Reunió de la Comissió de Mobilitat

cenit
Science
for Transport

La distribució urbana de mercaderies, entre els vells problemes i els nous reptes

Sergi Saurí
Director del CENIT

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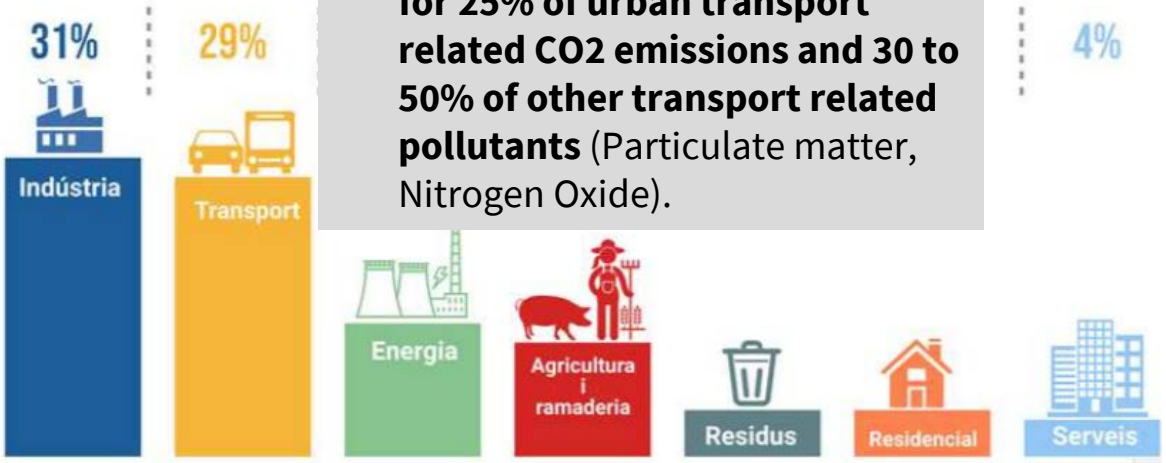
The starting point, the old problems

Some data

- ✓ Big cities are facing enormous challenges in terms of **accessibility and livability**.
- ✓ Scenarios of the European Commission show an **increase of freight transport** of 82% in the period 2005-2050 (European Commission, 2011).
- ✓ According to ALICE (2019) outgoing freight, from cities, represents **20 to 25% of truck-km** in urban areas, incoming freight **40 to 50%,** and the rest originates from and is delivered within the city
- ✓ Approximately between **11,000 and 12,000 freight vehicles enter the city each day** to perform delivery activities.
- ✓ Urban freight being **responsible for 25% of urban transport related CO2 emissions and 30 to 50% of other transport related pollutants** (Particulate matter, Nitrogen Oxide).

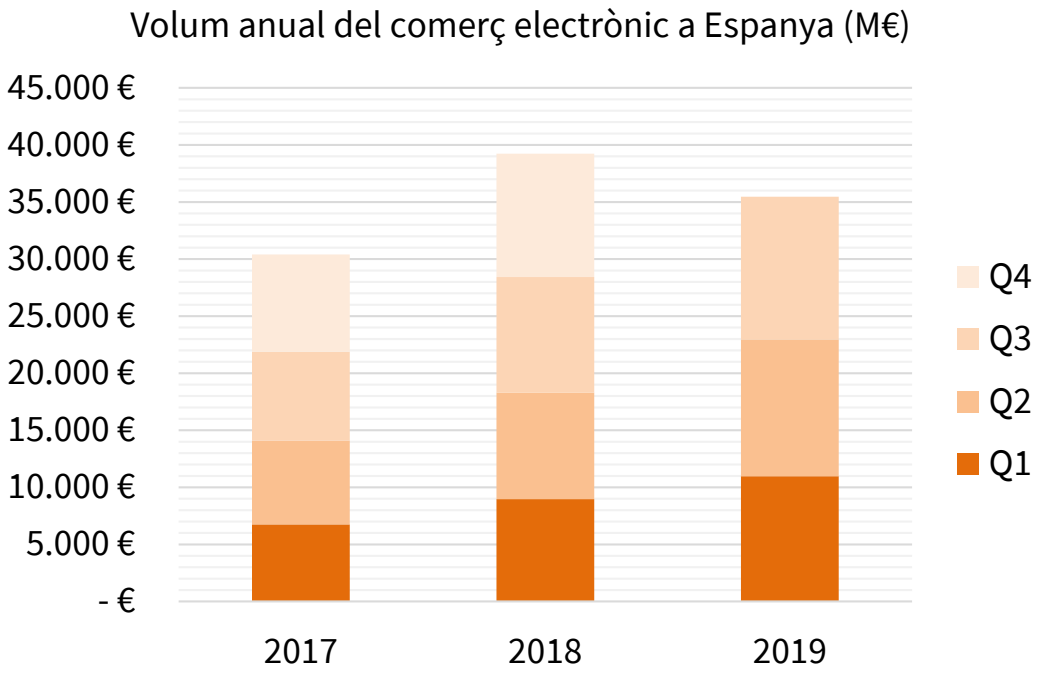


Els sectors que contribueixen a les emissions de GEH. Dades 2018.

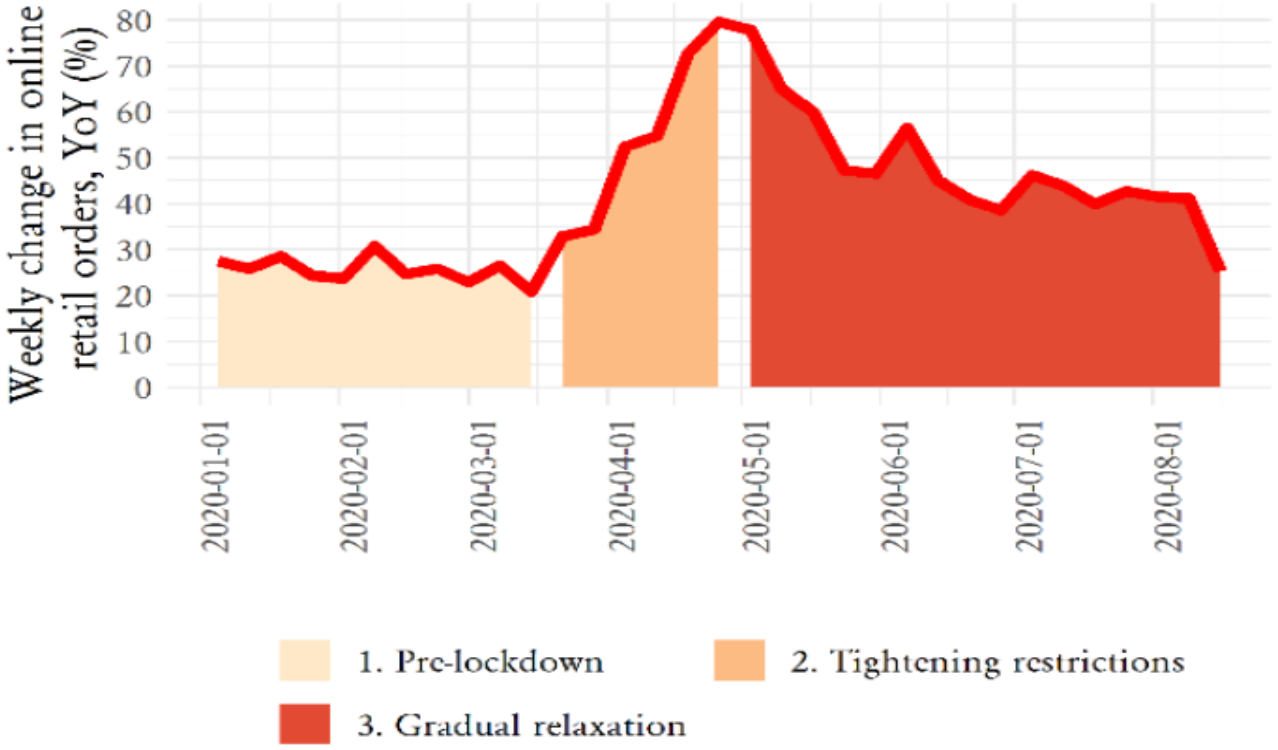
Increase of e-commerce

E-retailers consider that **delivery services** are one of the **fundamental factors** that determine a **consumer's decision** to shop with them, forcing retailers to develop a wide range of services which offer **flexible hours**, **reduced prices** and **fast deliveries**.

