	Understand UFT flows for e-commerce	None	-	
Receiver-led consolidation (RLC)	Retailers in shopping (replenishment with consolidated transport)	Delivery flexibility Delivery reliability and punctuality "Basic" transport service cost reduced Value-added services	None	Base service – paid by shopping centre owners Extra services – paid by tenants	Use of existing UCC/warehouse -> no new investment cost Operational costs
Automated locker system (ALS)	LSP (Light goods delivery)	Reduced failed deliveries Reduced costs for transport Access to city Green branding	Extra costs for usage	Pay-per-use charged to LSP	Real estate (fully funded by municipality) Installation of lockers Operating costs (maintenance, surveillance, energy, ICT system)
	Receivers (Light goods delivery)	Reception flexibility Reception accessibility No extra cost	May not fit every receiver due to travelling	None	

7. Minimum dataset describing UFT for regular collection (observatory)



Recommendations for Regulation & incentives for data provisioning by the industry

novelog

8. Valid Stakeholder's Operational Agreements

CITTA' DI TORINO MERCI

NOVELOG

New cOoperatiVe business modEls and guidance for sustainable city LOGistics

PERMESSO MERCI

Ente o ditta:

N: Scade: 30/09/2016

Targa:

IL DIRIGENTE

Service Level Agreement for a Freight Network

SHARING COPENHAGEN

BE PART OF THE SOLUTION

PARTNERSHIP AGREEMENT

Between

[enterprise]

and

City of Copenhagen

an agreement has today been entered into on cooperation/development in **[Energy Production/Energy Consumption/Urban Nature/Green Mobility/Climate Adaptation/Sustainability]**

novelog

NOVELOG SULP Guidelines

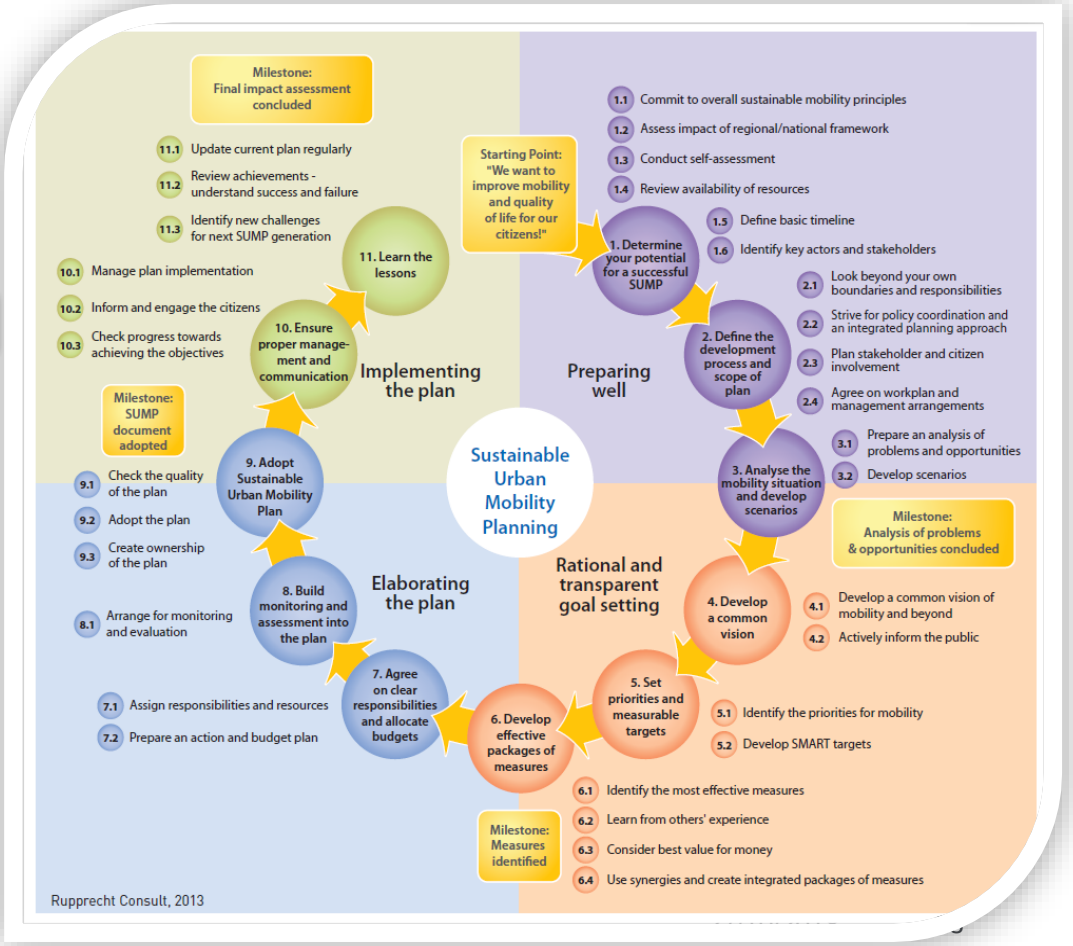
A method to implement for ..making a SULP

