City logistics – omvärldsperspektiv

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City logistik och cirkulär ekonomi

Att förverkliga hållbar utveckling och nå Agenda 2030 målen krävs också drastiska sociotekniska förändringar i såväl städer som industrier.

Den cirkulära ekonomin, som ersättare för dagens resurskonsumerande linjära ekonomi, kräver ökat samarbete, mer transparens och mer samnyttjande av resurser, data och kunskap. De cirkulära modeller och system som implementeras måste därför bygga på öppenhet och enkelhet, för de berörda aktörerna.

Då merparten av vår konsumtion sker i städer och där också existerande produkter finns tillgängliga, handlar det i något om att tillgängliggöra dessa på effektivare sätt för nyttogörande. Men då städer är komplexa system råder det stora utmaningar att få till gemensamma lösningar och koncept som gör skillnad.

- Syftet med denna rapport är
  - att ge en sammanställning av relevanta exempel och kunskapsläget för hållbar logistik i städer och
  - för nytänkande i omställning till mer cirkulära stadskoncept av produkter och tjänster.

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Research perspectives:

Key Success Factors for City Logistics Kiba-Janiak (2016)

Purpos: the identification of key success factors for city logistics and their importance from the perspective of various groups of stakeholders on the basis of the authorial SLIM-PREF model.

The acronym of the SLIM-PREF model stands for:

(S) strategy and operations,

(L) logistics infrastructure,

(I) innovation and ideas,

(M) marketing,

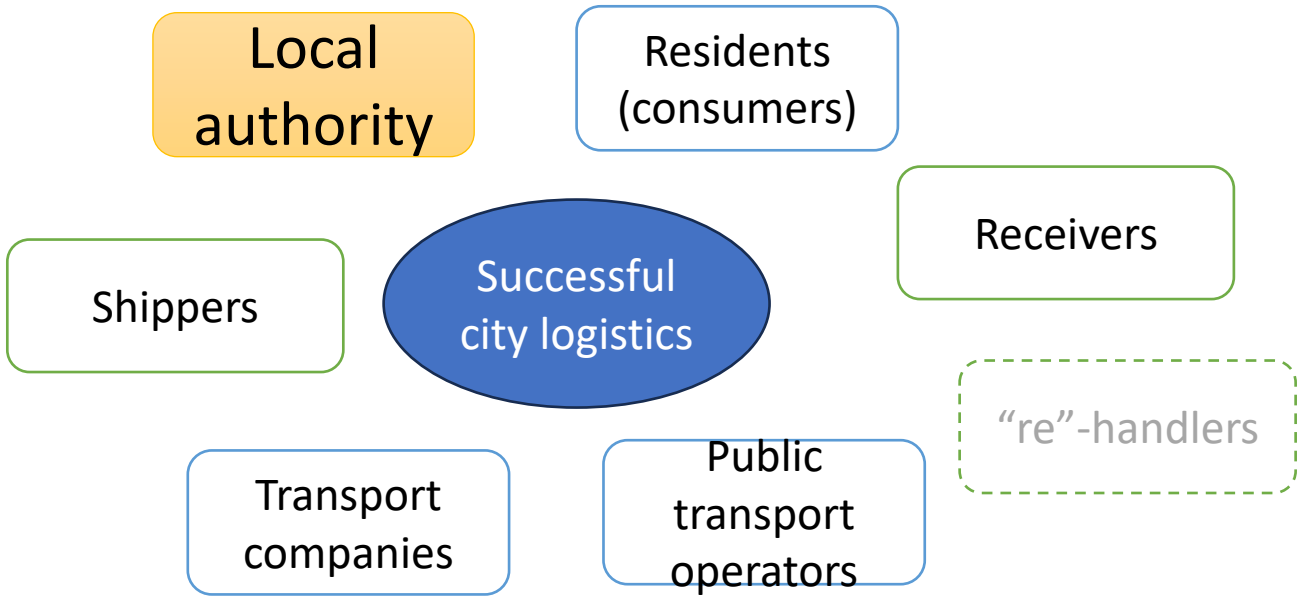
(P) people,

(R) regulations,

(E) environment,

(F) finance.

- Conclusions – top KSF for CL:
  - Local government's regulations affecting city logistics and
  - Cooperation of city logistics stakeholders during planning, implementation and controlling of projects related to the passenger and freight transport



Key stakeholders for successful city logistics – (re-handling added by F.Nilsson, 2023)

Ref: Key Success Factors for City Logistics from the Perspective of Various Groups of Stakeholders - ScienceDirect

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Research perspectives:

Key Success Factors for City Logistics Kiba-Janiak (2016) cont.

The fields of analysis adopted in the SLIM-PREF model can be characterised as follows:

- Strategy and operations – relating to strategic documents in a city and operational activities (for example including targets for freight and passenger transport environmentally friendly in city strategic documents).
- Logistics infrastructure – mainly relating to the linear and point infrastructure.
- Innovation & ideas – innovative technologies, such as for example intelligent transportation systems, ICT etc.
- Marketing – mainly relating to promotion of ecological passenger and freight transport.
- People –social aspects, such as for example road transport safety, staff availability, experience and knowledge.
- Regulations – mainly related to all regulations affecting passenger and freight transport in a city.
- Environment – mainly relating to environmental degradation caused for example by freight transport
- Finance – mainly relating to the financial situation of stakeholders (for example budget of local government, expenditure for communication and transport in a city) and economic benefits for city logistics stakeholders accruing from implementation of projects.

