EVÅLUTION – Elektrifieringens utveckling ur ett åkeriperspektiv

Licentiatuppsats - Sabrina Brunner, LiU / VTI

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FOSSIL FREE FREIGHT

Åkerier och elektrifieringen av godstransporter på väg: Påverkansfaktorer och komplexitet

Sabrina Brunner, VTI / LiU

15 April 2026

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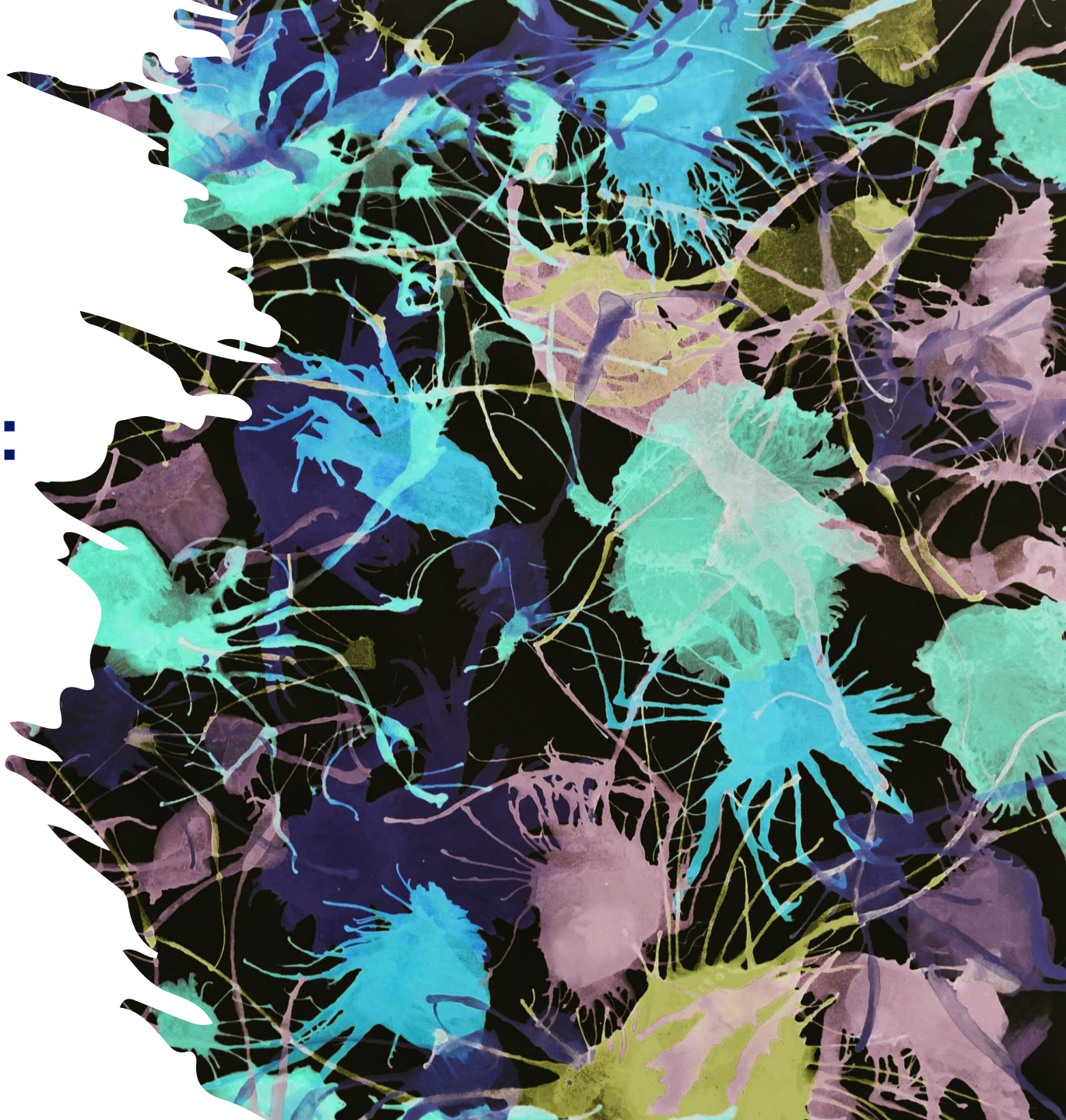

Bakgrund

CO_2

CO_2

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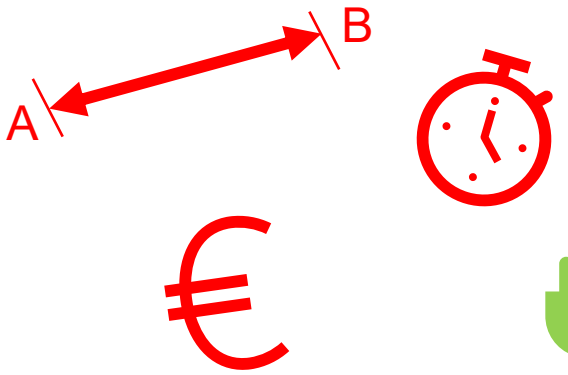
Höga utsläpp för godstransporter på väg

Bakgrund

CO_2

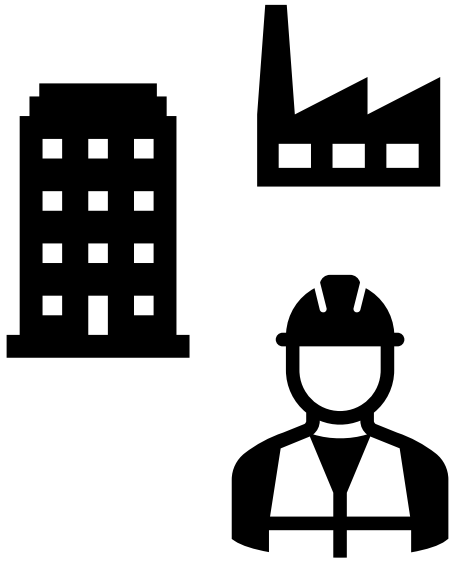
Möjlig lösning: Eldrivna lastbilar (BEV)