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 636626"

Eltis SUMP Guidelines

A **Sustainable Urban Mobility Plan** is a strategic plan designed to satisfy the **mobility** needs of people and businesses in cities and their surroundings for a better **quality of life**. It builds on existing planning practices and takes due consideration of **integration, participation** and **evaluation** principles

- Published in 2015
- 11 main steps & 32 activities
- Mainly emphasizes in passenger mobility
- No concrete guidelines on how to achieve efficient and effective urban freight transport



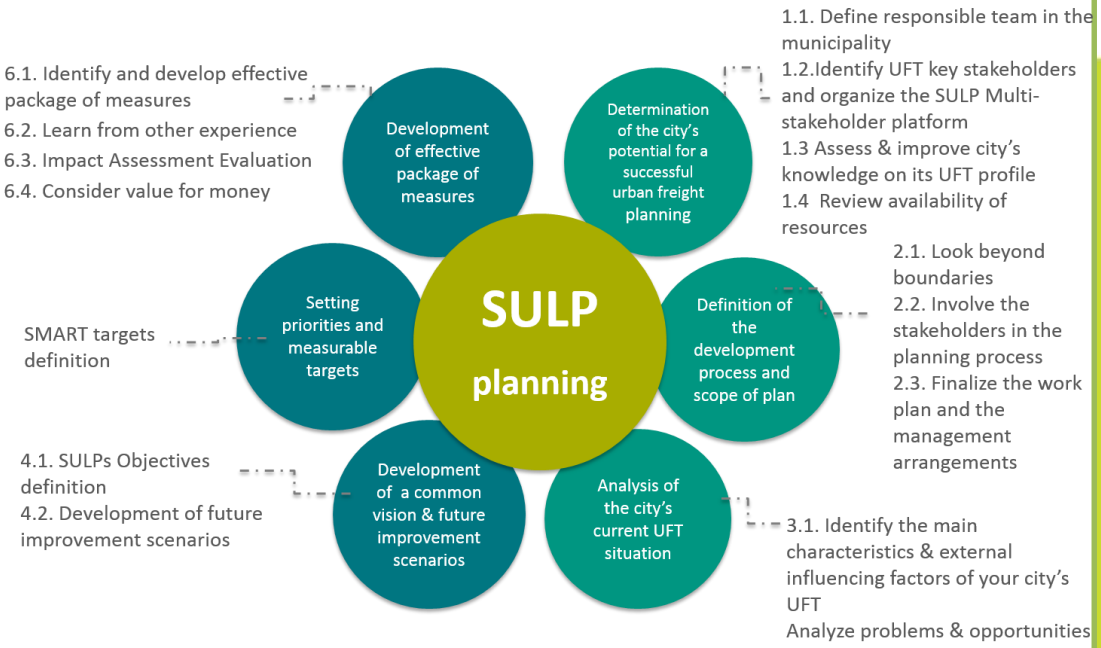
Eltis: The Europe's main observatory on urban mobility

SULP Guidance process

The **NOVELOG project** is filling the gap of the current SUMPs approach by suggesting **specific guidelines** on how a local authority could **incorporate UFT measures and policies** in their SUMP

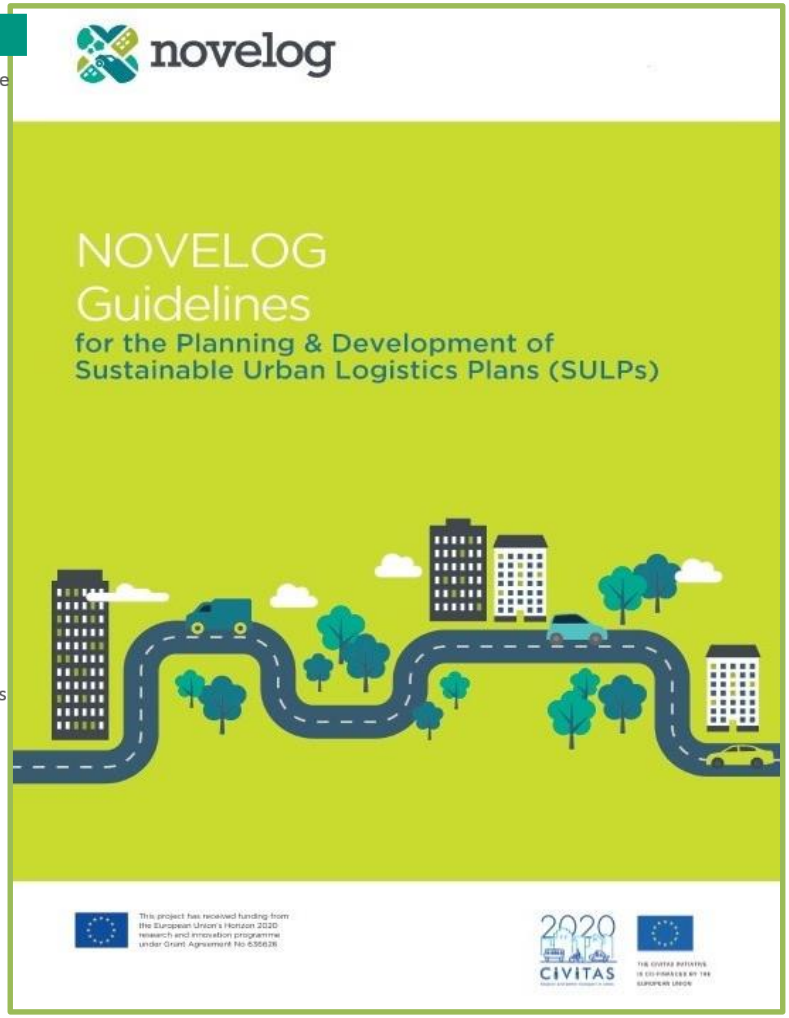
Phase II: Rational and transparent goal setting