Areas	KSF	Key Success Factor (KSF)	Selected examples of indicators
Strategy and operations	F1	Including targets for environmentally friendly transport in the city development strategy	Including targets for freight transport into city development strategy
	F2	Inclusion of departments or workplaces responsible for individual and freight transport in the organisational structure of local authority	Number of workplaces in the organisational structure of local authority responsible for freight transport in a city
	F3	The involvement of representatives of local government (assuming the role of a coordinator) for the implementation of activities in the field of urban logistics	Number of projects related to urban freight transport in which the local authority has been involved
	F4	Cooperation of city logistics stakeholders during planning, implementation and controlling of projects related to the passenger and freight transport	Numbers of partnerships for quality of freight transport in a city
	F5	Experts' involvement	Undertaking the cooperation with other experts (e.g. academics)
Logistics infastructure	F6	Accessibility of the infrastructure enabling the use of ecological, more efficient and effective ways of passenger and freight transport (park and rides, bicycle lane, city distribution centre, motorways)	Accessibility to Park and Ride systems Accessiblity to urban consolidation centres
	F7	Land allocation for city logistics operations (trucks unloading/loading)	Designated unloading/loading zones
	F8	Urban space planning and organising taking into account intensity of road traffic (for example planning factors outside the city centre)	Infrastructure access to freight transport generators

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Research perspectives:

A sustainability cross-case assessment of city logistics solutions

Natrhanail et al. 2021

Aim: introduce a holistic sustainability-based framework for the assessment of logistics solutions based on Life Cycle Sustainability Analysis (LCSA) and multi stakeholder multi criteria decision making concept by considering four sustainability disciplines (economy, environment, mobility and society) and three enablers (solution maturity, user acceptance and user uptake).

Evalog, an open platform, has been developed based on the framework concepts and is implemented to assess and cross-compare city logistics solutions that have been selected by twelve European city cases.

Part of the EU H2020 Novelog project (Novelog, 2018)

- Conclusions
  - an average improvement of 24.5% may be achieved in all criteria (Logistics Sustainability Index) and city cases owing to the logistics solution

List of city logistics solutions.

Cooperative logistics	**Administrative & regulatory schemes and incentives**
Multimodality for urban freight	Loading/unloading areas and parking
Urban consolidation centers	Access: time windows, emission zone
Trans-shipment facilities	Access by load factor
ITS for freight monitoring and planning/routing	Multi-users lanes
Home deliveries system	Enforcement and ITS adoption for control and traffic management
E-commerce systems for small shops	Businesses recognition scheme
Cargo bikes for B2B and B2C	Public transport indirect promotion for shopping
Electric vehicles diffusion in businesses	Urban planning measures
Reverse logistics integration into supply chain	Harmonization and simplification of city logistics rules
Lockers introduction	Off peak deliveries
	Public transport for freight
	Freight travel plans

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Research perspectives:

City logistics for sustainable and liveable cities Taniguchi(2021)

The objectives of city logistics encompass the reduction of logistics costs as well as the decrease of traffic congestion, greenhouse gas (GHG) emissions and other negative environmental impacts, and energy consumption, and the improvement of safety and security in community. Therefore, we need to do interdisciplinary studies for tackling the complicated urban freight transport issues.

- Use of emerging technologies including ICT, ITS, IoT, big data, and AI
- Autonomous vehicles and robots for last mile delivery
- Collaborations between stakeholders
- Multi-agent simulation

Conclusions:

- the collaborations between stakeholders are critical for successful implementation of city logistics initiatives, and
- modelling city logistics using advanced simulation and optimisation techniques is essential to anticipate the effects of policy measures and benefits for each stakeholder to make proper decisions.

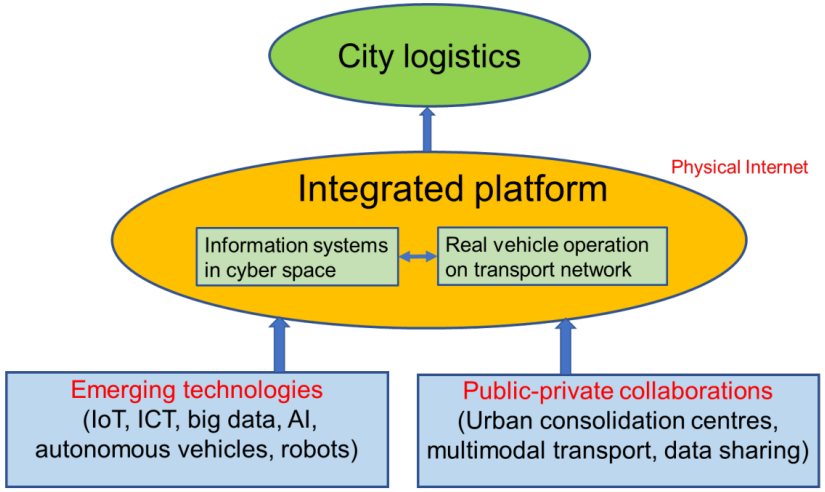

Figure 4.1 Framework of integrated platform of city logistics

City logistics for sustainable and liveable cities (hal.science)

Ref: Eiichi Taniguchi. City logistics for sustainable and liveable cities. 2021. ffhal-03313187

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Case example: CityLogistics, Denmark

On behalf of you as the receiver, City Logistic consolidates all deliveries in our hub and deliveries when the products are needed in the quantum that is needed. And of cause always in our 100% electric fleet – where we reduce emissions and congestion in your hometown.

Benefits for municipalities/cities:

•Reduce deliveries to each location by more than 90%

•Schedule deliveries outside peak hours

- No more large trucks at the schools when children are playing around
- Let employees focus on citizens and not on receiving deliveries

•Reduce emissions and congestion in the inner-city

•Lead the green transition in your town by example

Benefits for retailers:

