THE MARKET DILEMMA

IMPLIEDATIONS OF AN INTRODUCTION OF ELECTRIC ROAD SYSTEMS ON MARKETS AND POSSIBLE BUSINESS MODELS

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Implications of an Introduction of Electric Road Systems on Markets and possible Business Models

- Part of ScanMed freight corridor
- 3 countries (SE, DK, DE)
- 424 km corridor length in total
- 17’000 long haul HDV operations daily
- 3.8 million km daily

Swedish-German Research Collaboration on Electric Road Systems (CollERS)

Hamburg
Puttgarden
Lübeck
Rødby
København
Malmö
Starting point

- The long-haul freight sector is one of the most difficult sectors to decarbonize, and road freight is projected to grow drastically in upcoming years.

- ERS has emerged as a potential way to achieve sustainable CO2 reduction.

- Most pre-commercial ERS activities have been initiated, supported, and subsidized by public funding, driven by societal and ecological needs.

- An ERS core network requires large investments in developing and commercializing technology (e.g. electric road trucks) as well as capital investments in a new physical infrastructure (e.g. electrified roads and power grid extensions) - at a development stage when uncertainty is high and rewards are difficult to predict.

- Thus, for market deployment of ERS the main variables of promising business models play a crucial role.
Step 1 | The transport market

- System-affecting aspects (exogenous factors)
  - sustainability
  - technology
  - truck availability
  - oil prices
  - regulation
  - digitalisation
  - sharing

freight movement

- demand
- supply

(ERS) truck operations
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Step 2 | The primary market for goods and services

primary market for goods & services

transport market

freight movement

demand

supply

(ERS) truck operations

System-affecting aspects (exogenous factors)
sustainability | technology | truck availability | oil prices | regulation | digitalisation | sharing
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Step 3 | The primary market for infrastructure and energy

primary market for goods & services

primary market for infrastructure & energy

transport market

freight movement

demand

supply

(ERS) truck operations

System-affecting aspects (exogenous factors)
sustainability | technology | truck availability | oil prices | regulation | digitalisation | sharing

\[ e \text{ (GDP, t-km)} \]

\[ \text{year} \]
Step 4 | The market model

### Primary Market for Goods & Services
- **Consumption**
  - Demand
  - Supply
- **Production**
  - Logistics

### Primary Market for Infrastructure & Energy
- **Freight Movement**
  - Demand
  - Supply
  - (ERS) Truck Operations
- **Journeys**
  - Demand
  - Supply
  - (Electric) Roads
- **Demand for Electricity**
  - Demand
  - Supply
  - Power Supply & Grids

### System-affected Aspects (Exogenous Factors)
- Sustainability
- Technology
- Truck Availability
- Oil Prices
- Regulation
- Digitalisation
- Sharing

**Implications of an Introduction of Electric Road Systems on Markets and possible Business Models**
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Heterogenous market principles for transport, energy, and infrastructure

dilemma 1

Different market drivers between trade and energy

dilemma 2
Dilemma 1 | Heterogenous market principles

- **transport market**
  - road transport competition

- **infrastructure market**
  - road infrastructure access & use

- **energy market**
  - electricity market regulation

**road haulage legislation**

**competition**

- § GüKG

**organisation**

- § FStrG, BFStrMG

**access**

- § EnWG
Consequences out of dilemma 1 for business models

- Open competition, market organization, and regulated access are completely different principles for structuring markets

- Assigning the wrong principle to a (sub-)market leads probably to market failure

- **Thus, for every step towards the deployment of ERS a clear orientation, which market is focused at the moment, and which principle is used, is essential**

- In detail, if acceptance for ERS shall be achieved on the transport market, this has to be done by respecting and using the **rules of a strongly competitive market** and by modeling the transport market as a **new business opportunity** for the energy sector at the same time
Dilemma 2 | Market drivers

- **Primary market for goods & services**
  - Trade market
  - Forwarding market
  - Logistics

- **Primary market for infrastructure & energy**
  - Infrastructure market
  - Energy market

Driver: cost efficiency

Driver: market opportunities
Dilemma 2 | Setting the right incentives

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Enhancing (cost) efficiency in transport ↔ new energy business & CO2-reduction

primary market for goods & services

vehicle operator models ↔ vehicle manufacturing

trade market

forwarding market

supply chain

consumption

demand

supply

production

overall flexibility of trip planning ↔ electric mileage

journeys

demand

supply

(electric) roads

energy market

primary market for infrastructure & energy

easy payment ↔ managing energy & grids

infrastructure market

incremental change ↔ radical change

power supply & grids

cutting cost ↔ market opportunities

Dilemma 2 | Setting the right incentives

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Consequences out of dilemma 2 and conclusions

- Implementation scenarios of ERS might be looking completely different, depending on the market the responsible person is coming from.

- The market model is a suitable way of pointing that out, to show the ongoing dilemmas, and possible solutions.

- Different market perspectives on ERS open up innovative business opportunities, e.g.:
  1) Truck operators that are running electric trucks might become part of the energy supply system through offering capacity for temporal energy storage.
  2) Infrastructure companies could be interested in operating or financing ERS infrastructure as a new part of their business.
  3) Companies providing billing solutions (e.g. collecting tolls) could be interested in billing electricity for ERS trucks, for instance.

- ERS operators, either in the public or private sector, are key actors, as they are moderating between the different primary markets, and can benefit from both markets.
THANK YOU FOR LISTENING

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