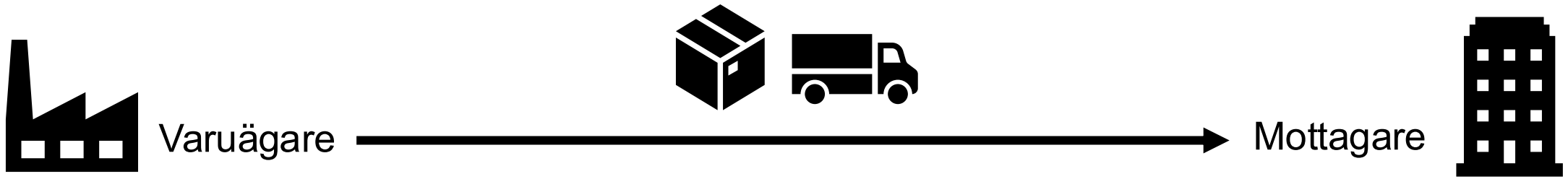
Bakgrund

CO_2

Vilka är implementerande aktörer?



Möjliga aktörer för implementering



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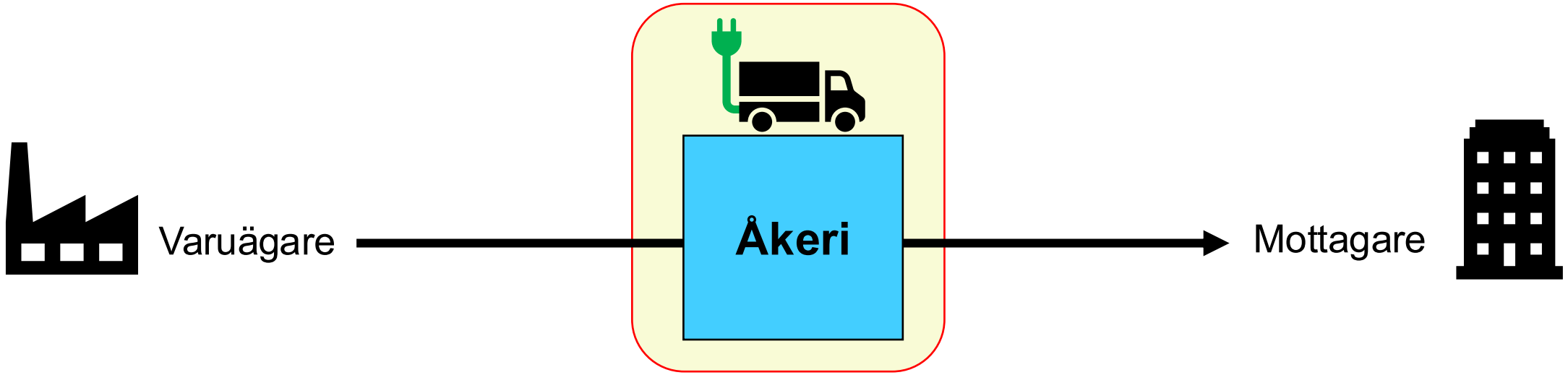
Möjliga aktörer för implementering



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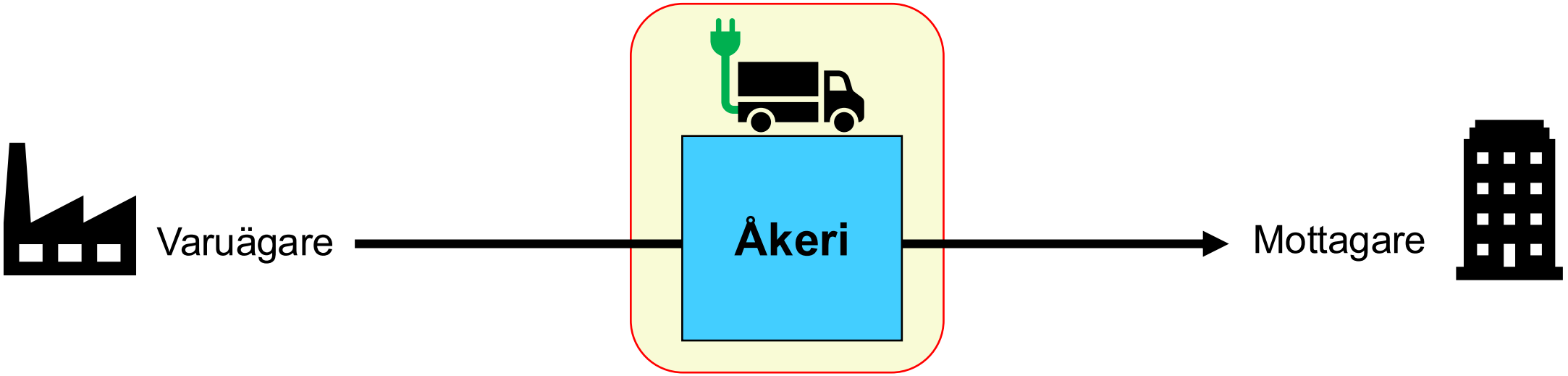
Möjliga aktörer för implementering



Åkerier

- Ofta små företag
- Stark konkurrens åkerier emellan
- Starkt kundberoende
- Ofta låga marginaler

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Syfte och forskningsfrågor

Syftet är att undersöka åkeriers implementering av eldrivna lastbilar.

- RQ1: Vilka faktorer påverkar implementeringen?
- RQ2: Hur svarar åkerier på dessa faktorer?