Phase I: Prepare well



Need for Sustainable Logistics Plans Development Similar to that of SUMPs

novelog



SULP Guidelines – 6 Steps 13 activities

1. Determination of the city's potential for a successful urban freight planning process.
2. Definition of the development process and scope of the plan
3. Analyse the current UFT situation
4. Development of a common vision & future improvement scenarios
5. Setting priorities and measurable targets
6. Development of effective package of measures

Step 1: Determination of the city's potential for a successful urban freight planning process (4 activities)

1.1. Define responsible team in the municipality/city authority for the SULP design and implementation

1.2. Identify UFT key stakeholders and organize the SULP Multi-stakeholder platform (MSP)

- **Best practice: Implement a Multi-stakeholder Platform**

Perfect Mixture of a Multi-stakeholder platform

Stakeholder's Category	Proportion
Supply Chain Stakeholders (Transport Operators, Freight Forwarders, Retail chains, Shop owners e.tc.)	**25%**
Public Authorities (Local % National government e.tc.)	**25%**
Other Stakeholders (Industry % Commerce Associations, Research % Academia, Consumer Associations e.tc.)	**38%**
Experts	**12%**

Turin-Italy

- Express couriers (TNT, SDA, BARTOLINI, DHL, UPS, GLS)
- Industrial Stakeholders(ANFIA,API,Confindustria,Federauto,Unione Industriali,UNRAE)
- Association and logistics operators (AICAI, Apsaci, FEDIT, Federdistribuzione, Confartigianato Trasporti, FITA C.N.A., FAI
- Retailers associations (ASCOM – Confcommercio, C.N.A., Confartigianato, Confcooperative, Confesercenti)
- Public Authority (Local Chamber of Commerce, Municipality of Turin, Ministry of Infrastructure and Transport, Piedmont Region)
- Technology partners (5T,Viasat,Torino Wireless)
- Freight Villages (Sito Interporto)

Step 1: Determination of the city's potential for a successful urban freight planning process

1.4. Review availability of resources

1) Confirm in the MSP meeting the tools and data that are available for UFT planning

2) Compare the data proposed in NOVELOG Data Collection Framework with your own resources, to identify which further data should be collected.

Pisa-Italy

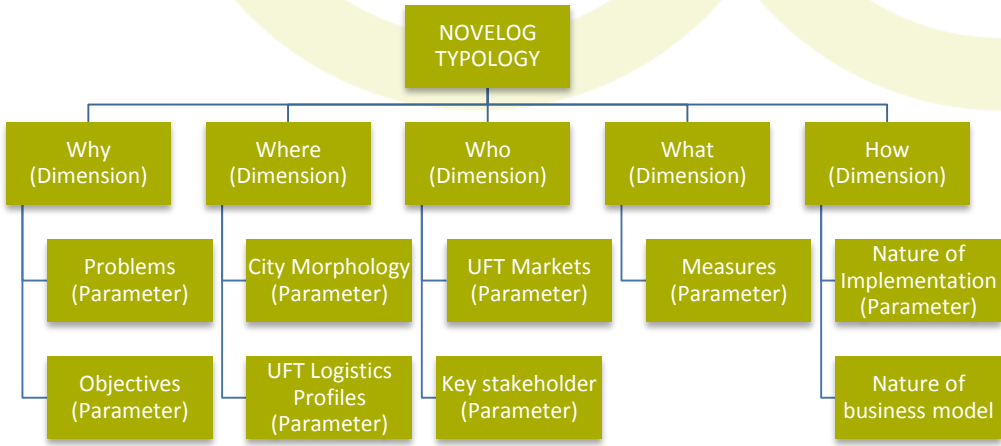
- RFID gates & passes
- Flow sensors
- Draft SUMP