From a city logistics point of view, **home deliveries constitute one the most problematic solution** in terms of service costs and organization however consumers seek **express, arranged** and **reliable services**.



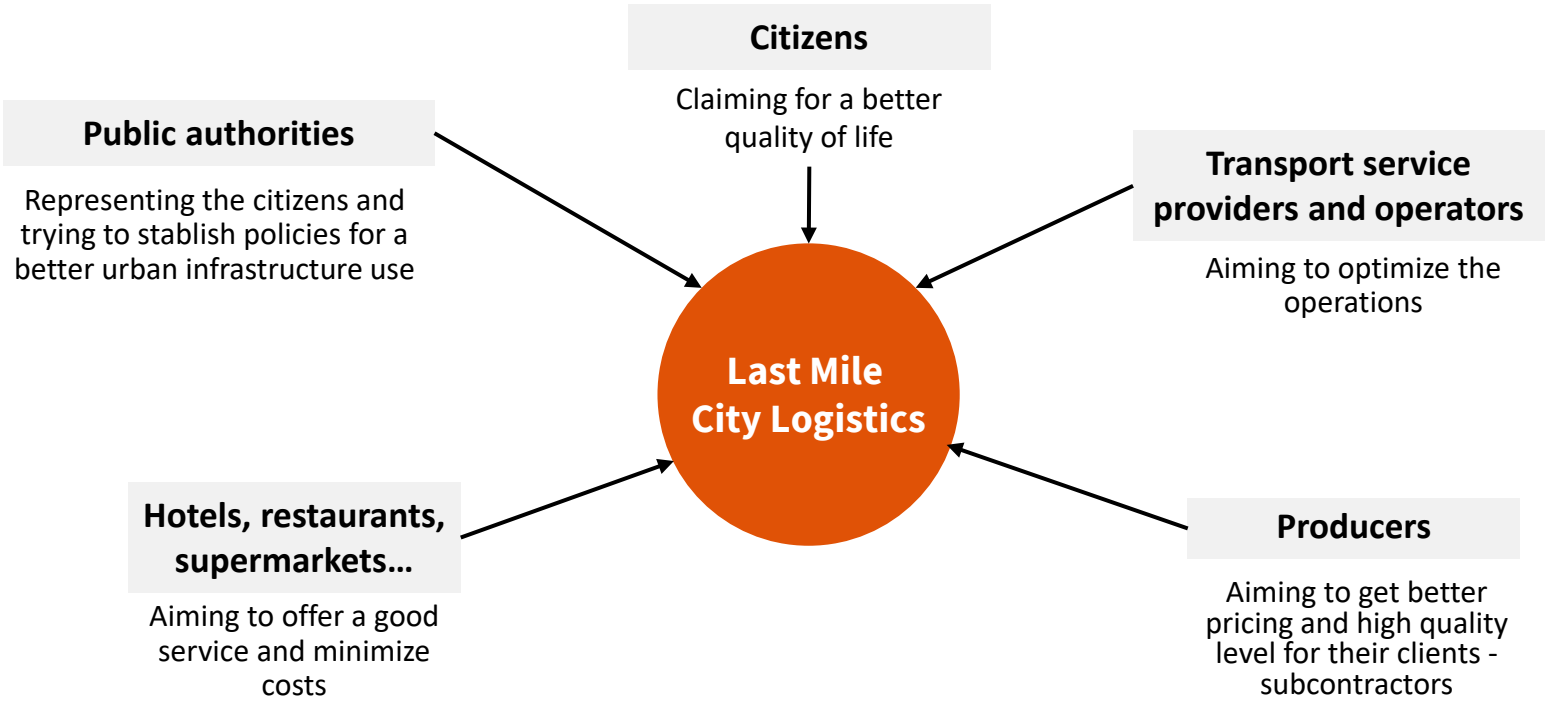
The increase of e-commerce has been accelerated with COVID



Source: Emarsys, COVID-19 Commerce Insight.
Note: Simple average at the global level.

Although cities are addressing challenges associated to passenger mobility, **strategies for last mile delivery of goods at city level are often missing**.

Identification of Stakeholders

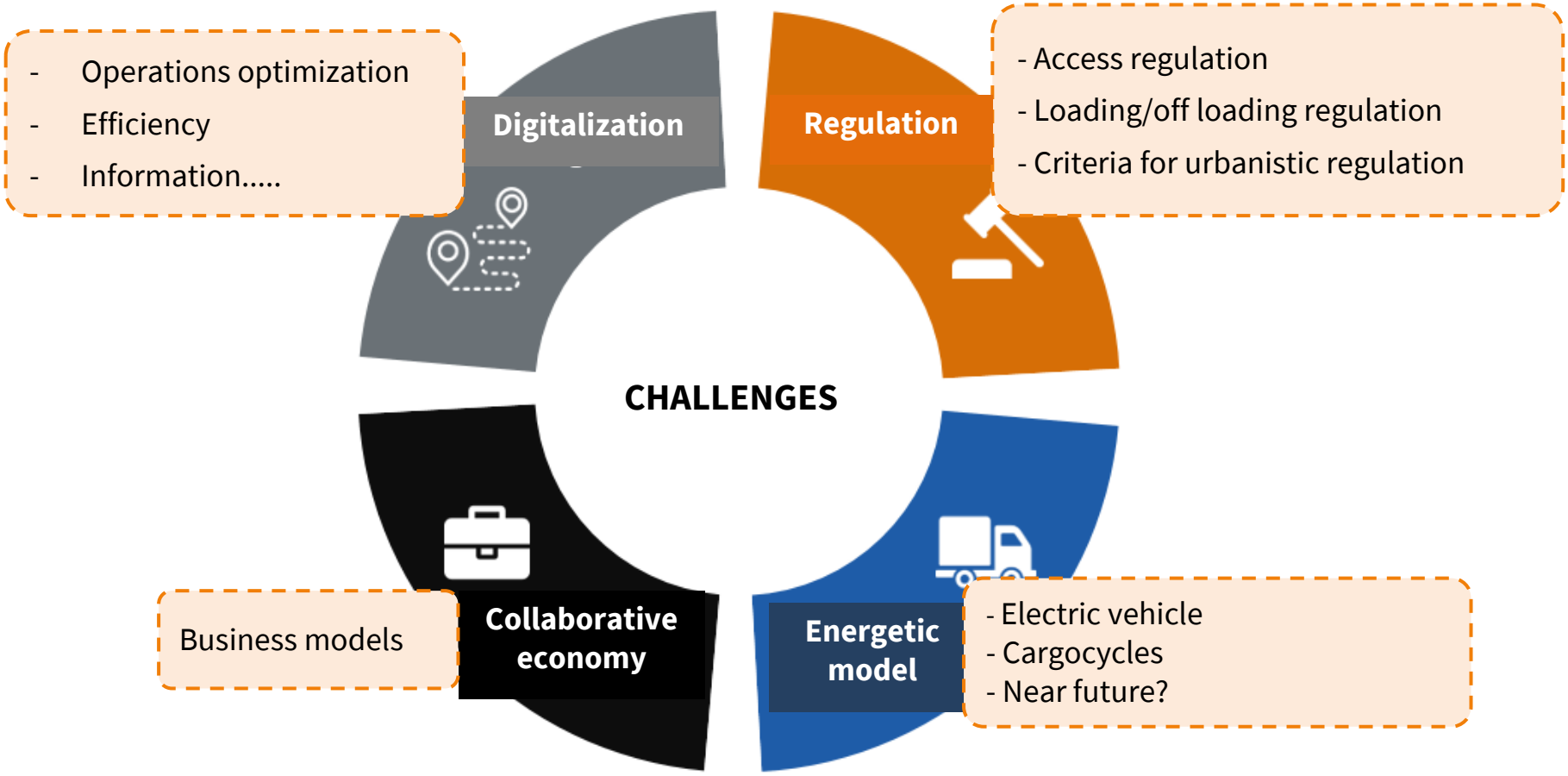


In order to achieve all the objectives it is necessary to define and
model urban distribution of goods based on the concepts of coordination, centralization, consolidation and unification

Each stakeholder may have **diverging interests and objectives**. These stakeholders often lack shared understanding of the priorities and most appropriate action levers.