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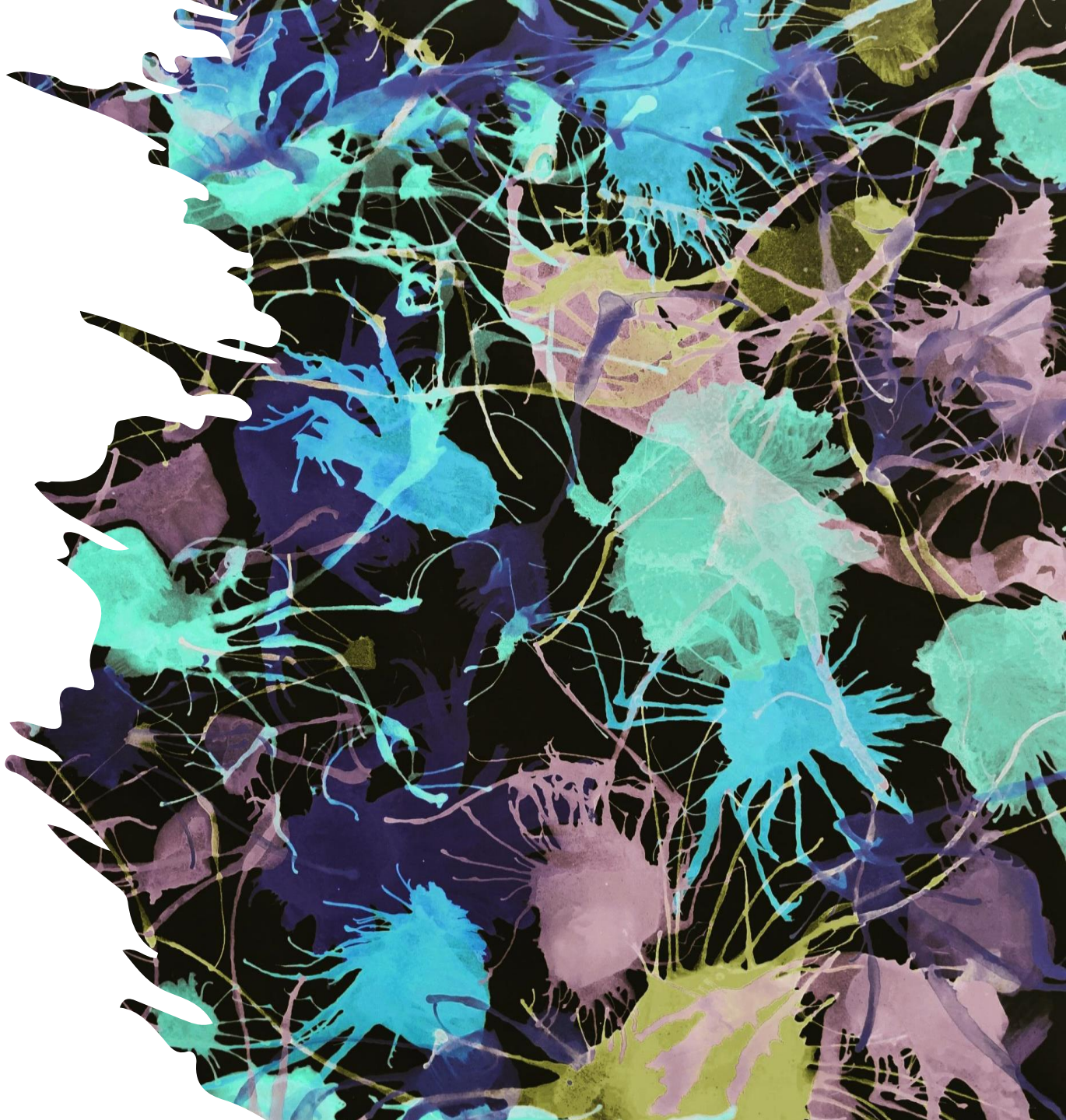
Metod

- Systematisk litteraturgenomgång (SLR)
- Flerfallsstudier med åkerier
- Intervjustudie
- Analys av vägtrafikregistret

	RQ1	RQ2
SLR	x	x
Multiple-case studies	x	x
Interview study	x	x
Register data		x

Resultat RQ1

- Vilka faktorer påverkar implementeringen?



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Ett mångtal påverkansfaktorer…

Advances in battery techn.

Battery aging

Vehicle investment costs

Charging investment costs

Vehicle manufacturers

Customer willingness to adapt

Local grid capacity

Battery capacity

Uncertain reliability

TCO

Price for electricity / charging

Customer contracts

Customer willingness to pay

Maintenance costs

Vehicle residual value

Public authorities

Haulage cooperatives

Uncertain development of public charging infrastructure

Lack of public charging infrastructure

Truck driver costs

Haulier's limited economic strength

Societal pressure

Haulier's own charging infra.

Total availability of charging infra.

Firm size

Firm image

Tight operational margins

Driving style

Diversification vs specialisation

Haulier's environmental strategy

Firm age / experience

Driving range

Decision maker's personal interest

Local weather/ temperature

Overall vehicle function

Charging time/ waiting time

Truck driver attitudes

General economic situation

Global developments

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Kända i litteraturen (om lätta BEVs)

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General economic situation

Global developments

Charging time/ waiting time

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Known from literature (on light BEVs)