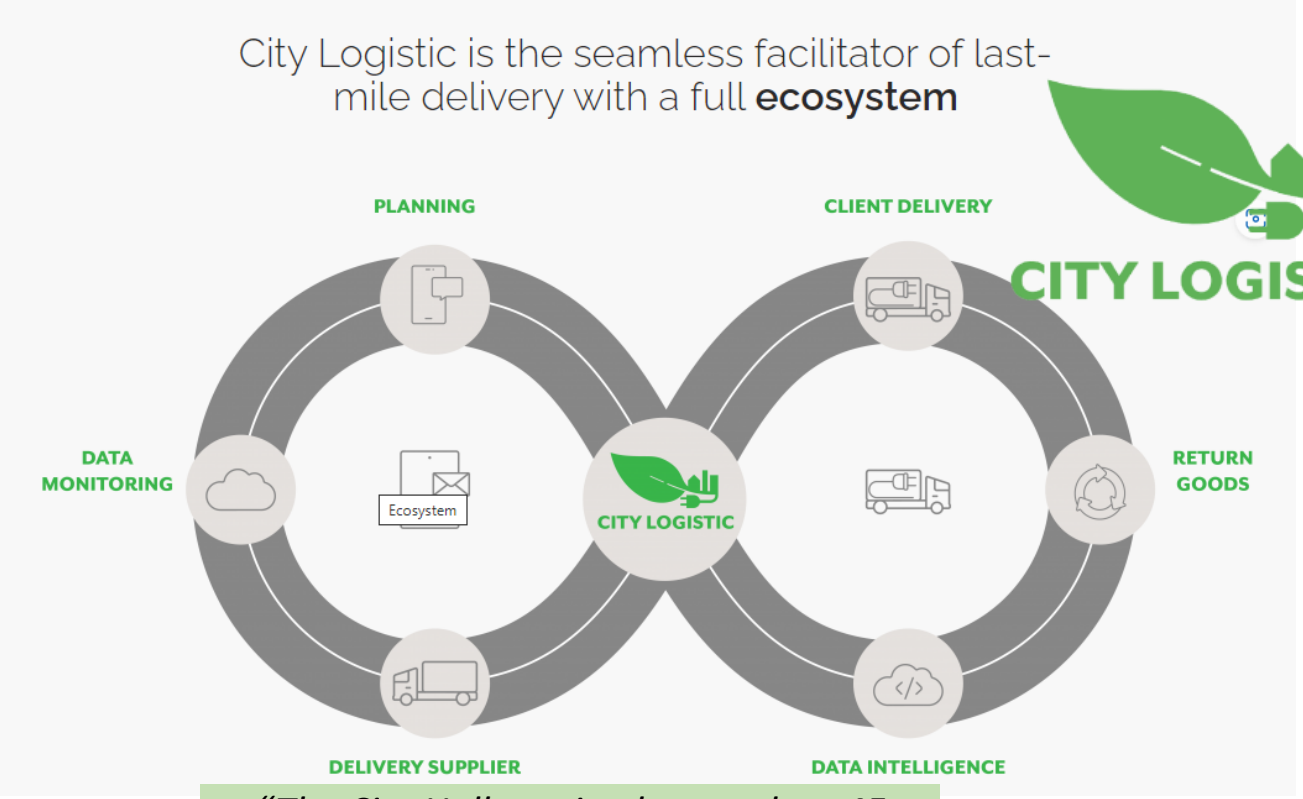
•The stores can pick their optimal delivery time, and we coordinate directly with the stores

•Deliveries are consolidated at our hubs with fewer interruptions to the stores

•We can handle all reverse logistics for the stores

•Reduce emissions with a 100% electric fleet and help reduce congestion in the inner-city

•Take a lead in the green transition



"The City Hall received more than 45 weekly deliveries. With the City Logistic subscription, we were able to reduce this by 95% and only 2 deliveries every week! "

Roskilde Municipality

"In the municipality of Lyngby, Denmark the change to City Logistic reduces the number of diesel trucks/van stops by 150.000 a year –reducing emission by 98% and congestion by 57%!"

Lyngby municipality

"At Matas, we have a very ambitious goal for reducing our CO2 consumption. That's why we are happy to collaborate with City Logistic, a frontrunner in the use of electric vans and electric trucks in Denmark"

Brian Gøbel Poulsen, Logistics Director at Matas

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City logistic | Rethinking the infrastructure model

Case example: Tokyo, Japan

Multiple freight carriers drop off their goods at UCCs and a single freight carrier deliver goods to MTB and final destinations of shop restaurants etc. within MTB.