Step 2: Define the development process and scope of the plan (3 activities)

2.1. Look beyond boundaries

NOVELOG created a poly-parametric city typology of cities where a city can be described based on six main criteria:

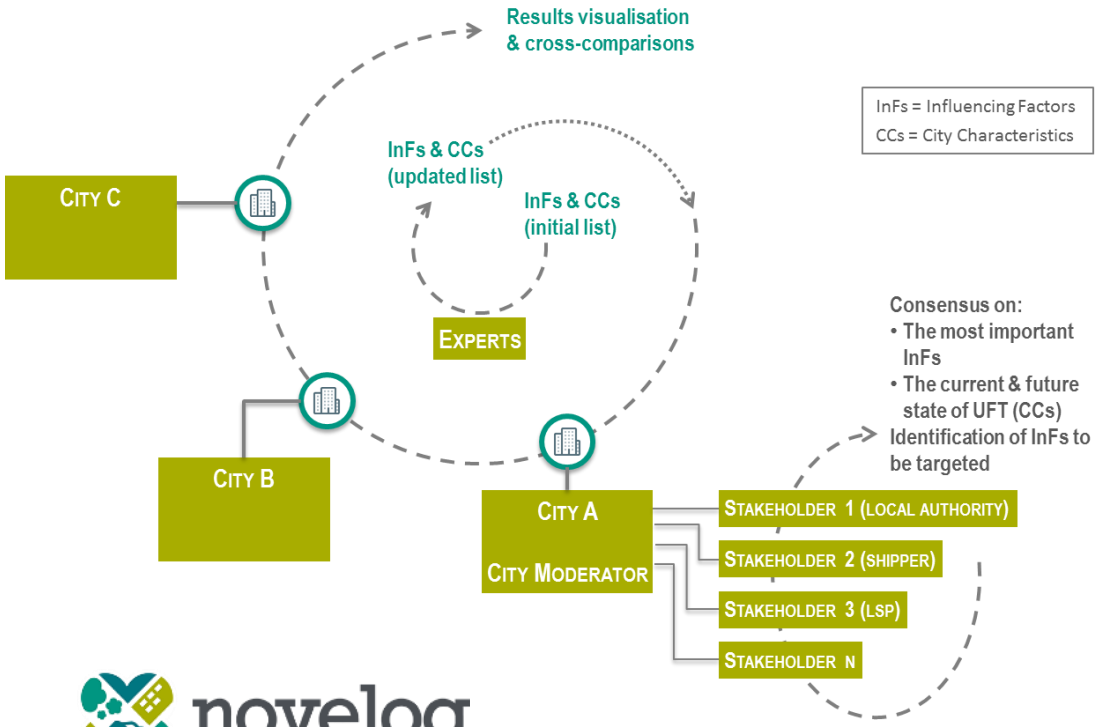
1) Economic activity, Infrastructure, Gross Domestic Product
2) Degree of integration of freight generating activity, such as the presence of a few large employers in a City
3) Political culture
4) Culture
5) Degree of logistics sprawl
6) Legal and regulatory framework.



Step 2: Define the development process and scope of the plan

2.2. Involve the stakeholders in the planning process

The NOVELOG Understanding the Cities Tool (UCT) through a web-enabled Delphi methodology, allows for virtual MSP meetings and opinion management techniques.

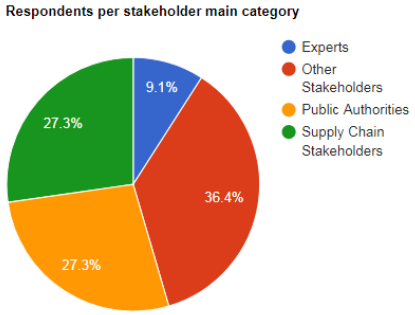


All Novelog cities

Who provided their views?

134 Total number of respondents

14 Total number of cities



Step 2: Define the development process and scope of the plan

2.3. Finalize the work plan and the management arrangements

The management and implementation arrangements may be formalized in **written Memorandum of Understandings** among the UFT stakeholders participating in the MSP.