Relativt outforskade / Nya insikter

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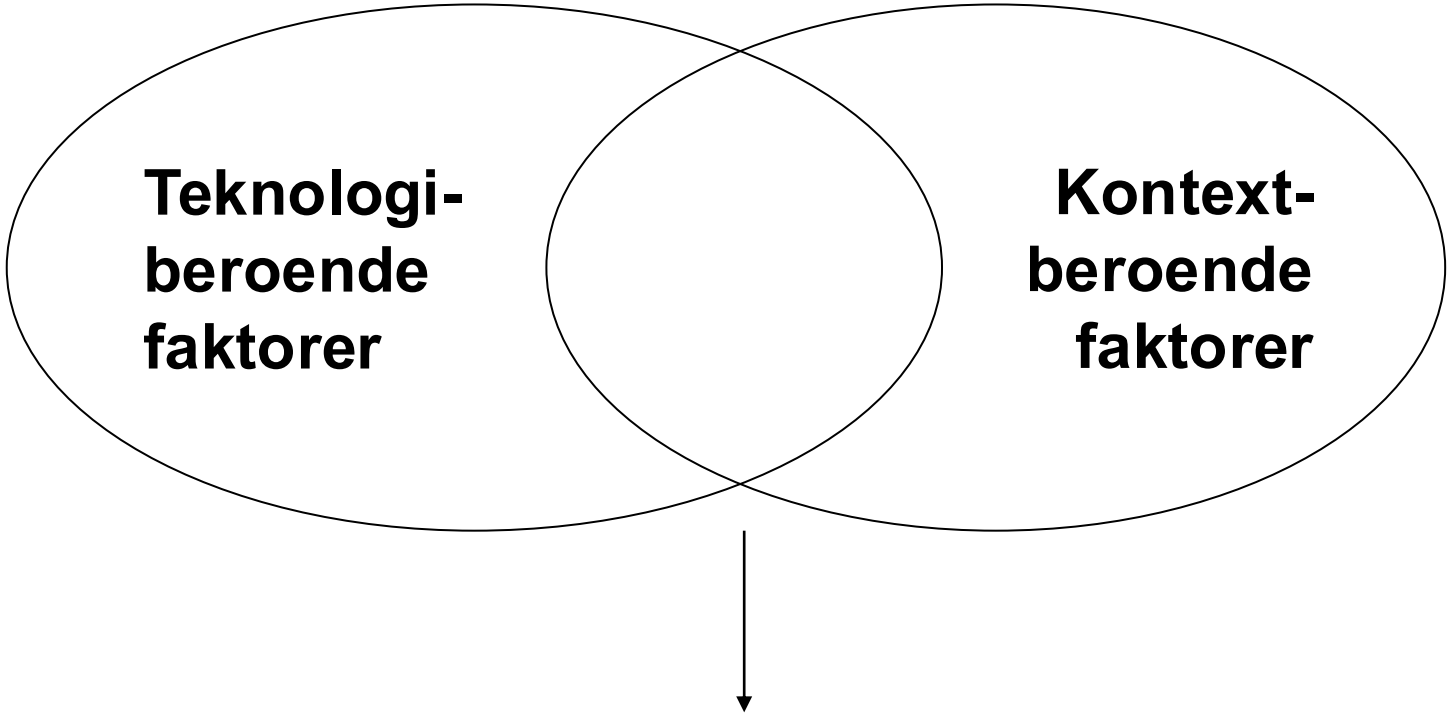
Ett mångtal påverkansfaktorer…

Teknologi & kontext

Tex:

Teknologi & infrastruktur

Ekonomiska faktorer



Tex:

Organisatoriska faktorer

Stakeholders

Åkeriers implementering av eldrivna fordon

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Komplexiteten av implementering

Implementering av BEVs är ett komplext åtagande för åkerier.

→ Mångtal påverkansfaktorer

→ Faktorernas dynamik: osäkerhet och oförutsägbarhet

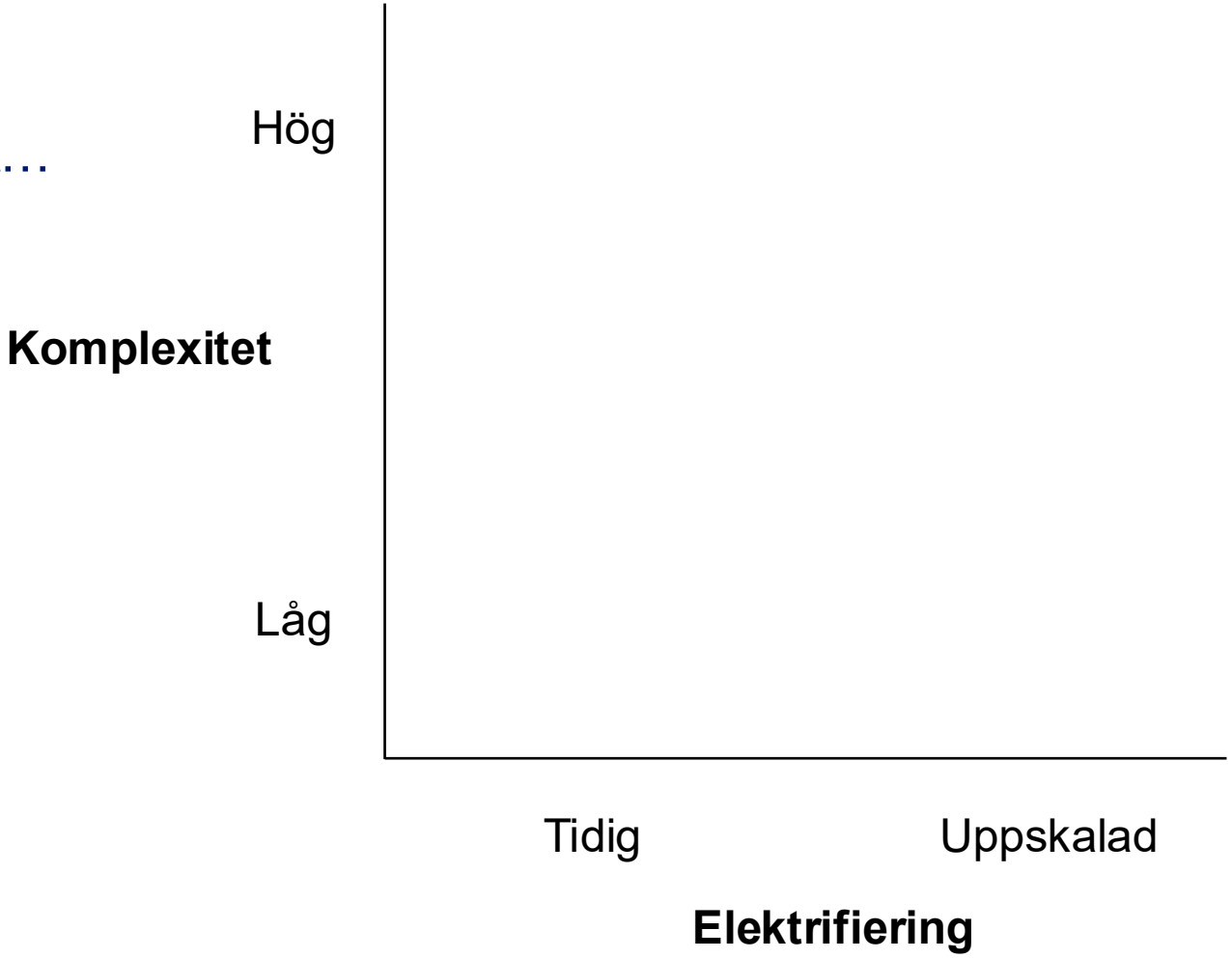
- Policy utveckling
- Teknologi utveckling
- Marknadsutveckling
- Infrastrukturutveckling
- Utveckling av transportefterfrågan

…

→ Härstammar från åkeriers omgivning = **externa**
Påverkar strategiskt beslutsfattande

Komplexiteten av implementering (cont.)