This **complexity** often leads to enforcement of partial, sub-optimal or even counter-productive **decisions and solutions**.

Challenges for the urban freight distribution


- Operations optimization
- Efficiency
- Information.....
Digitalization
Regulation
- Access regulation
- Loading/off loading regulation
- Criteria for urbanistic regulation
CHALLENGES
Business models
Collaborative economy
Energetic model
- Electric vehicle
- Cargocycles
- Near future?

Transport Digitalization

Many technologies are applied/can be applied to the transport sector

All technologies directly or indirectly end up affecting the transport sector

3D printer

IoT

Sensors

Blockchain

Artificial Intelligence

Big Data

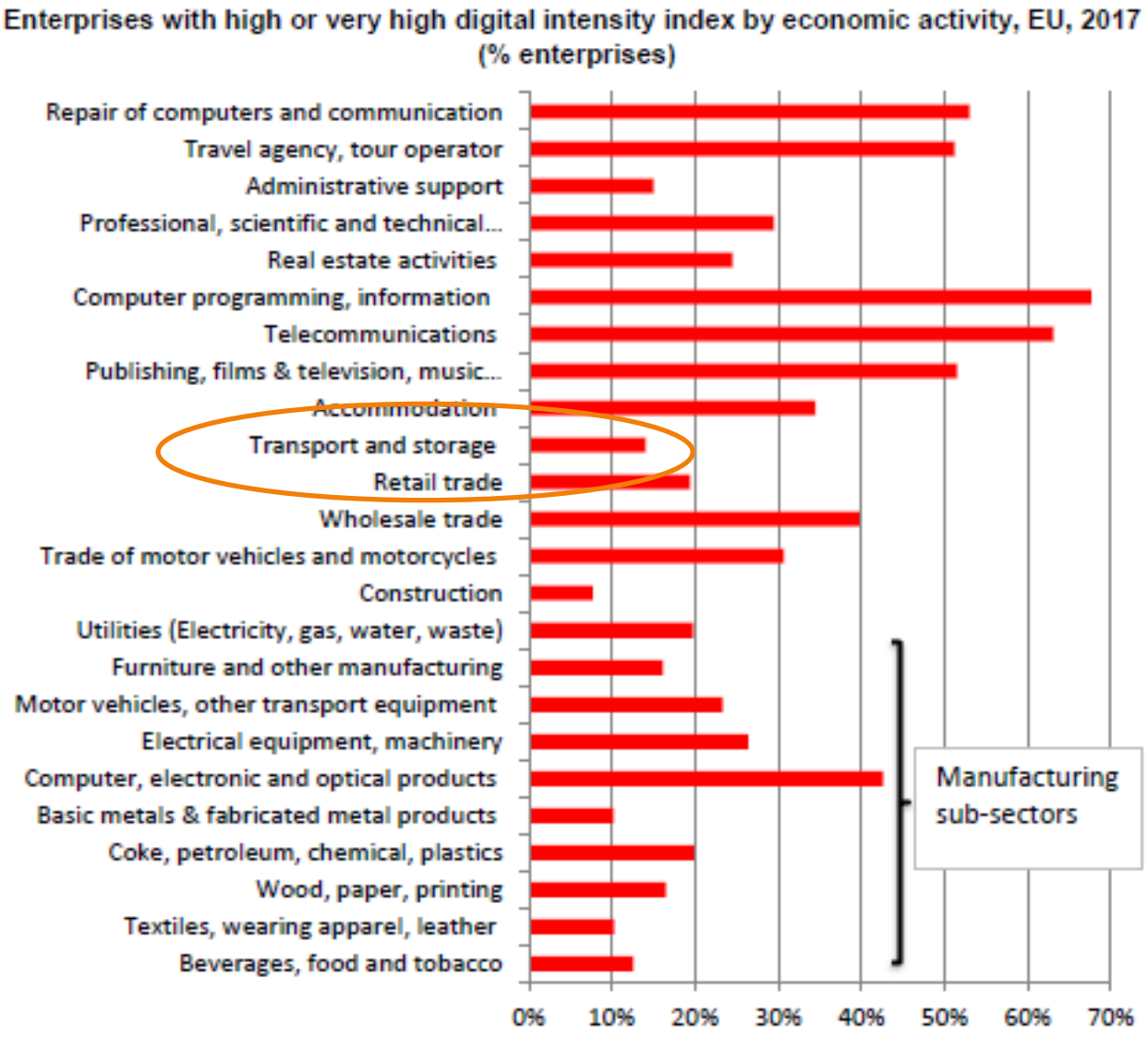
Plataformes

Autonomous vehicle

Electronic papers

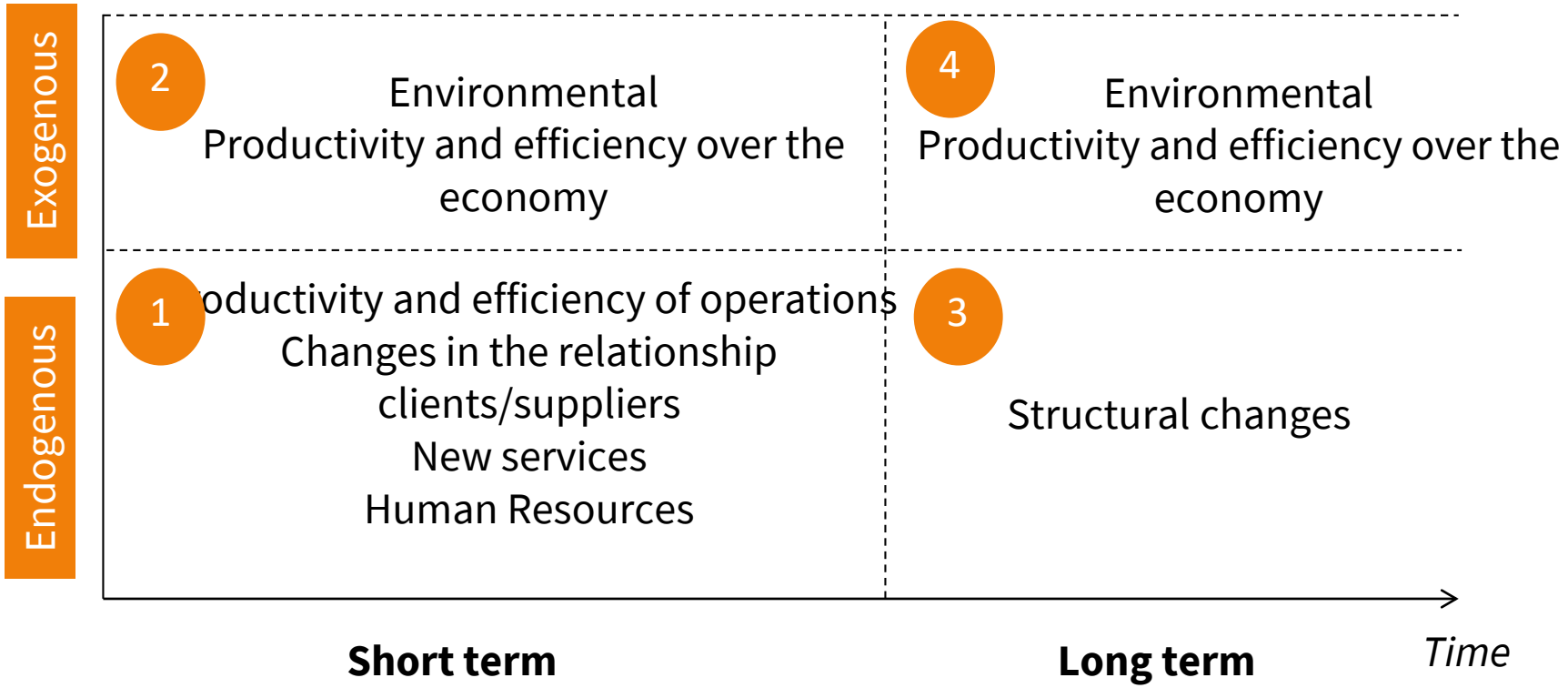
BIM