Copenhagen-Denmark

SHARING COPENHAGEN
BE PART OF THE SOLUTION

PARTNERSHIP AGREEMENT

Between

[enterprise]

and

City of Copenhagen

an agreement has today been entered into on cooperation/development in [Energy Production/Energy Consumption/Urban Nature/Green Mobility/Climate Adaptation/Sustainability]

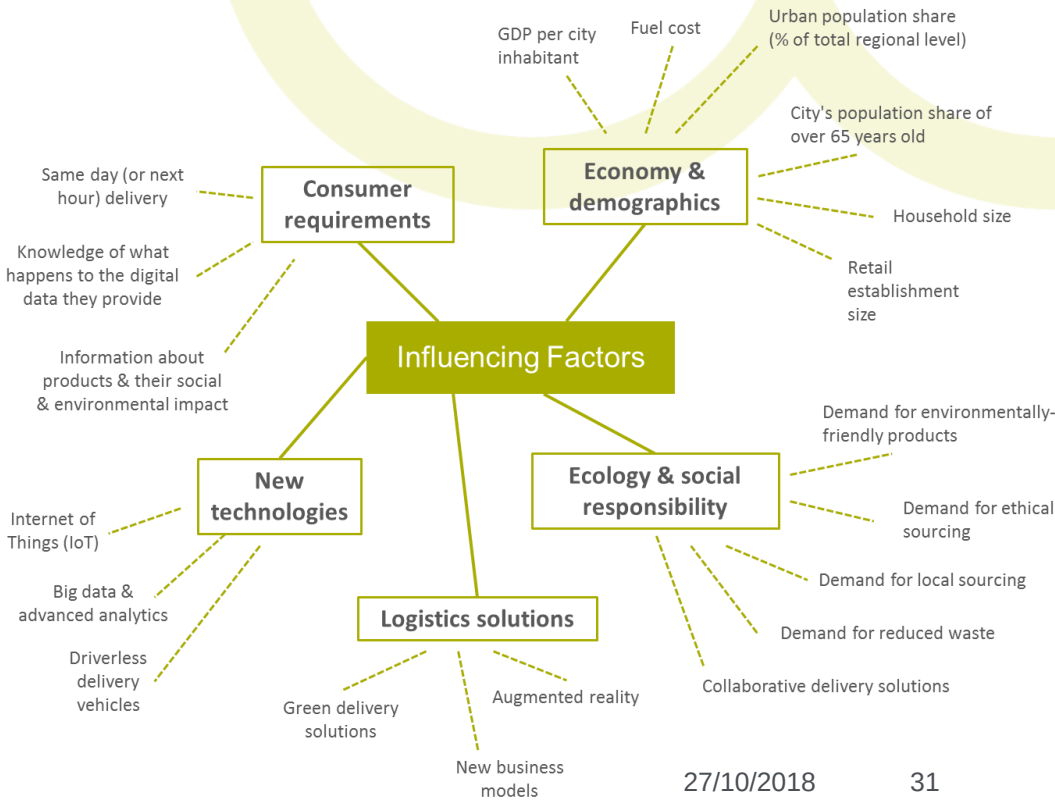
1. Background and purpose

The City of Copenhagen has adopted a series of ambitious plans, among other things on CO_2 neutrality in 2025, Climate Change Adaptation of the City, Green Mobility, Waste as a Resource and Green Urban Nature. They are put into effect under the overall vision of "Co-create Copenhagen", the point being that Copenhagen has to be created jointly. Copenhagen's plans can only be accomplished in close cooperation with enterprises, knowledge institutions and the people of Copenhagen.

Step 3: Analyse the current UFT situation (2 activities)

3.1. Identify the main characteristics and external influencing factors of your city's UFT environment

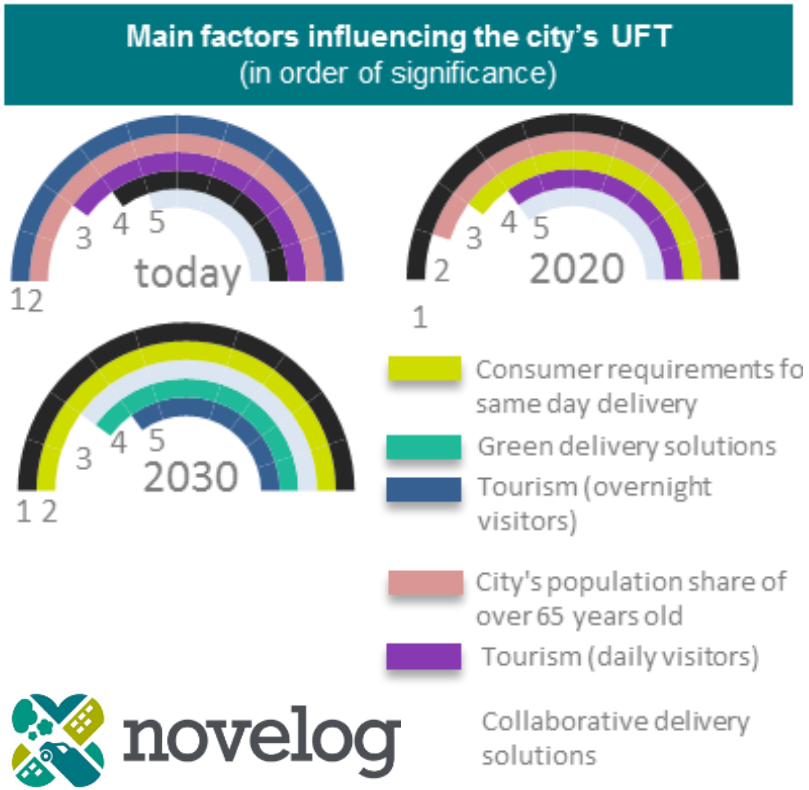
- Which are the factors influencing UFT in my city ?
- Which are my city's main UFT characteristics?