Komplexiteten har en tidskomponent…



Komplexiteten av implementering (cont.)

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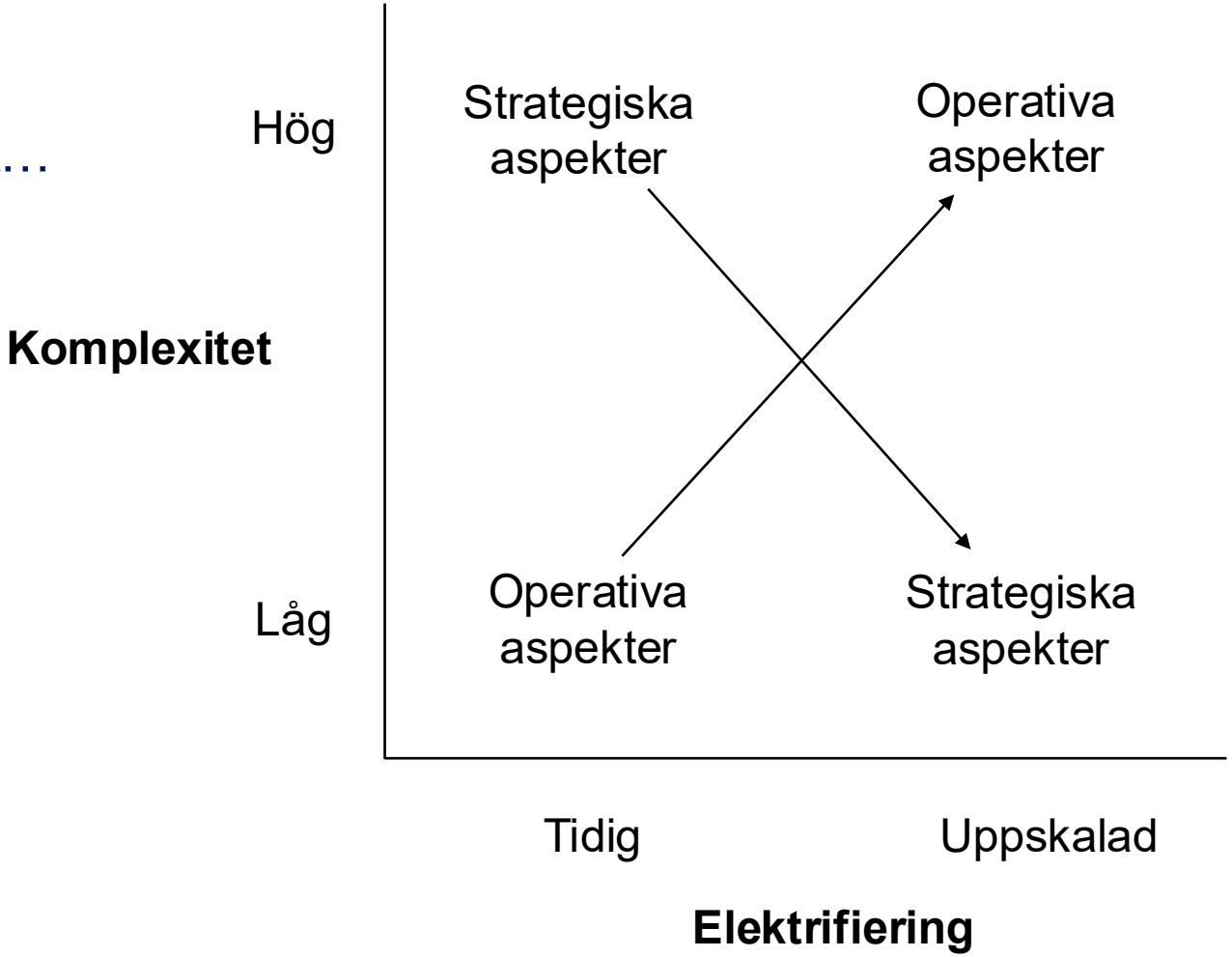

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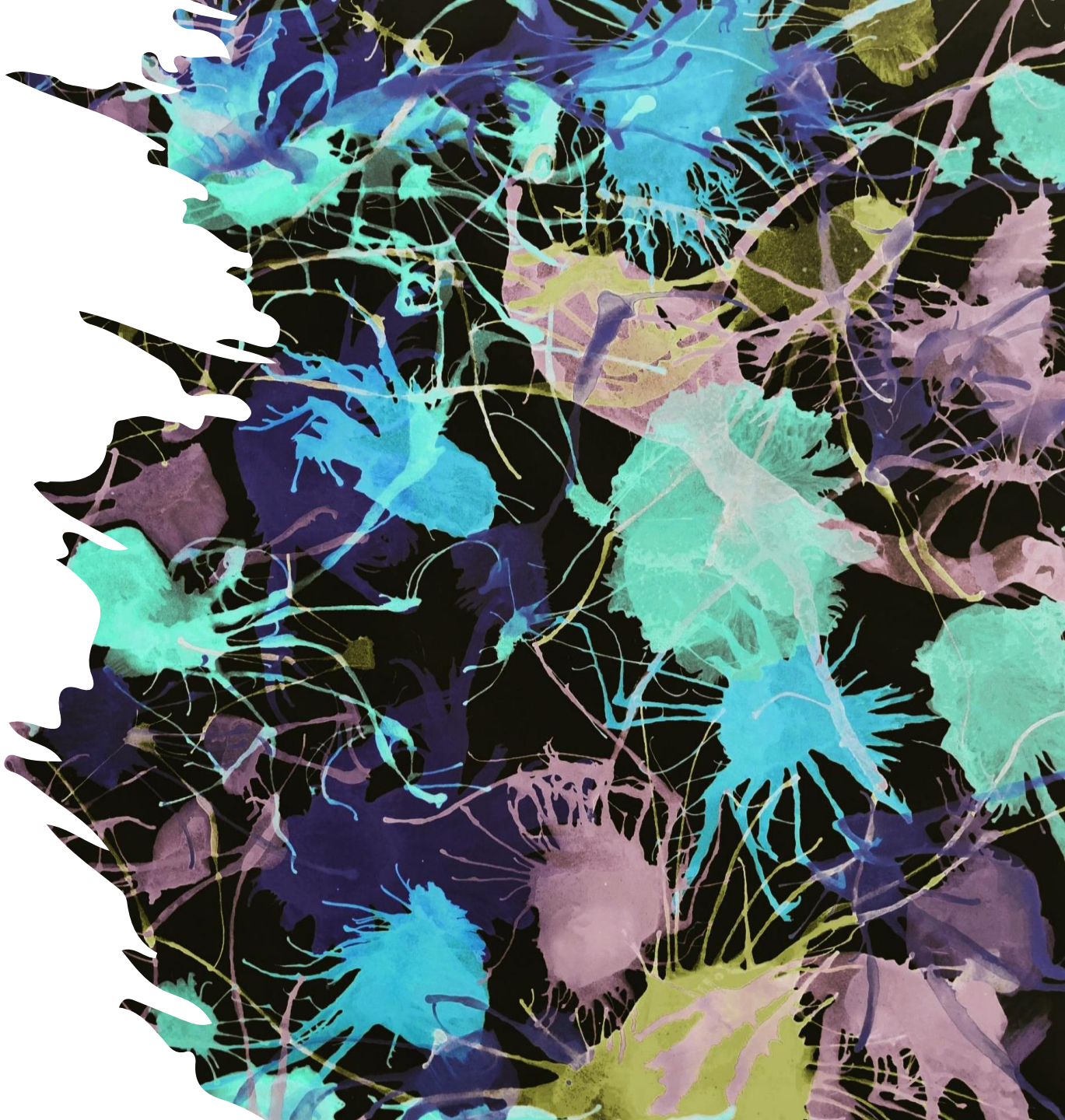
Resultat RQ2