…but digitalization is slow in the transport sector

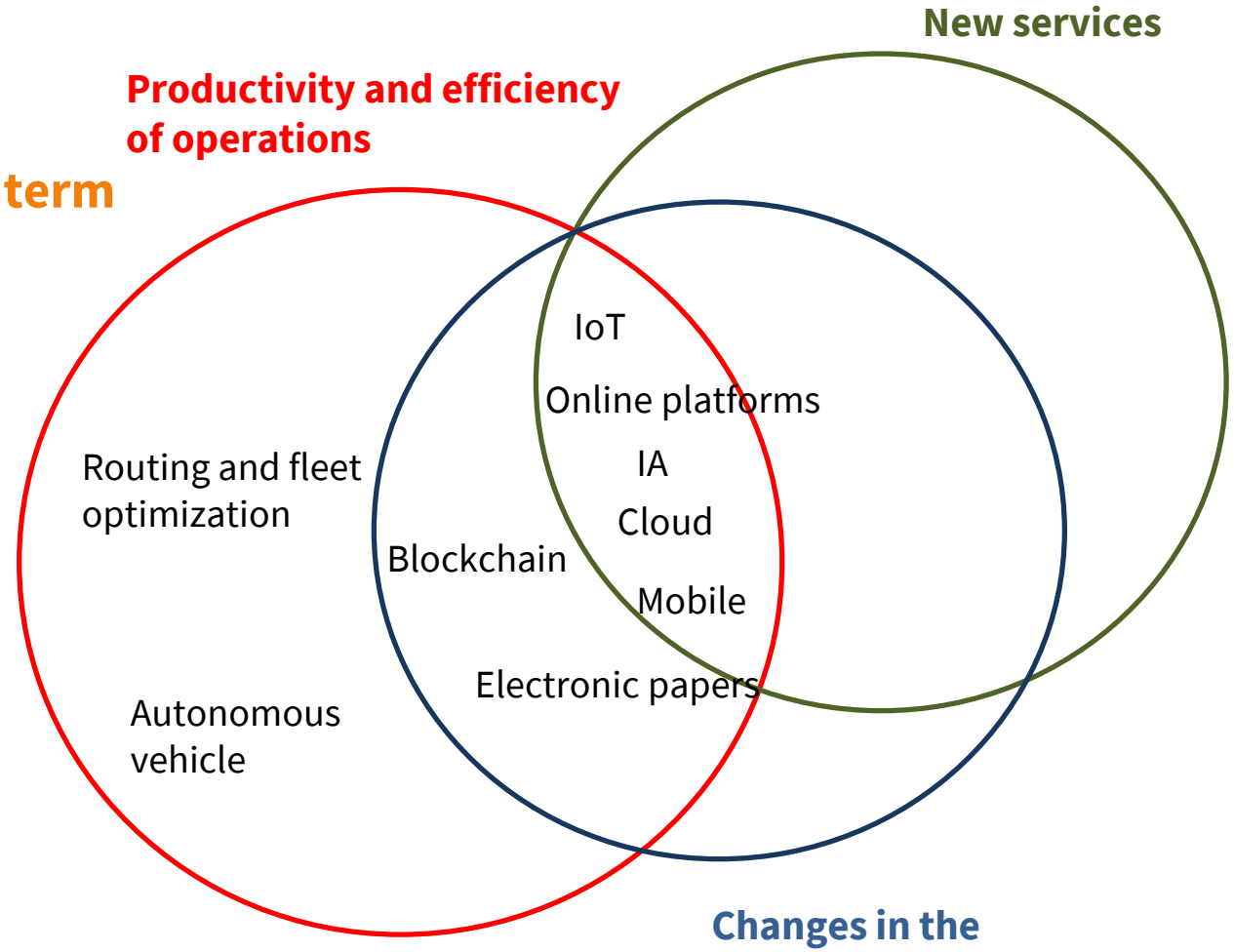


Source: EC

Taxonomy of the impacts of digitalization



Endogenous short term impacts

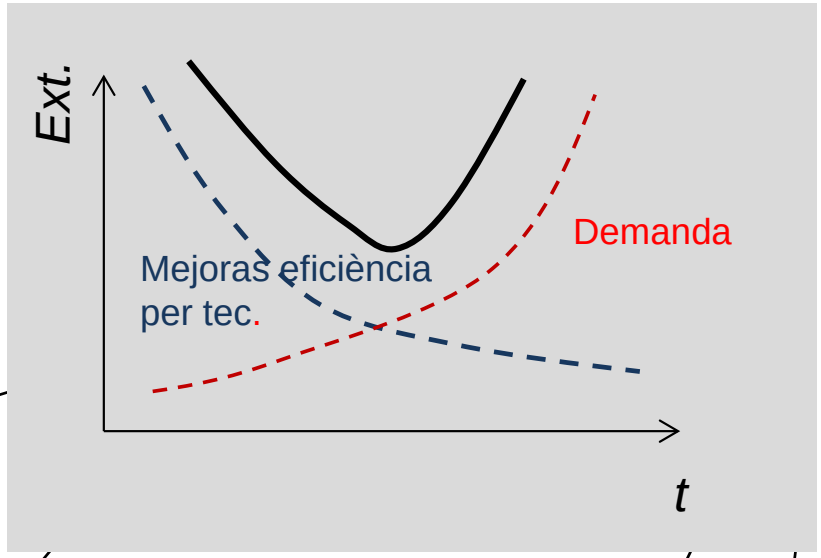


+ Human Resources

Training

New profiles

Exogenous short term impacts



+
Productivitat i eficiència global
-
Costos econòmics
+
-
+
Canvi en les relacions amb els proveïdors/clients
Les millores en productivitat i eficiència
Núm. vehicles (flota)
-
+?
+
Nous serveis
Satisfacció dels usuaris
+

Regulation. A more sustainable mobility and transport

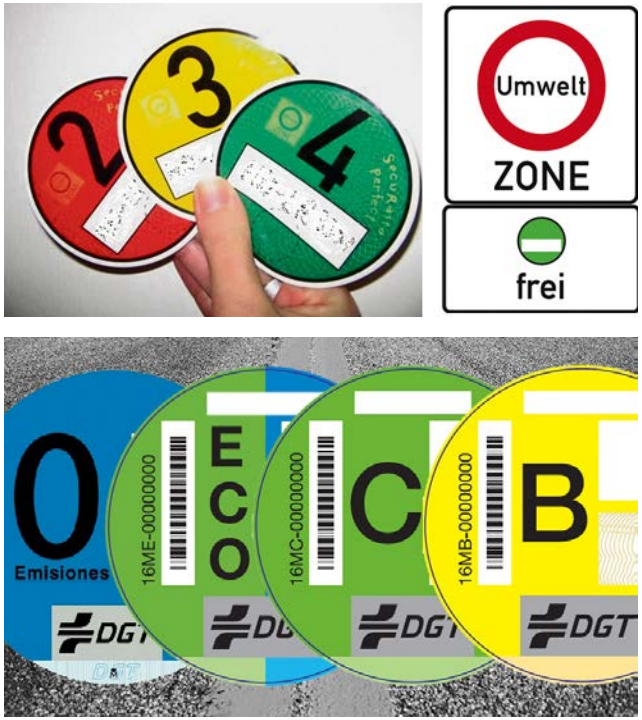
Regulation. Access

It is define **Low Emission Zones** (LEZ) or **Congestion Charging Zones** (CCZ) with the objective to **regulate the access to an specific** areas by forbidding or charging the entrance to a group of vehicles.