Step 3: Analyse the current UFT situation

3.2. Analyze problems and opportunities

- Understand the current state of the city's UFT.
- Identify the problems the opportunities
- How do you imagine your city in the future?



Venice-Italy

The city's main UFT characteristics

	Today	2020	2030
Time of day of delivery/pick up	41-60%	± 5%	+5-15%
Empty running	<20%	± 5%	± 5%
Loading activities: docking	21-30min	11-20min	5-10min
Delivery activities: round trip delay	21-25min	16-20min	21-25min

Step 4: Develop a common vision and future improvement scenarios

4.1. SULP Objectives definition

"A vision needs to be specified by concrete objectives, which indicate the type of change desired. These changes also need to be measurable. This requires selecting a well-thought-out set of targets that focus on selected areas (indicators)." ELTIS

Gothenburg-Sweden

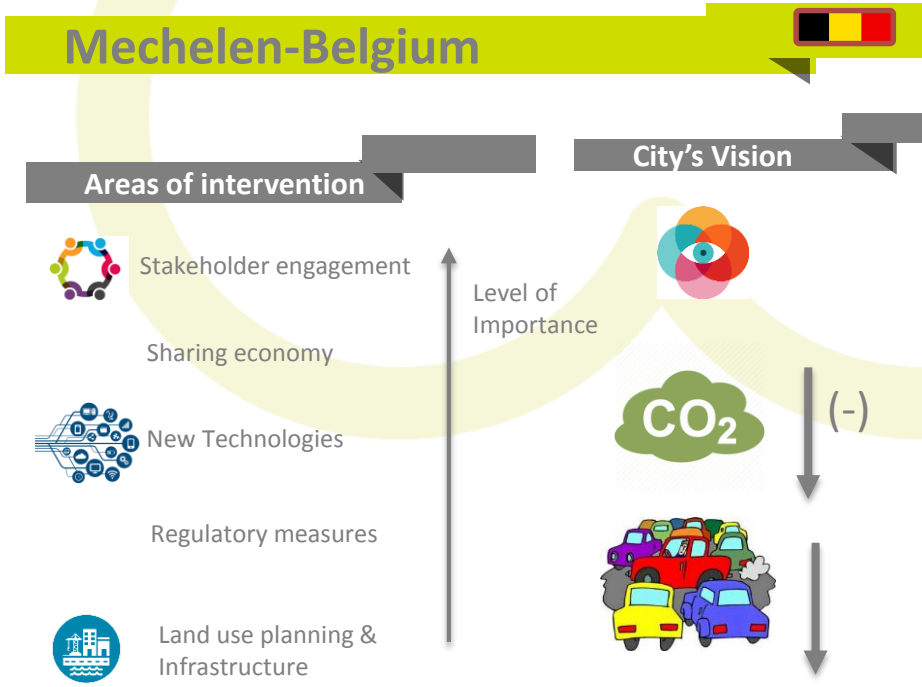
Pilot Title	Promoting the care of addresses concept of an UCC
City's primary objectives	Economic: : increase UFT system efficiency Environmental:: Reduce CO2 emissions Social: • improve service accessibility • change behaviour towards sustainable UFT • reduce congestion
City's secondary objectives	• increase delivery load factor • increase use of clean technologies/delivery means (EVs, bikes, walk) • introduce Urban Consolidation Centres • adopt new business models • introduce new/adapted regulatory schemes (SULPs, LTZs) • provide evidence/incentives for further adoption • "shared" freight and passengers schemes
Expected impacts	• **15% CO2 emissions reduction** • **5% deliveries reliability increase** • **4% accidents / damages decrease** • **8% traffic reduction** • **Operational costs reduction** • **stakeholders behaviour improvement towards sustainable UFT**

novelog

Step 4: Develop a common vision and future improvement scenarios

4.2. Development of future improvement scenarios

- 3 time horizons (current, 2020,2030) ,
- three levels of development (minimum, medium, maximum)
- 3 iterations
- Suggested actions: Training actions before implementing the consensus building; personal meetings with the stakeholdes; workshops implementation



Step 5: Set priorities and measurable targets

- *Selection of the most suitable KPIs*
- *The Novelog Evaluation framework also proposes alternative methods for collecting evaluation data and quantifying Key Performance Indicators (KPIs).*