- Hur svarar åkerier på påverkansfaktorer?



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Åkeriers agerande

- Risk management
- Cost management
- Operativ planering och anpassningar
- Samverkan
- Lärande
- Strategiska vägval

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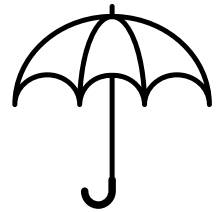
Åkeriers agerande (cont.)

- **Risk management**
- Cost management
- Operativ planering och anpassningar
- Samverkan
- Lärande
- Strategiska vägval

➢ Överföra risk till andra

➢ Tex genom leasing



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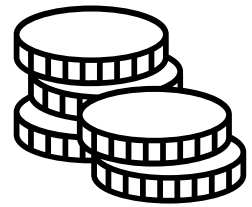
Åkeriers agerande (cont.)

- Risk management
- **Cost management**
- Operativ planering och anpassningar
- Samverkan
- Lärande
- Strategiska vägval

- Utnyttja låga driftkostnader
  - Tex genom depot laddning
- Öka fordonens nyttjandegrad
- Överföra kostnader till andra
  - Tex kunder eller lastbilscentral



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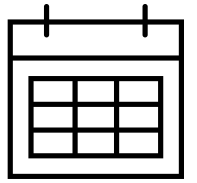
Åkeriers agerande (cont.)

- Risk management
- Cost management
- **Operativ planering och anpassningar**
- Samverkan
- Lärande
- Strategiska vägval

- Förutsägbara rutter
- Bygga in operativ flexibilitet, tex för stödladdning
- Energimanagement
  - Tex genom körstil
- Men: operativa flexibiliteten är begränsad



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Åkeriers agerande (cont.)

- Risk management
- Cost management
- Operativ planering och anpassningar
- **Samverkan**
- Lärande
- Strategiska vägval

➢ Samskapande av eldrivna transportupplägg med:
  - Kunder
  - Lastbilscentraler
  - Fordonstillverkare

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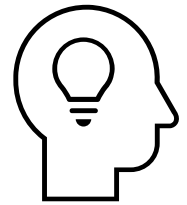
Åkeriers agerande (cont.)

- Risk management
- Cost management
- Operativ planering och anpassningar
- Samverkan
- **Lärande**
- Strategiska vägval

➢ Testar eldrivna lastbilar
➢ Omvärldsbevakning
➢ Observerar andra (tex andra åkare)
➢ Sprider kunskap till andra



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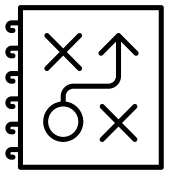
Åkeriers agerande (cont.)

- Risk management
- Cost management
- Operativ planering och anpassningar
- Samverkan
- Lärande
- **Strategiska vägval**

- Säkerställa långsiktighet (tex att fordonen passar verksamheten länge)
- Strategiska investeringar
  - Tex i laddinfrastruktur
- Avvakta (“wait & see” strategi)
- Dikotomin: risk vs. möjlighet



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Åkeriers agerande (cont.)