There are several criteria followed for restrictions: vehicle type, vehicle weight, driver type… but the most typical restriction is based in vehicle emissions, **Euro Standards.**

The main objective is:

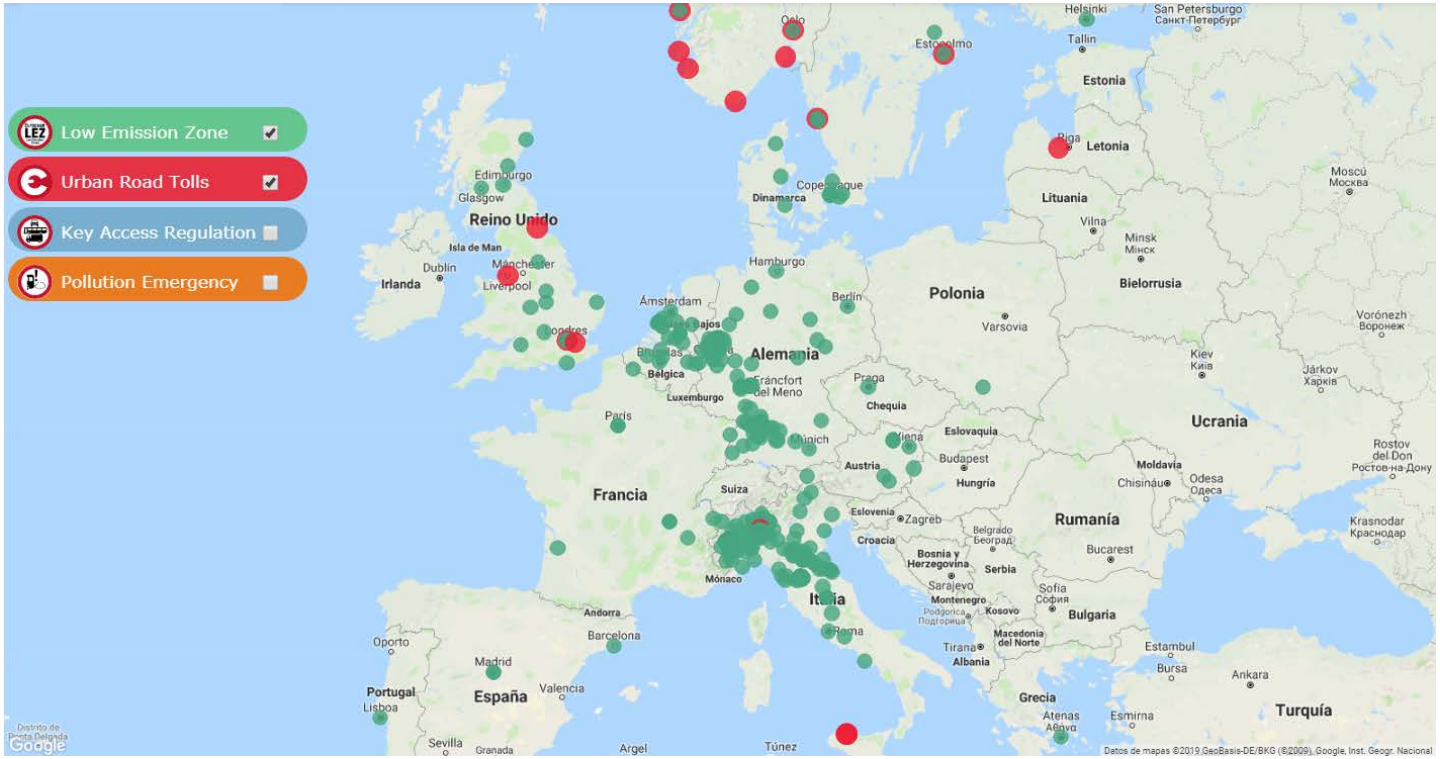
- ✓ **Optimize** freight trips.
- ✓ **Promote a fleet turnover** to greener vehicles.



Access control DGT Barcelona (2006)

Lessons from the European experiences

Usually the LZE measure is implemented with other policies, such as congestion pricing (London, Milan, etc.)



LZE in Europe. Source: https://urbanaccessregulations.eu/userhome/map

Alternative sources of energy

Current technologies

- Conventional: gasoline and diesel
- Gas: GNC, GNL and GLP

- Traditional Hybrid / Híbrid tradicional (HEV)
- Plug-in electric hybrid / Híbrid elèctric endollable (PHEV)

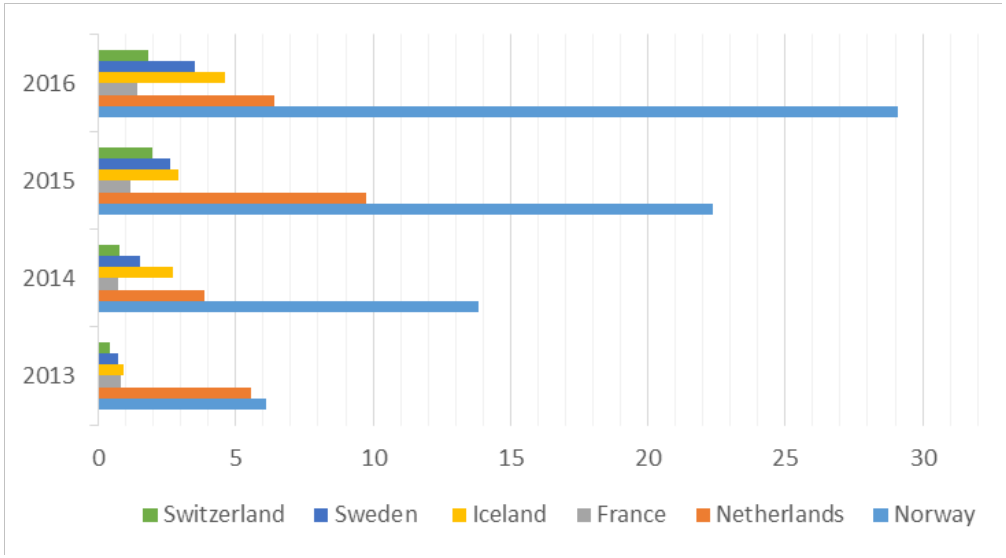
- Electric

- Hydrogen

Vehicle innovations. Electric vehicles

These vehicles are already in use in many LMD solutions:

- ✓ Last mile distribution is a great chance to incorporate EV for its **repetitive routes**.
- ✓ **Limited** models, infrastructure and technical support in an **impediment**.
- ✓ It is needed **public sector** involvement because benefits are basically for citizens.



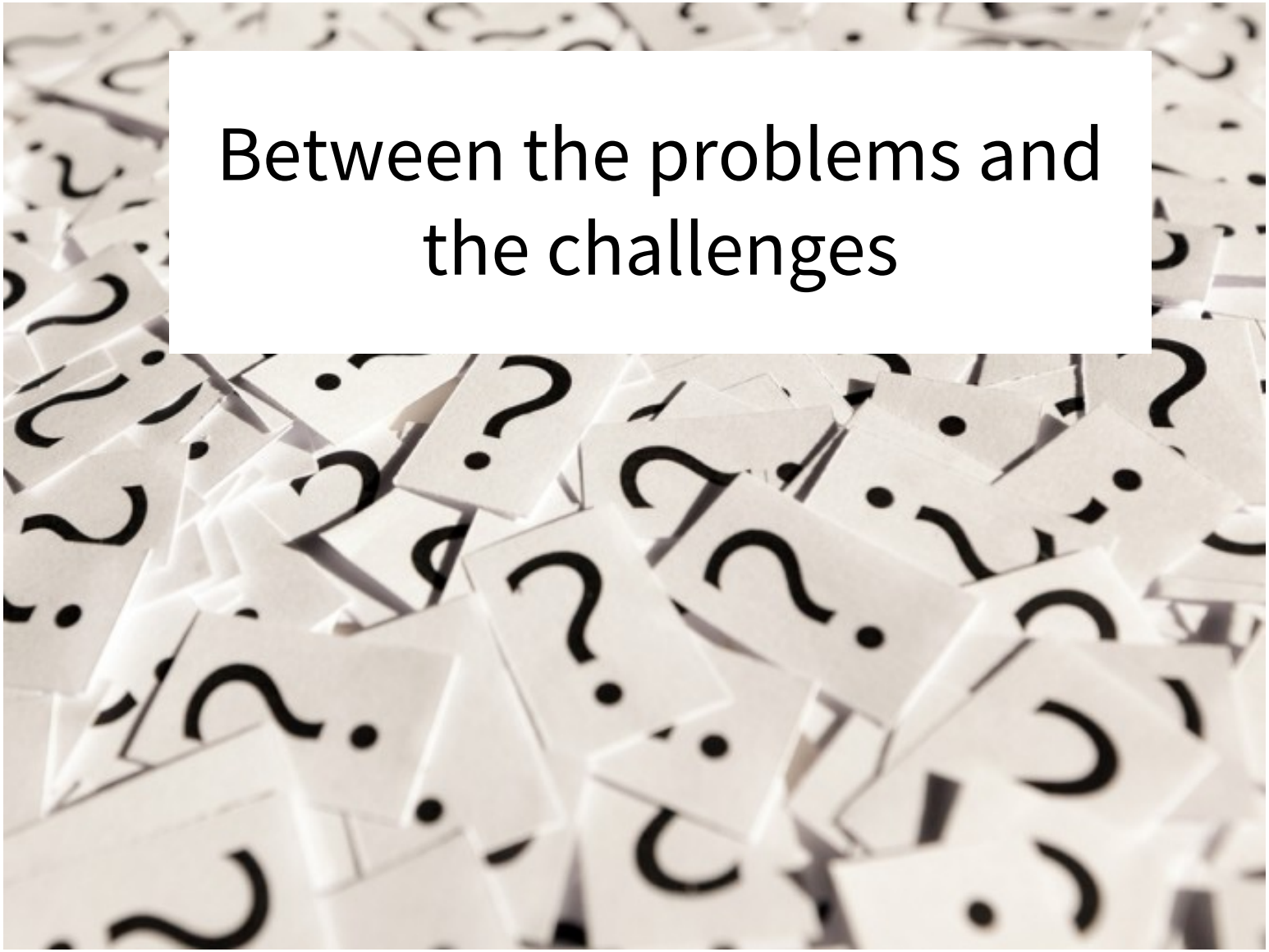
Quota de mercat dels VE (2013-2016)