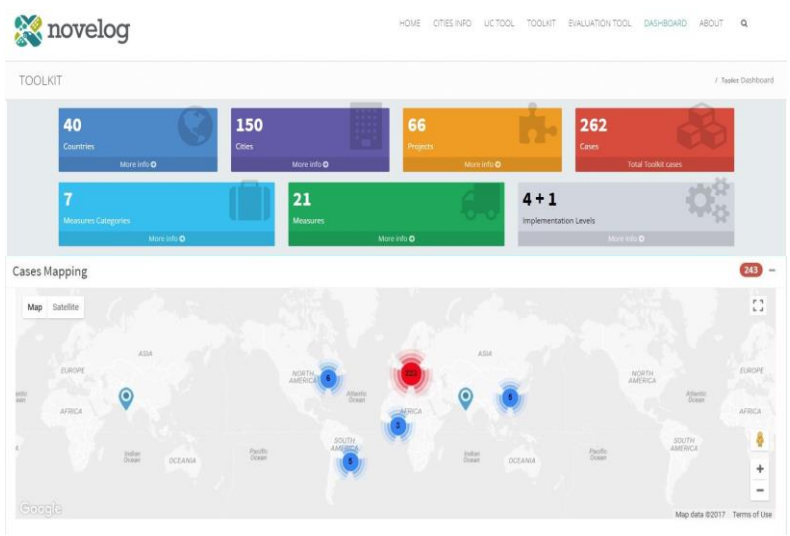
Graz-Austria

Module	Impact Areas	Collected relevant data indicators	Wish list of indicators
Impact assessment	Mobility	Number of deliveries with “bring mE” (nr., amount of shipments, distance, weight, volume)	Load factor; Vehicle utilisation factor; Traffic throughput; Violations; Punctuality;
	Environment	Number of deliveries with “bring mE” (nr, amount of shipments, distance, weight volume) - but based only on the number of deliveries a reduction of GHG emissiions can only be estimated but not calculated	CO2 emissions; Behavioural on Greening;
Adaptability and transferability	Adaptability		Stakeholder acceptance; Stakeholders percentage; Adoption rate;
	Transferability	Transferability to new project areas	
Risk analysis	Political and social framework	Access regulations for pedestrian zones	Lack of willingness from stakeholders for cooperation;
	Economic, legal and organizational support		Behavioural - Compliance with regulations;
	Infrastructure requirements		Urban space engagement; Infrastructure usage;
	Time of the actions		

Step 6: Identify and develop an effective package of measures (4 activities)

- 6.1. Identify effective measures
  - The NOVELOG City Typology
- 6.2. Learn from other experiences
  - The NOVELOG Toolkit