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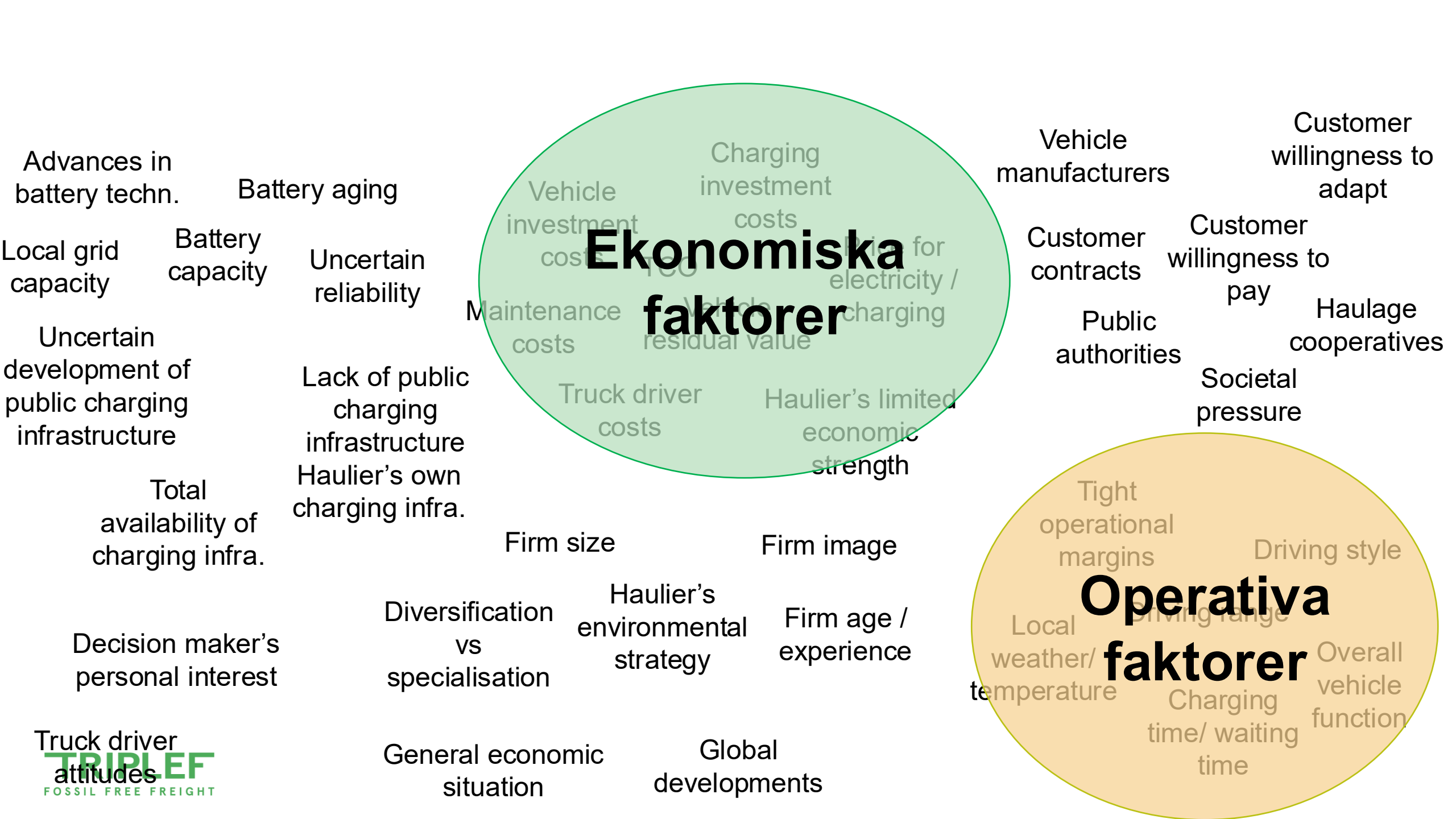
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Global developments
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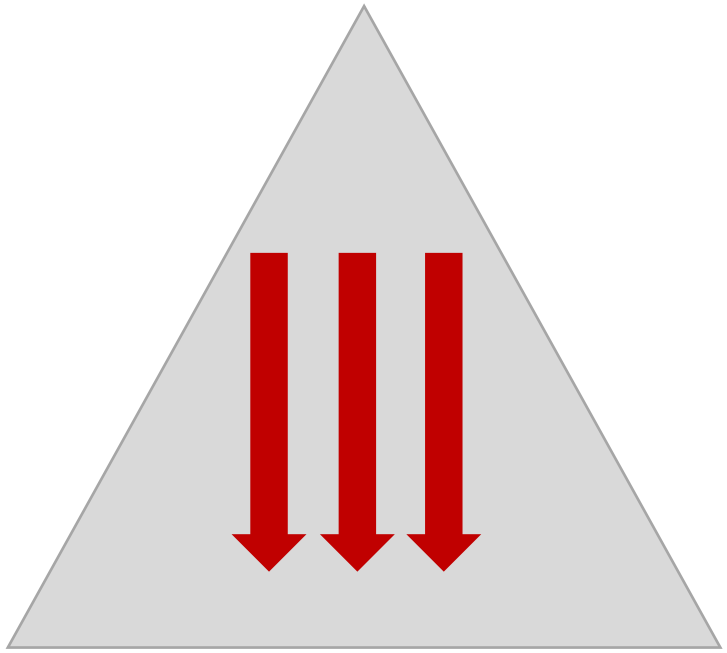
Tight operational margins
Driving style
Local weather/ temperature
Overall vehicle function
Charging time/ waiting time

Ett nytt sätt att se på omställningen…



Top-down?
“Utrullning”

eller

Bottom-up?
“Gräsrotsrörelse”