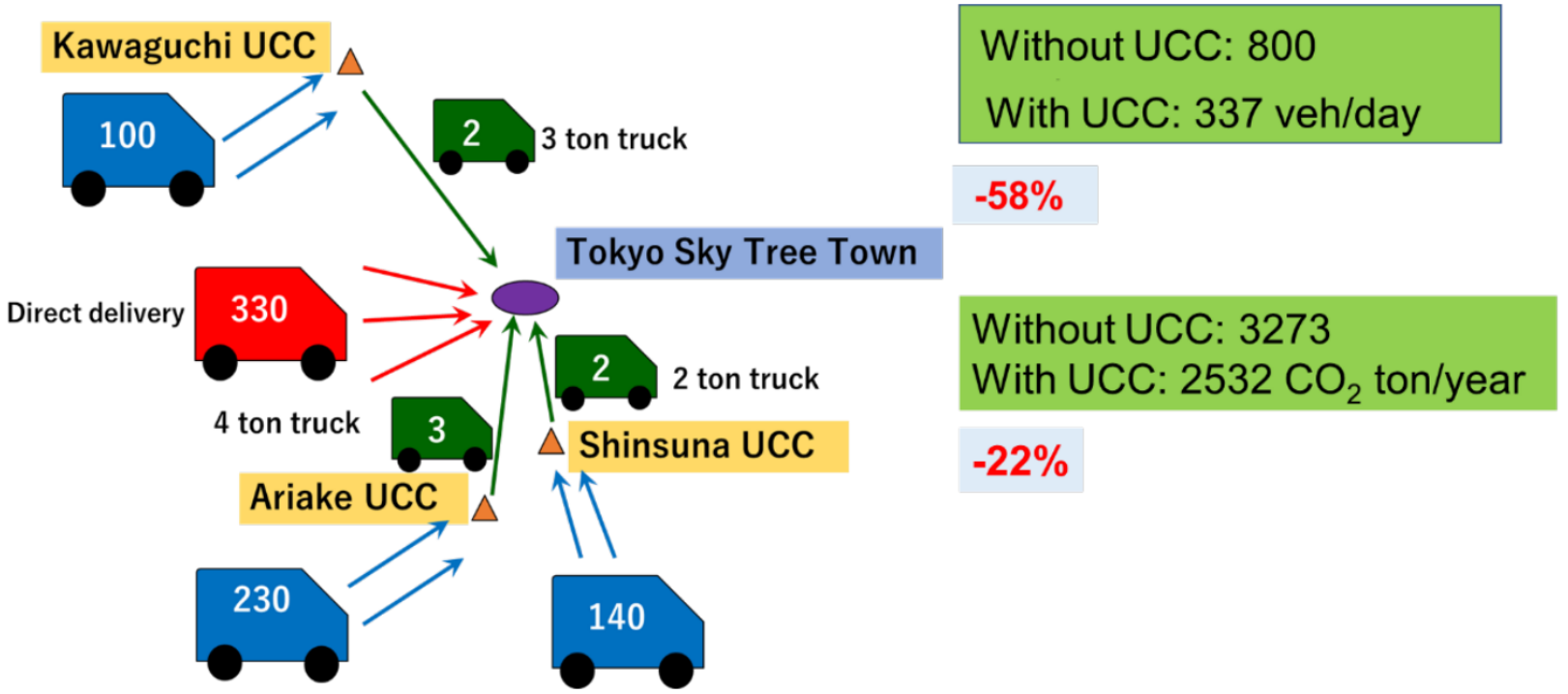

Figure 4.9 Reduction of number of trucks by the consolidation at UCCs to Tokyo Sky Tree Town (Taniguchi, 2021)

Case example: SWISSLOG

https://www.swisslog.com/en-gb/about-swisslog/our-offering/industry-40/smart-city-logistics-urban-fulfillment

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Case example – data infrastructure: Rotterdam, Netherlands

The covenant of data sharing between City of Rotterdam and 56 companies was signed in 2020, including receivers, transporters, shippers, retailers, financial service providers, vehicle manufacturers and think tank.

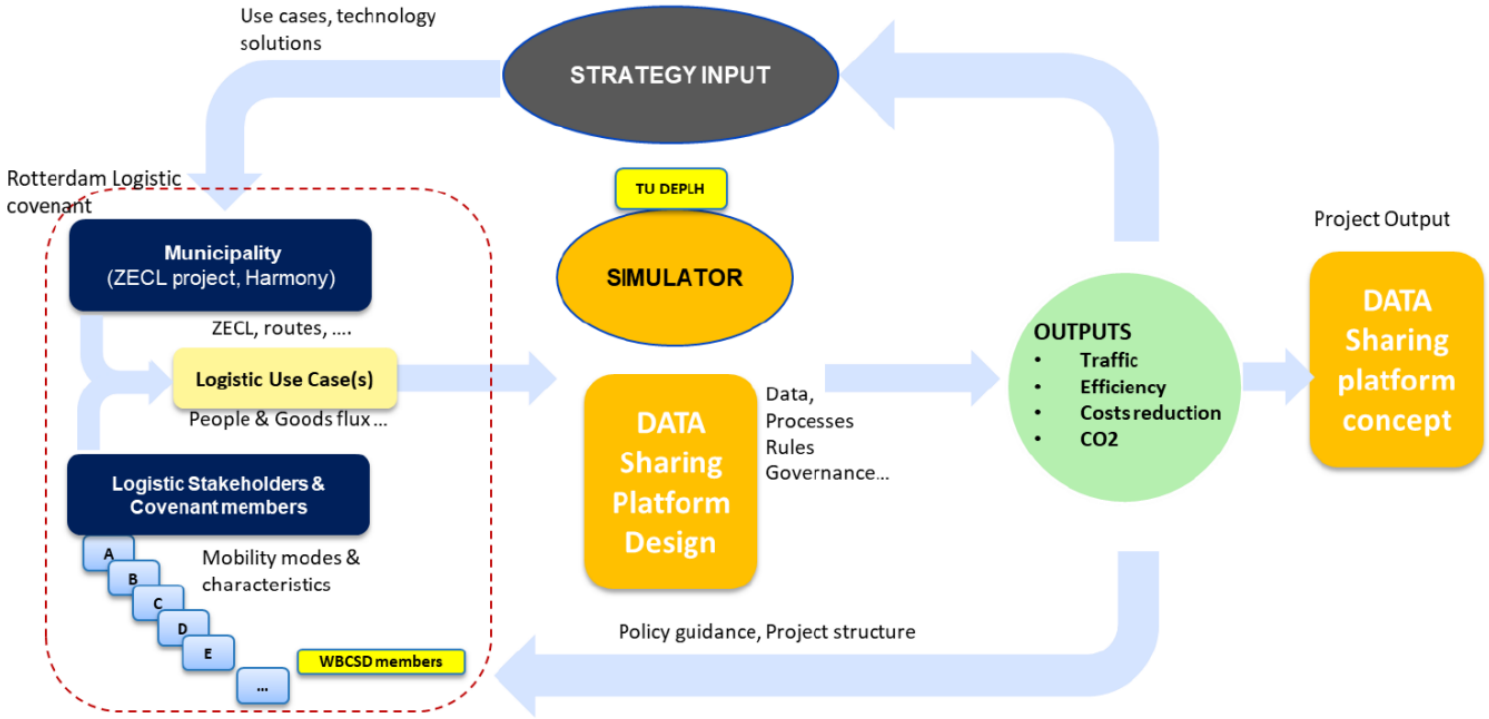

Figure 3.1 Data sharing scheme in Rotterdam (Source: City of Rotterdam)

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Closer project: Dencity

The DenCity Project is a collaboration project between 21 organizations that develops innovative solutions for sustainable passenger, freight and waste transport in dense urban areas, with high demands on transport efficiency, attractiveness, accessibility and sustainability.