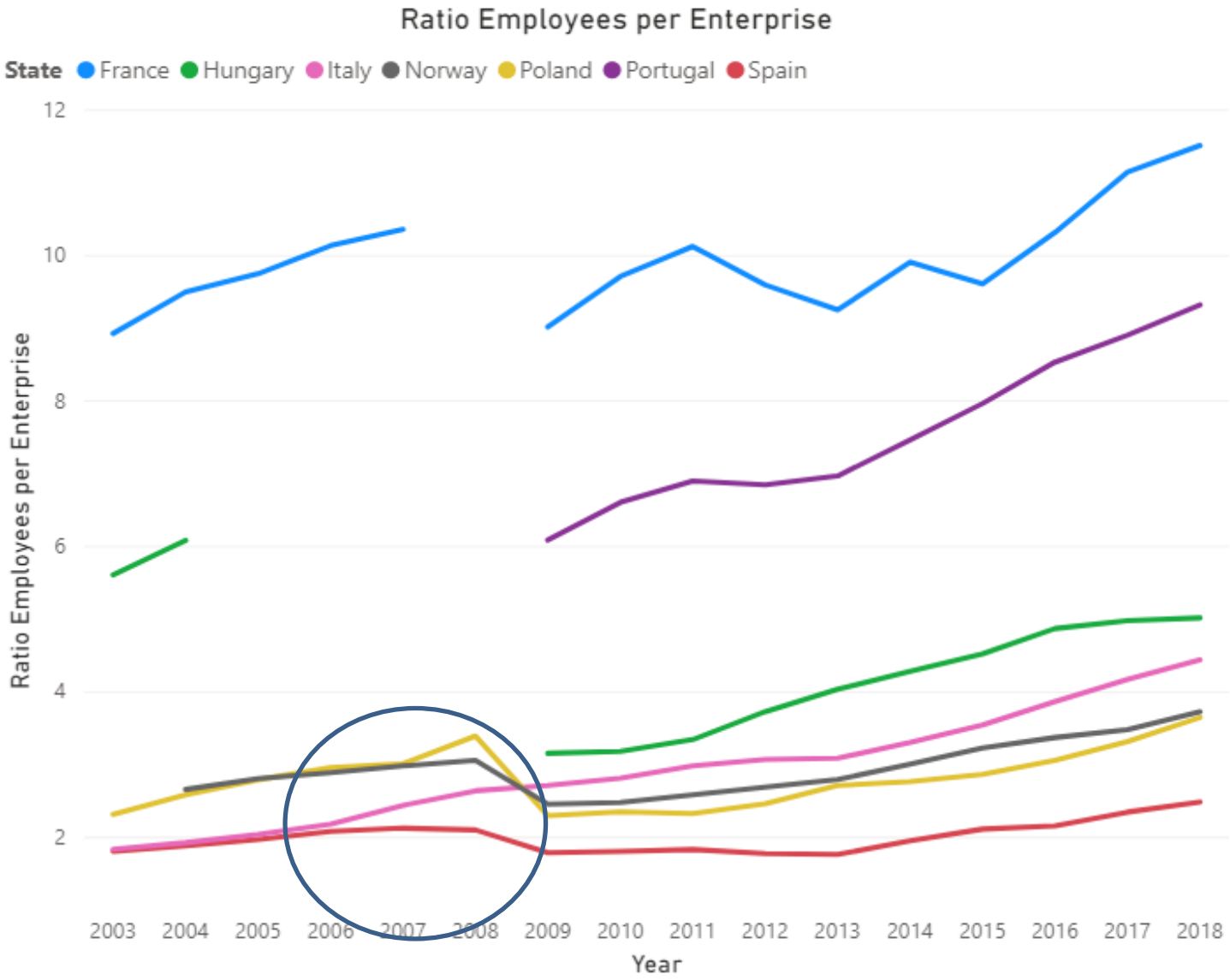
Cargocycles

- ✓ Alternative to face with strong restrictions in **complex urban areas**.
- ✓ Parcel deliveries, point to point.
- ✓ Some operators are shifting their urban fleets.

DHL, is introducing cargocycles in their fleets for LMD in inner cities. These works into system based in a hub where a customized trialer can carry up to four containers, and these are spread from the hub to the destination through cyclocargos.

Between the problems and the challenges





Soruce: Eurostat, own elaboration.

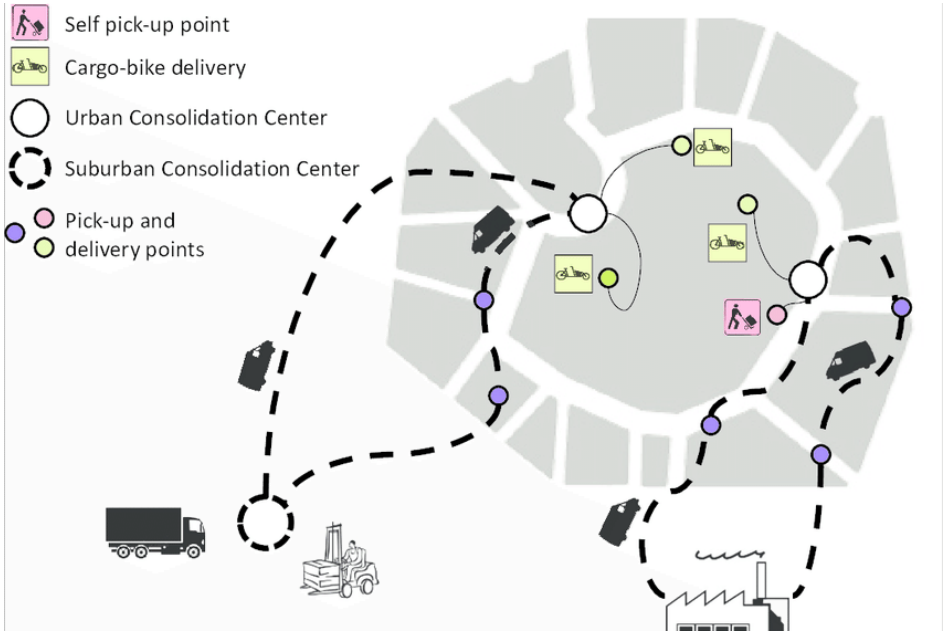
Examples of measures for a more sustainable urban freight distribution

Logistic strategy. Urban Consolidation Centers

UCC (Urban Consolidation Centers) as intermodal platforms allows to **bundle freight** and carry out a more efficient last-mile distribution for a specific area.

Large trucks are replaced by alternative vehicles, improving the **environmental conditions by:**

- ✓ Reducing the kilometers droved by pollutant vehicles.
- ✓ Fleet turn over for alternative fuel vehicles and cargo-bikes free of emissions.