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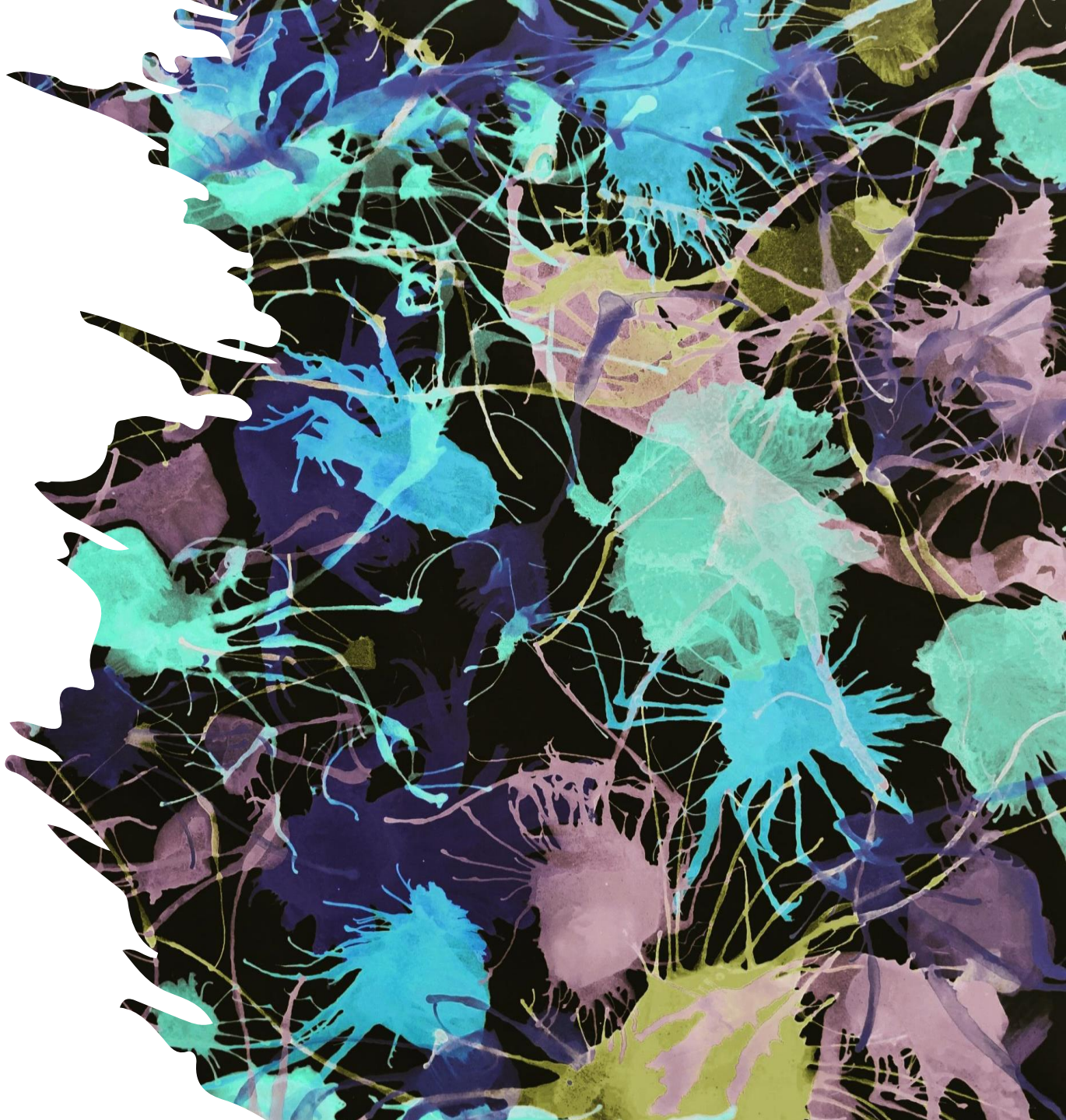
Photo: https://expertsnutrite.com/en/lawn-diagnosis/yellow-patches/yellow-grass-patches-causes-and-solutions/

Slutligen…



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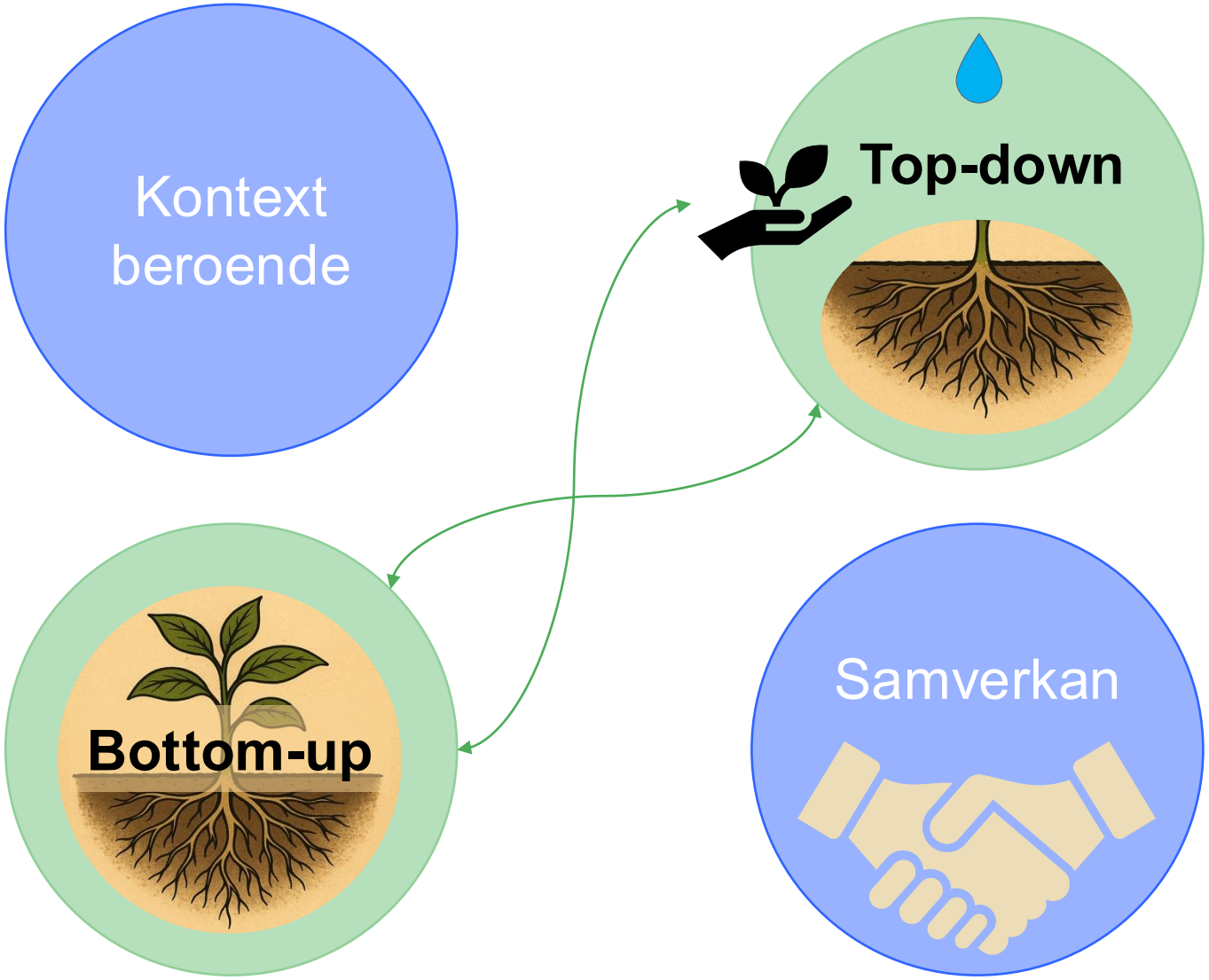
En sammanfattning i bilder



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Tack!

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