Figure 14 Illustration of developed digital mobility broker

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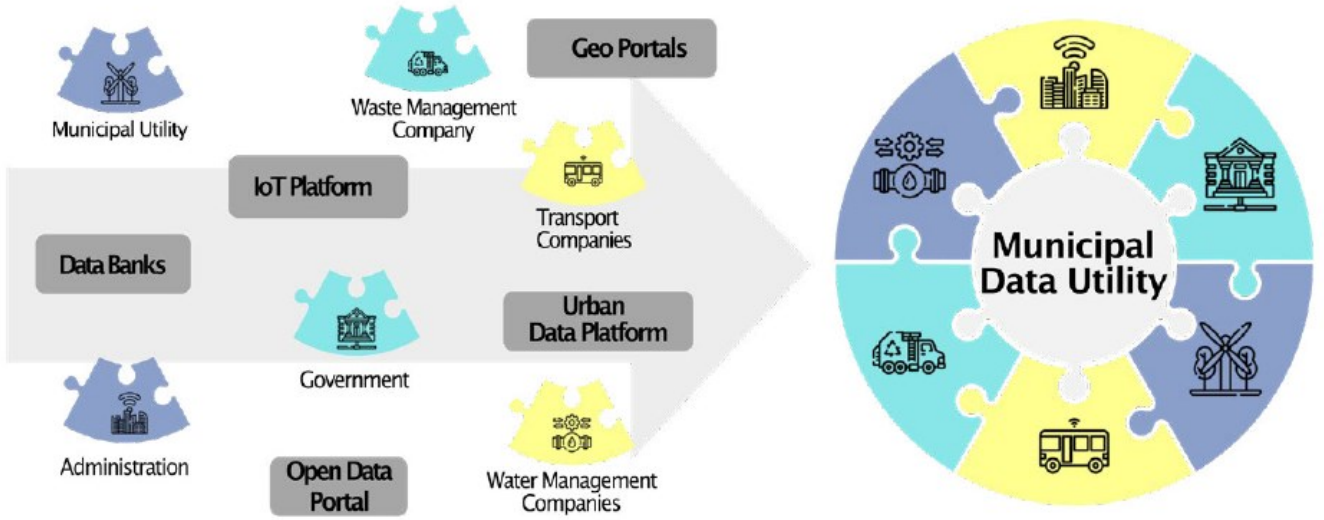
https://acrobat.adobe.com/link/track?uri=urn%3Aaaid%3Ascds%3AUS%3A2877b686-7566-4548-a475-c0b849f4ec90

Data platforms

FIWARE is an open source initiative defining a universal set of standards for context data management which facilitate the development of Smart Solutions for different domains. The Orion Context Broker is its core component. Selected in 2018 by the European Commission as a Connecting Europe Facility (CEF) Building Block, it gathers, manages and provides access to context information coming from different sources describing what is going on in a city. Coupled with a set of additional FIWARE components, the Orion Context Broker facilitates:



Credit: DKSR

Intermunicipal data sharing platforms to shape cities

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Data sharing example for city overviews

Based on FIWARE

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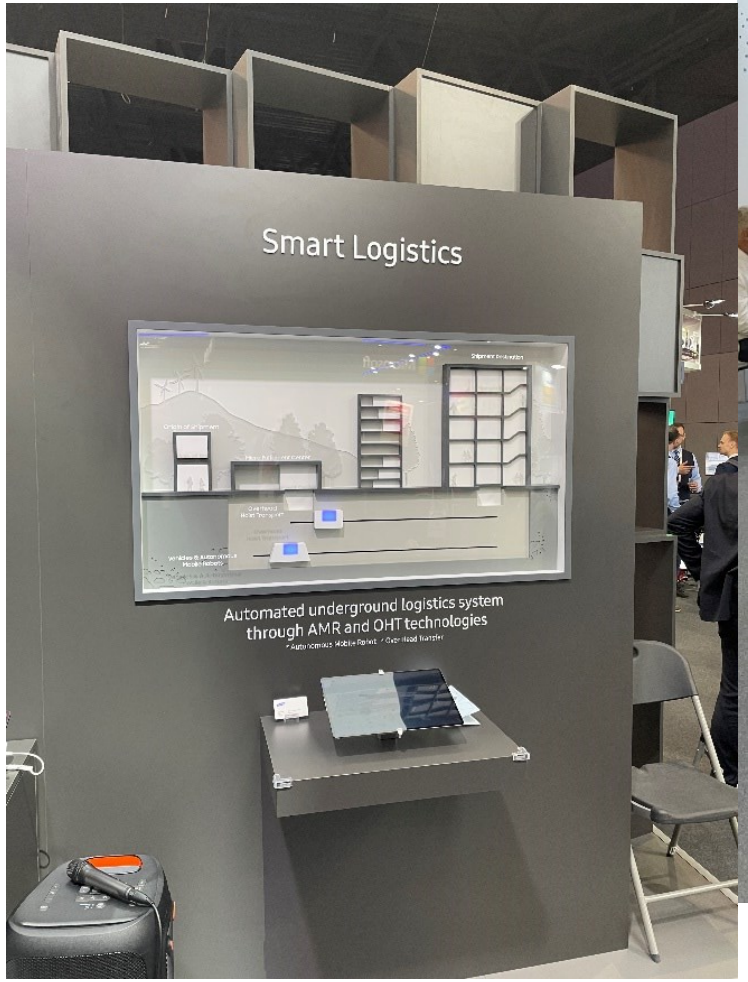
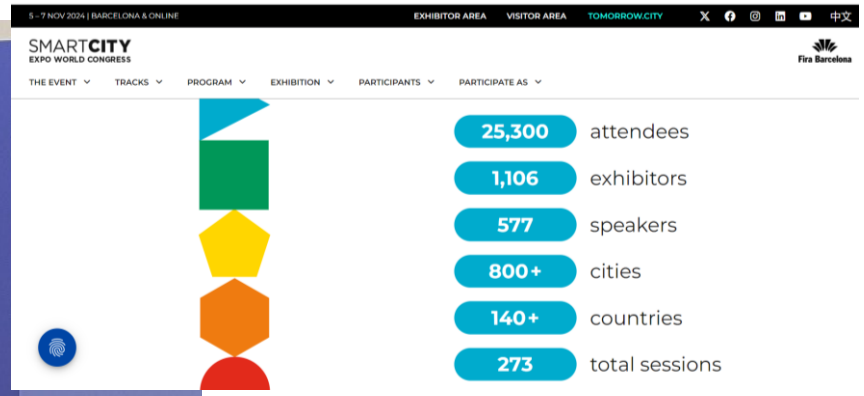
Some insights from Smart city Expo 2023 Nov 6-9





