

# Understanding the impacts of concepts on the urban logistics system

### 18/06/2021 Claudia Andruetto





### From the project vision...



### **Project Vision**

To understand and create conditions for a sustainable transport system in the city.

By addressing...



We have a chance to also affect...







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### ...to the research question

#### **Project Vision**

To understand and create conditions for a sustainable transport system in the city.





System effects and design of sustainable urban logistics systems

## How do concepts for urban logistics contribute to a sustainable urban logistics system?





### Research background

#### i) Sustainability

How can sustainable performance be assessed in urban logistics?



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ii) Modelling

How can a sustainable urban logistics system be modelled?

**TRAFIKVERKET** 

#### iii) Impacts

What are the impacts of different concepts on the urban logistics system?



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### Research methodology

#### Literature review





System dynamics modelling

#### Group model building





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### Literature review on sustainable urban logistics systems

#### **Research question**

How can *sustainable performance* be assessed in urban logistics?



#### Methodology

Systematic literature review





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Aim







i) review **existing literature** on logistics concepts



ii) select key performanceindicators (KPIs) for sustainabilityperformance assessment

iii) analyse the sustainabilityimpact of the concepts





### Literature review results



TRAFIKVERKET

Search performed on Scopus Year [2008-2020] Sustainable urban logistics

Total number of papers: 1435



Year of publication

ii) Nation of provenience

Region Stockholm



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iii) Journal or conference

iv) Most explored concepts

• Performance (number of papers)

Impact (average citations)





### Literature review results



#### **Explored** concepts



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Aim







i) review **existing literature** on logistics concepts ii) select **key performance indicators** (KPIs) for sustainability performance assessment iii) analyse the **sustainability impact** of the concepts





### Framework methodology





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### Framework

Region Stockholm

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	Societal level	Organisational level
Environmental	لَّسُ CO <sub>2eq</sub> emissions هُرُ Air quality	Operational energy consumption
Social	Accidents Accidents Noise Average parking time Customer coverage	ഫിമ Working conditions
Economic 🏦	Infrastructure cost Average operational speed Technological development cost	<ul> <li>A····<sup>B</sup> Distance travelled</li> <li>S Transport cost</li> <li>Fleet utilisation efficiency</li> <li>Fill rate</li> <li>Delivery time</li> </ul>

TRAFIKVERKET

Based on 19 papers:

Arvidsson, 2013; Bandeira et al., 2018; Behrends, 2016, 2020; Behrends et al., 2008; Buldeo Rai et al., 2017; de Mello Bandeira et al., 2019; Gonzalez-Feliu & Morana, 2014; Jamshidi et al., 2019; Kiba-Janiak, 2019; Melo & Baptista, 2017; Morana & Gonzalez-Feliu, 2015; Muñoz-Villamizar et al., 2020; Nathanail et al., 2017; Rai et al., 2018; Russo & Comi, 2011, 2016; Rześny-Cieplińska & Szmelter-Jarosz, 2020; Santén, 2016

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### Sustainability performance assessment



- Qualitative
- Quantitative
- Semi-quantitative



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#### KTH VETENSKAP OCH KONST

### Preliminary result



### Negative<br/>impact-2-1±1+1+2Positive<br/>impact

#### Based on 12 papers:

Akgün et al., 2020; Anand et al., 2019; Dupas et al., 2020; Elbert & Friedrich, 2019; Fioravanti & Lima Junior, 2019; Firdausiyah et al., 2020; Gatta et al., 2019; Heeswijk et al., 2019; Nataraj et al., 2019; Nathanail et al., 2020; Paddeu & Parkhurst, 2020; Rabe et al., 2018





### Summary



#### i) review **existing literature** on logistics

Region Stockholm





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ii) select **KPIs** for sustainability performance assessment





iii) analyse thesustainability impactof the concepts



#### **Project Vision**

To understand and create conditions for a sustainable transport system in the city.



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