Large trucks do not need to carry out last mile small-scale deliveries

Pilot case. SMILE UE-Project. Barcelona, 2014

- ✓ Small-scale UCC was tried combining the use of two **electric tricycles** (cargo cycles) and an **urban transshipment terminal** located in the inner city.
- ✓ Promoted by the City Council but with strong cooperation of **Vanapedal**, as private operator.
- ✓ Large vehicles left the goods in the UCC and, during the same day, Vanapedal managed to deliver these parcels to the retailers and final customers.

Transhipment terminal

64

Van km/day saved

1,9

CO2 tones saved during the pilot

2.400

Liters of fuel saved during the pilot

Pilot case. GrowSmarter UE-Project. Barcelona, 2015-2019

LOGISTIC OPERATORS

MICRO-DISTRIBUTION PLATFORM

RETAILERS

96%

Reduction in CO2 emissions

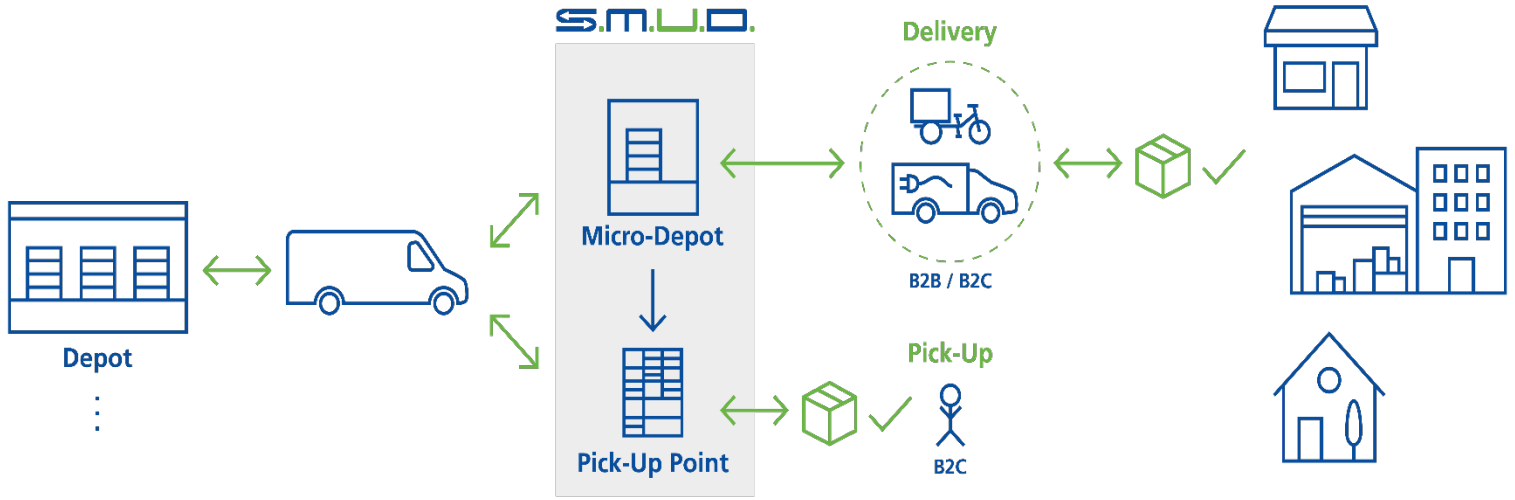
98%

Reduction in energy (Kwh) use

21,7%

Reduction in noise (dB)

Shared Micro Depots for Urban Pickup and Delivery (SMUD). 2020



Brainport Smart District (Helmond)

City of Helmond

Brainport Smart District; emmision-free, no van/car access to homes

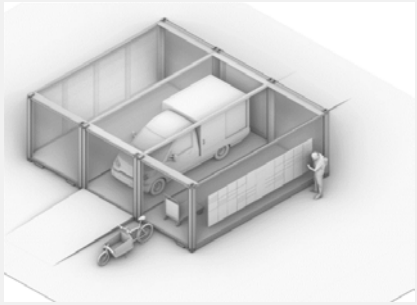
Shared Micro Depots for Urban Pickup and Delivery (SMUD). 2020

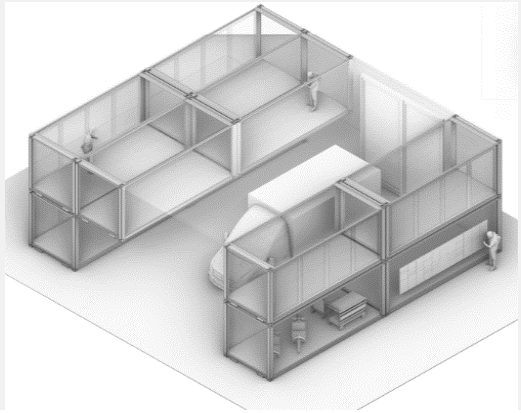
Solutions

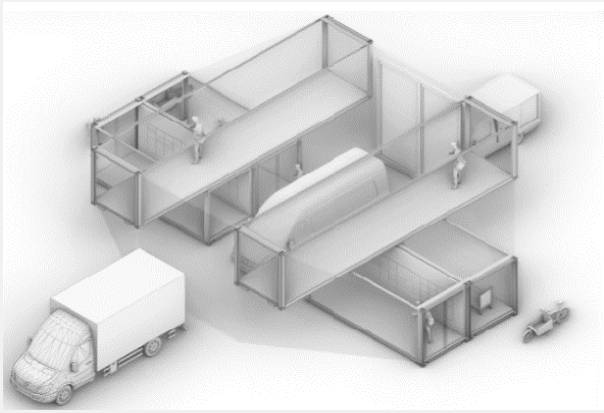
Cargo bike

Smart points

Images provided by Gateways



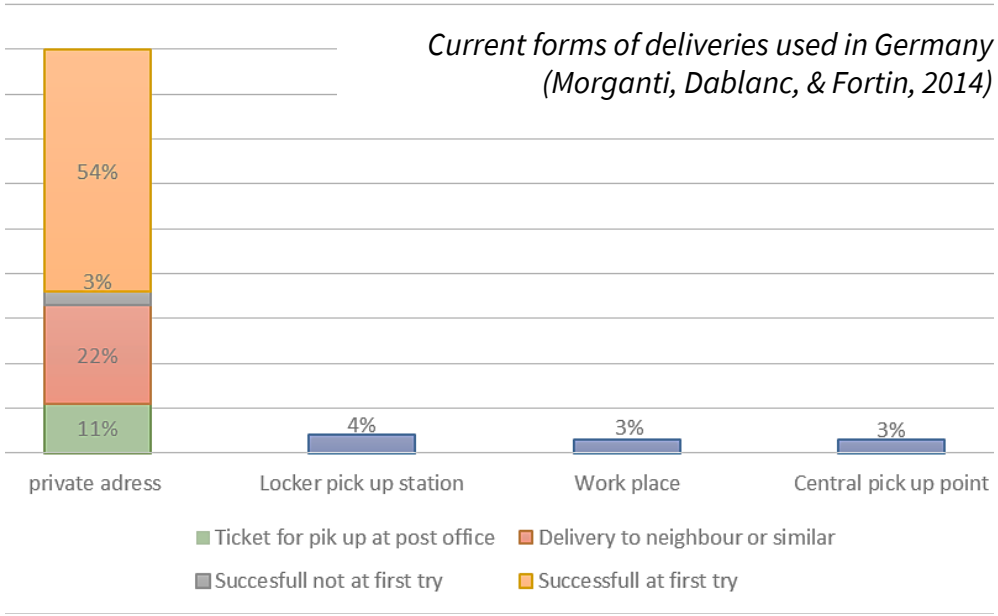




Logistic strategies. Pick-up points

Logistic operators create **pick-up point networks in order to avoid door to door distribution** and offer shipments close to the desired addresses. The delivery process is direct for the sender and the messenger can deliver the package at **first try** and in one place, avoiding multiple travels. This modality have two types:

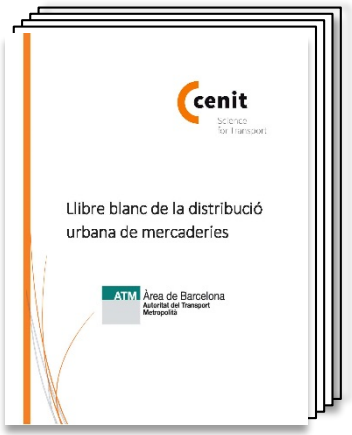
- ✓ **Attended pick-up points**: Some providers define a pick up point selecting independent shops, were regular employees are responsible of receive, store and deliver the package, corroborant the identity of person picking up.
- ✓ **Lockers**: There are lockers located in strategic parts of the city where the recipient can withdraw the package only by a number of client. As soon as the package arrives the customer is notified and allows 24/7 day pickup.