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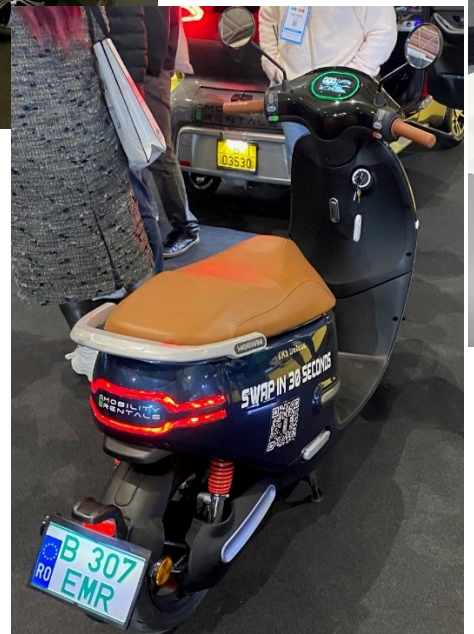
Smart city Expo 2023
Electric micro mobility



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Att tänka utanför boxen om urban logistik

- expansion av fysiska och konceptuella gränser för en hållbar och circular ekonomi

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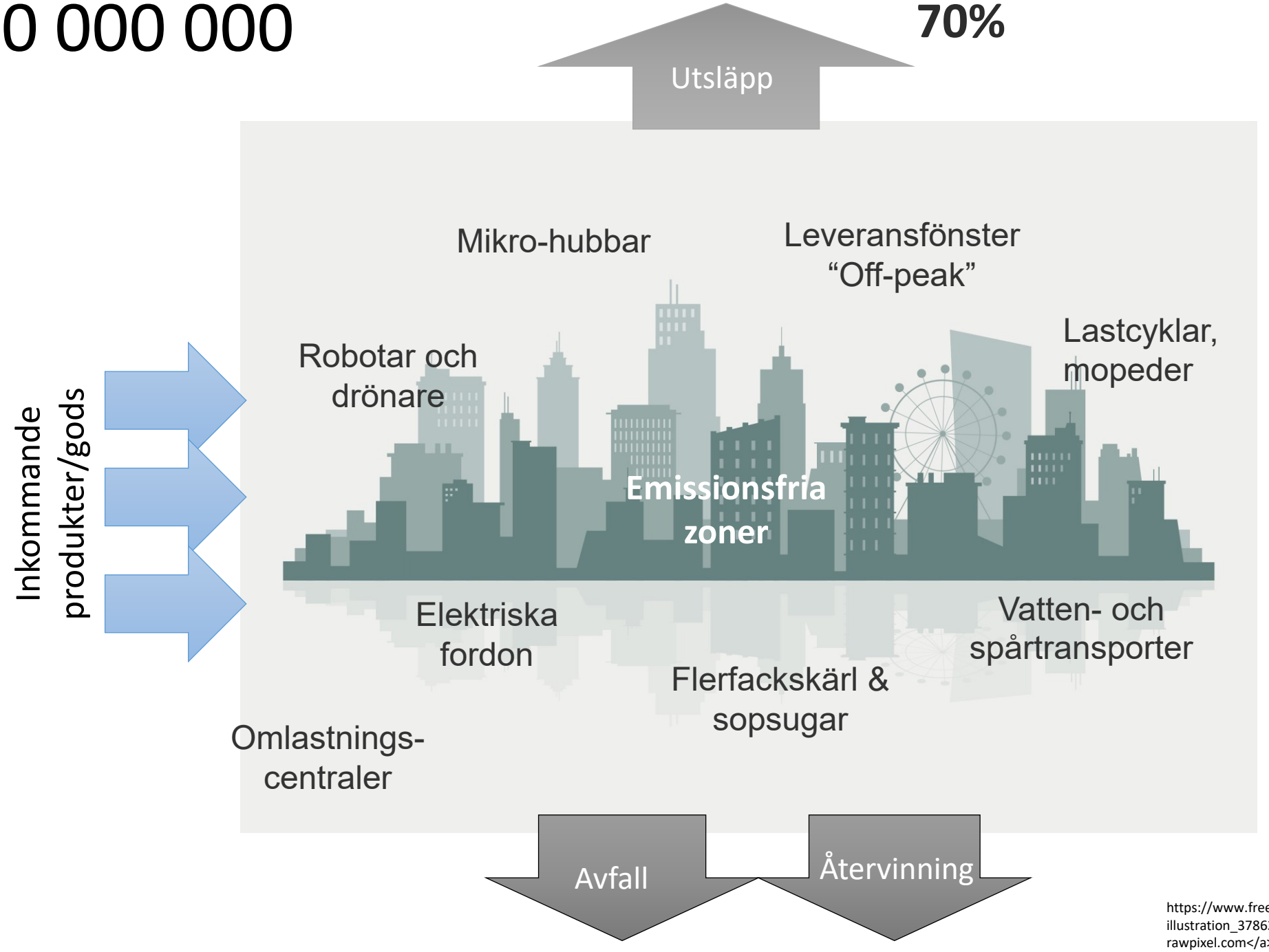
4 200 000 000