Toolkit's Database



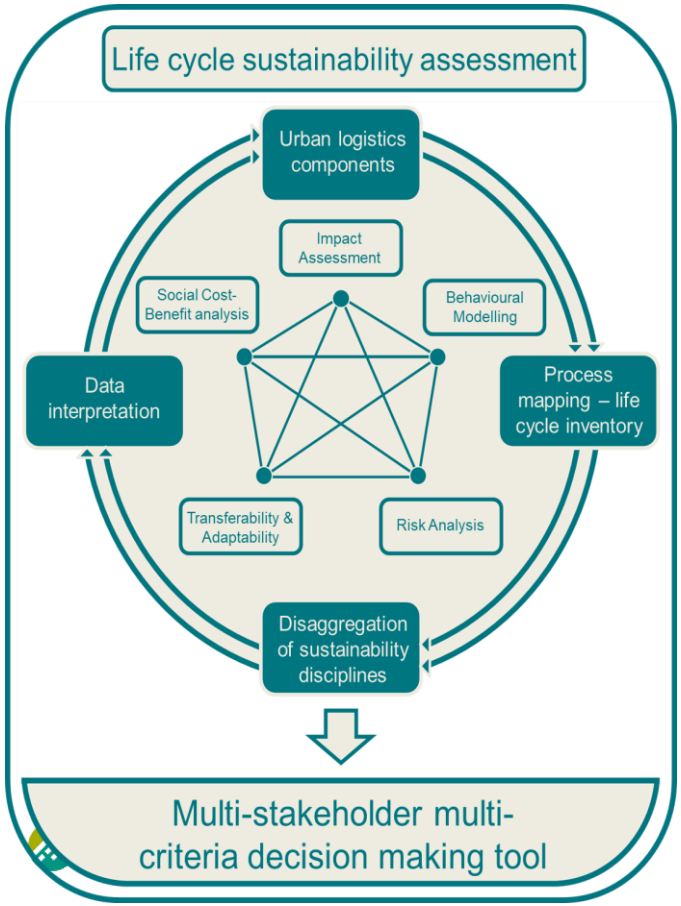
Emilia Romagna Region -Italy

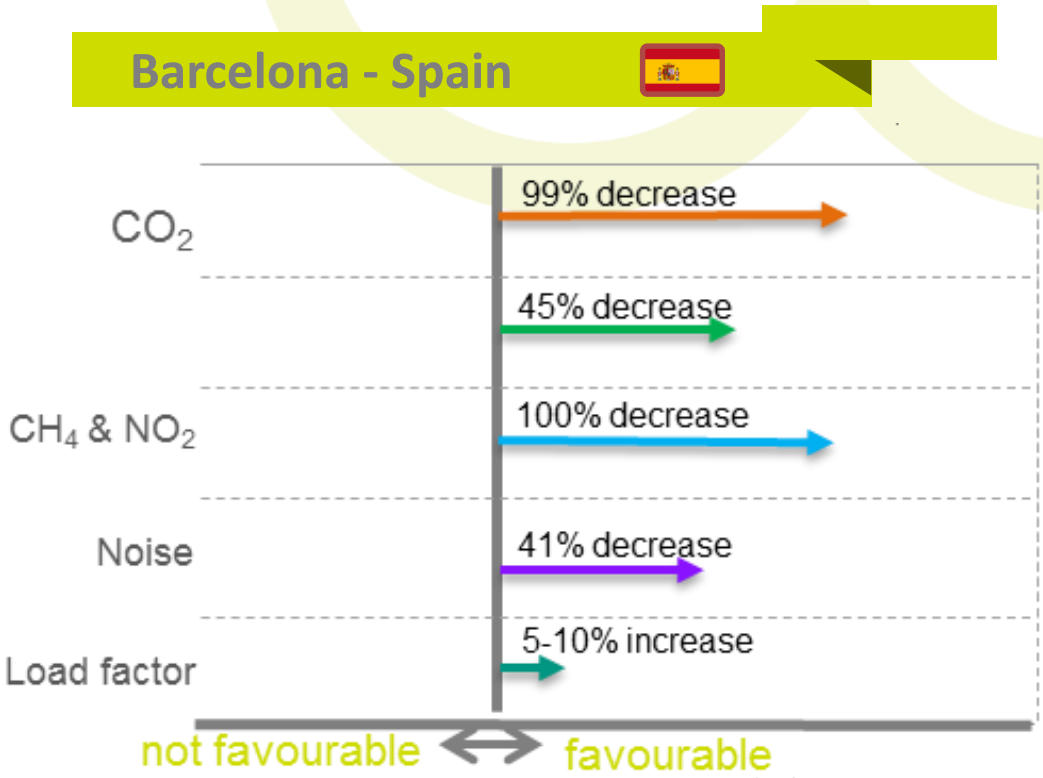
Ecologistics awareness

Land use planning & Infrastructure

Step 6: Identify and develop an effective package of measures

- 6.3. Impact Assessment Evaluation
  - Ex-ante and Ex-post impact assessment of UFT measures by reporting indicators





Step 6: Identify and develop an effective package of measures

- 6.4. Consider value for money
  - Appropriate Business Models for viable city logistics measures

Consolidation scheme	Customer (offering)	Value proposition	Reduced value proposition	Revenue stream	Cost structure
Urban consolidation centre (UCC)	LSP (UCC services)	Green branding Responsiveness to delivery (due to proximity) Value-added services	Additional fixed costs Additional handling	Subscription model	Existing UCC to be renovated Operational costs
	LSP (EV rental solutions)	Green branding EV rental (and recharging)	Additional transport costs	Subscription model	Purchase of vehicles and charging system
Micro-consolidation centre (MCC)	LSP (Light goods delivery)	For receivers – higher availability and therefore convenience Reduced transport cost Access to restricted area Pick-up point for parcels	Additional handling	Long-term contract with LSP No extra cost to receiver Charged for parcel pick-up	Investment and operational costs for MCC Real estate (provided by municipality) Investment and operational cost for cargobike deliveries ICT fleet management system
	(Other) LMO (Bicycle servicing)	Bicycle repair, recharge,	None (additional service)	Per use	
	City council (Delivery/transport data)	Understand UFT flows for e-commerce	None	-	
Receiver-led consolidation (RLC)	Retailers in shopping (replenishment with consolidated transport)	Delivery flexibility Delivery reliability and punctuality "Basic" transport service cost reduced Value-added services	None	Base service – paid by shopping centre owners Extra services – paid by tenants	Use of existing UCC/warehouse -> no new investment cost Operational costs
Automated locker system (ALS)	LSP (Light goods delivery)	Reduced failed deliveries Reduced costs for transport Access to city Green branding	Extra costs for usage	Pay-per-use charged to LSP	Real estate (fully funded by municipality) Installation of lockers Operating costs (maintenance, surveillance, energy, ICT system)
	Receivers (Light goods delivery)	Reception flexibility Reception accessibility No extra cost	May not fit every receiver due to travelling	None	

Thank you

www.novelog.eu

gea@certh.gr.gr

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 636626"