Current forms of deliveries used in Germany (Morganti, Dablanc, & Fortin, 2014)

More than one trip is needed to deliver a parcel.

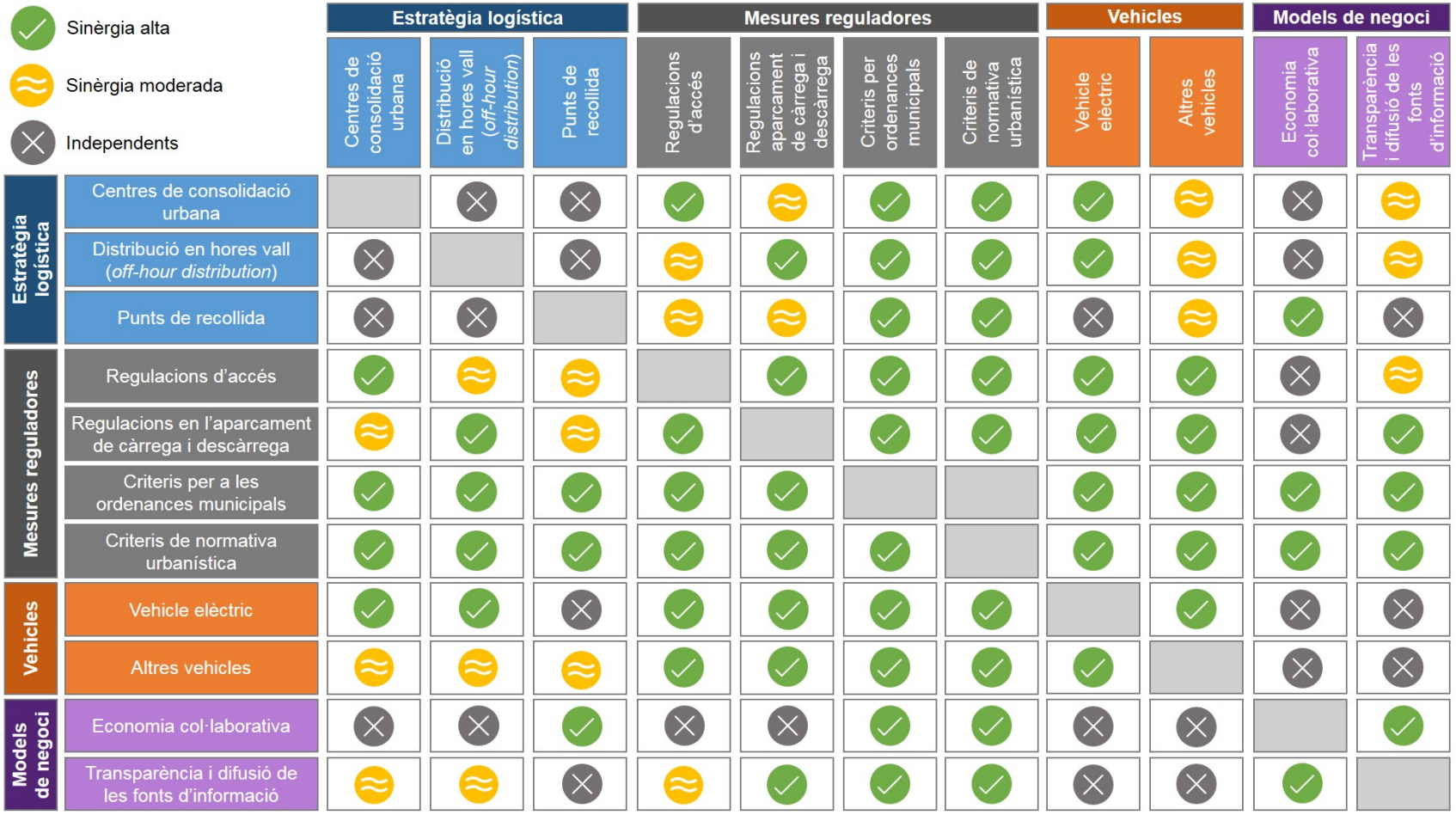
Impact of innovations/measures on the main goals of the City Hall



Impacte positiu significatiu
Impacte positiu moderat
Impacte neutre o negatiu

		Objectius					
		Reducció de la congestió	Reducció nivell pol·lució	Millora eficiència energètica i CO_2	Reducció del soroll	Millora comerç local	Millora habitabilitat espai públic
Estratègia logística	Centres de consolidació urbana	✓	✓	✓	✓	✗	✓
	Distribució en hores vall (*off-hour distribution*)	✓	✓	✓	✗	✗	✓
	Punts de recollida	✓	✓	✓	✓	✓	✗
Mesures reguladores	Regulacions d'accés	✓	✓	✓	✓	✗	✓
	Regulacions en l'aparcament de càrrega i descàrrega	✓	✓	✓	✓	✓	✓
	Criteris per a les ordenances municipals	✓	✓	✓	✓	✓	✓
	Criteris de normativa urbanística	✓	✓	✓	✓	✓	✓
Vehicles	Vehicle elèctric	✗	✓	✓	✓	✗	✗
	Vehicles alternatius (drons, autonomia, etc.)	✓	✓	✓	✗	✗	✗
Models de negoci	Economia col·laborativa	✗	✗	✗	✗	✓	✗
	Transparència i difusió de les fonts d'informació	✓	✓	✓	✗	✓	✗

Compatibility among measures



Vehicle innovations. Near future?

Future of last mile distribution consider **ambitious options** to deliver parcels without any human intervention.

These are still **over development** and only few companies invest resources on them.

DROIDS

Slow velocity, navigating using a mixture of **geolocation signals** and visual recognition.

Designed to cover **urban areas**.

Droid prototype (Swiss Post)

AMAZON TESTING DRONES – North America

Amazon became a pioneer on looking for new models and strategies of LMD.

Delivering parcels are carried out in less than 30 minutes at no extra costs, the trial is limited to daytime during suitable weather in specific places.

Direct routes at relatively high speed, designed to cover **rural areas**.

Delivery drone prototype (Amazon)

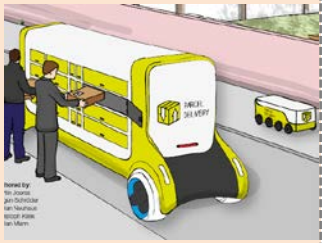
Vehicle innovations. Scenario on future fleet structure

The future fleet distribution has been changing in order to win efficiency, to reduce the consumption, to decrease the distribution time and also to reduce the emissions to the environment.

Last Mile Distribution adopt vehicle/robot
using standard box systems

Delivery by vans multi stop within the city and region

Delivery by bike and eVehicles



Last Mile vehicle/robot or infrastructure using locker systems

Specialised delivery vehicles with bodies making multi stops

Delivery vehicles

Long distance speeded delivery by van or consolidated by heavy truck

Interurban hub ***City Limits*** ***Shop/city hub*** ***Home***

Final remarks

- ✓ All **regulatory** measures for more sustainable transport and mobility in cities will be continuously and strongly implemented in Europe.
- ✓ The market is pushing for expanding the **e-commerce services** but they are not aligned with sustainable transport and mobility policies.
- ✓ Operators will have to **develop delivery strategies based on digitalization and alternative energies** in order to manage the market-regulation dilemma .

Sergi Saurí

Director del CENIT

sergi.sauri@upc.edu

cenit

Science
for Transport

Centre d'Innovació del Transport (CENIT)
C/ Jordi Girona, 1-3, C3, S120, 08034, Barcelona
www.cenit.es

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