70%

3%



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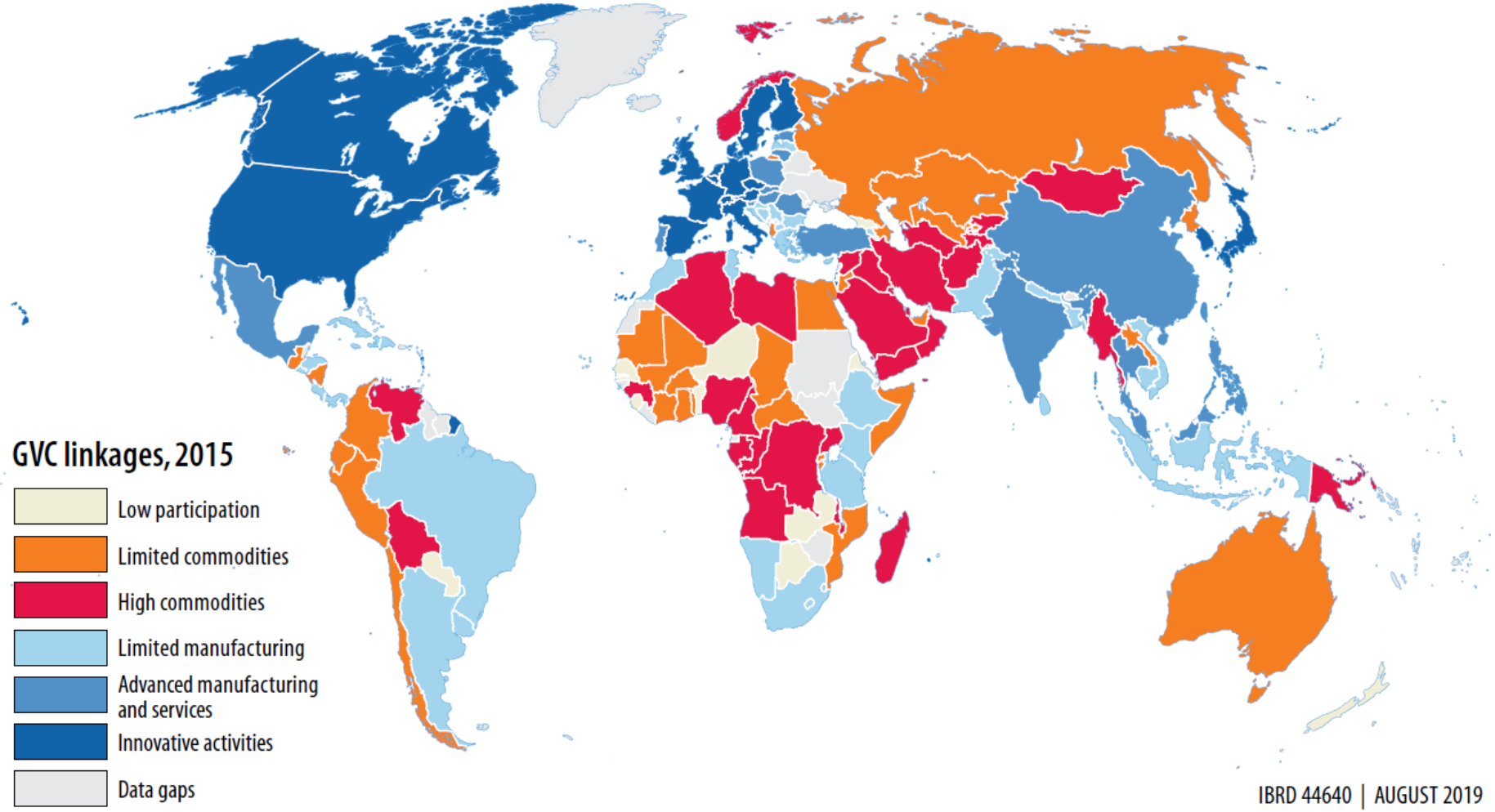
https://www.freepik.com/free-vector/silhouette-skyline-illustration_3786385.htm#&position=0&from_view=collections">Image by rawpixel.com on Freepik

Den cirkulära staden

- I omställningen till ett resurseffektivt och hållbart samhälle behöver såväl produkter som hela försörjningskedjor behöver bygga på cirkulära principer. Detta innebär då att just last mile logistiken blir ännu viktigare då cirkulära affärsupplägg bygger på just leveranser och upphämtningar av produkter hos/från konsumenter dvs den komplex och kostsamma delen i kedjan blir ännu större då produkter även ska hämtas, rekonditioneras och levereras ut igen. Följaktligen behövs ny kunskap om hur just detta ska hanteras då det blir klart avgörande för det cirkulära paradigmet att det inte flyttar klimateffekter från produkter till transporter utan löser det med hållbar tillgänglighet för maximerat resursutnyttjande. Det behövs också ett nytt tänkande där de globala flödena koordineras med mer integrerande cirkulära system i urbana miljöer.

Staden i det globala produktionsperspektivet



Source: WDR 2020 team, based on the GVC taxonomy for 2015 (see box 1.3).

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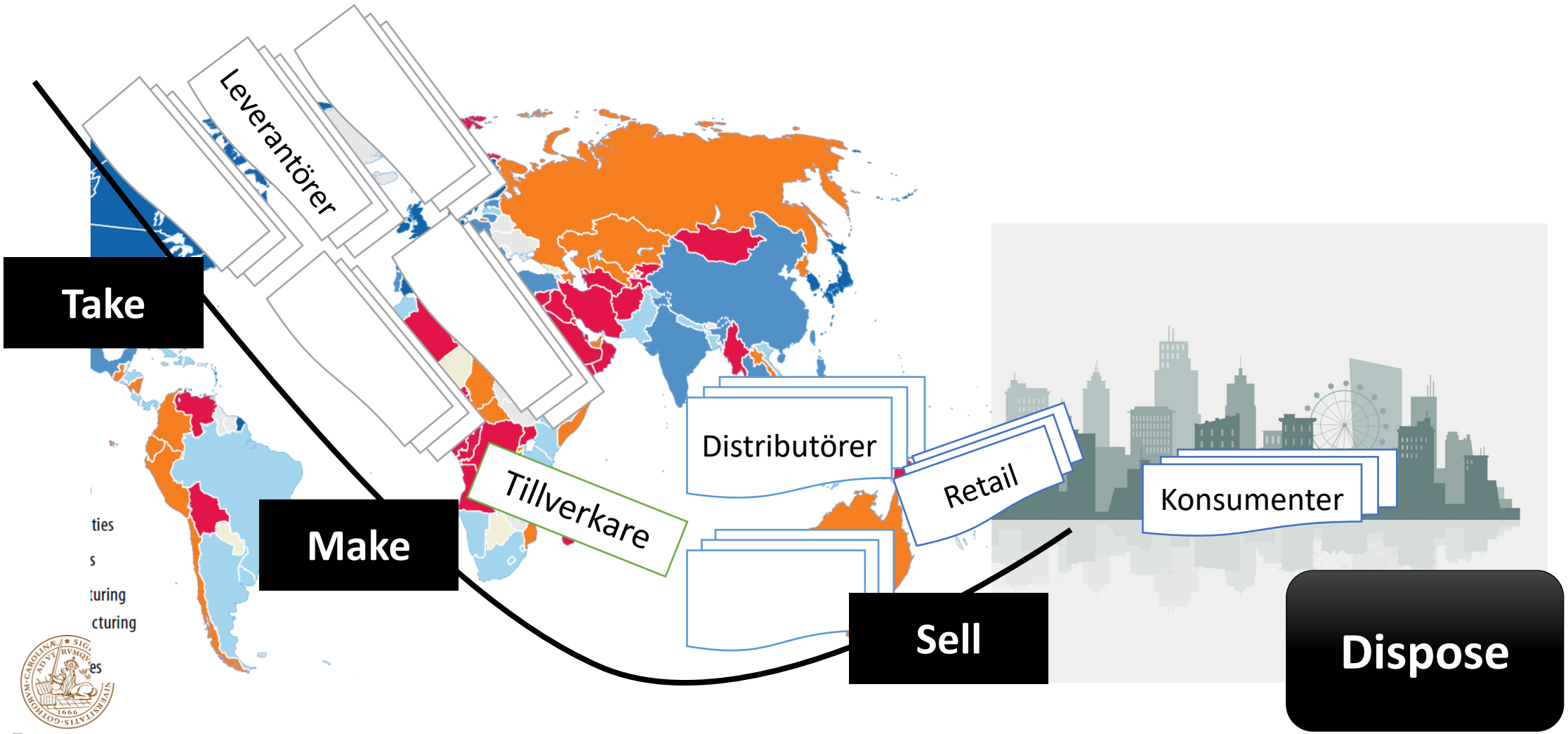
Linjära försörjningskedjor – accelerera flöde och konsumtion, maximera försäljning



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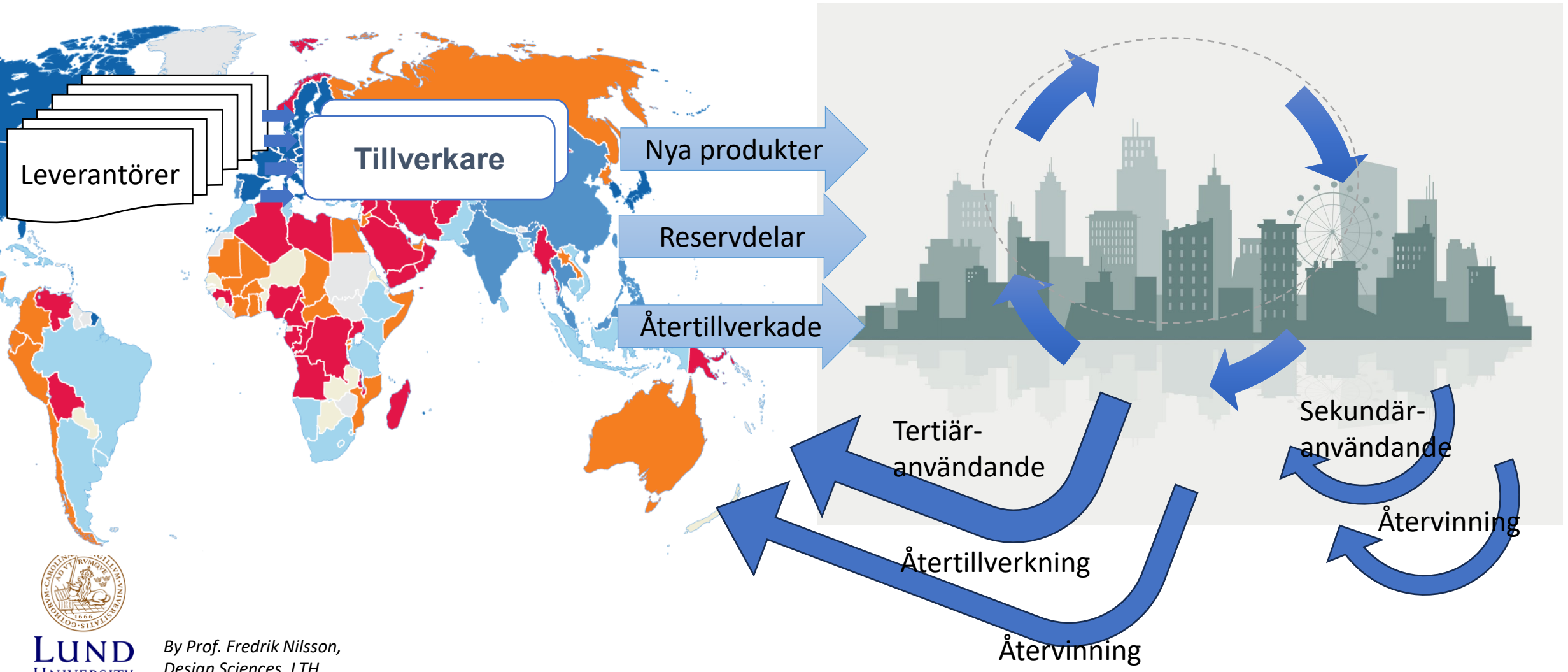
By Prof. Fredrik Nilsson, Design Sciences, LTH

Cirkulär urban ekonomi – att designa för och nyttja existerande resurser, länge



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By Prof. Fredrik Nilsson, Design Sciences, LTH

Konklusioner kring state-of-the art inom urban logistik

- Kommunen/staden behöver vara aktiv och driva samarbetet
- Delad och öppen data och möjlighet för aktörer att använda denna
- Brist på exempel/forskning som kombinerar återbruk/hantering i allmänhet och speciellt med avfallshantering
- Brist på helhetsperspektiv – ofta sker allt på en specifik stads-/kommunnivå...
- Det behövs ett nytt tänkande som införlivar staden som arena i den nya cirkulära designen av utökad användbarhet av produkter och resurser.

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