

# Analyzing innovations in Europe's rail freight system: a perspective from innovation theories on the barriers and the opportunity windows

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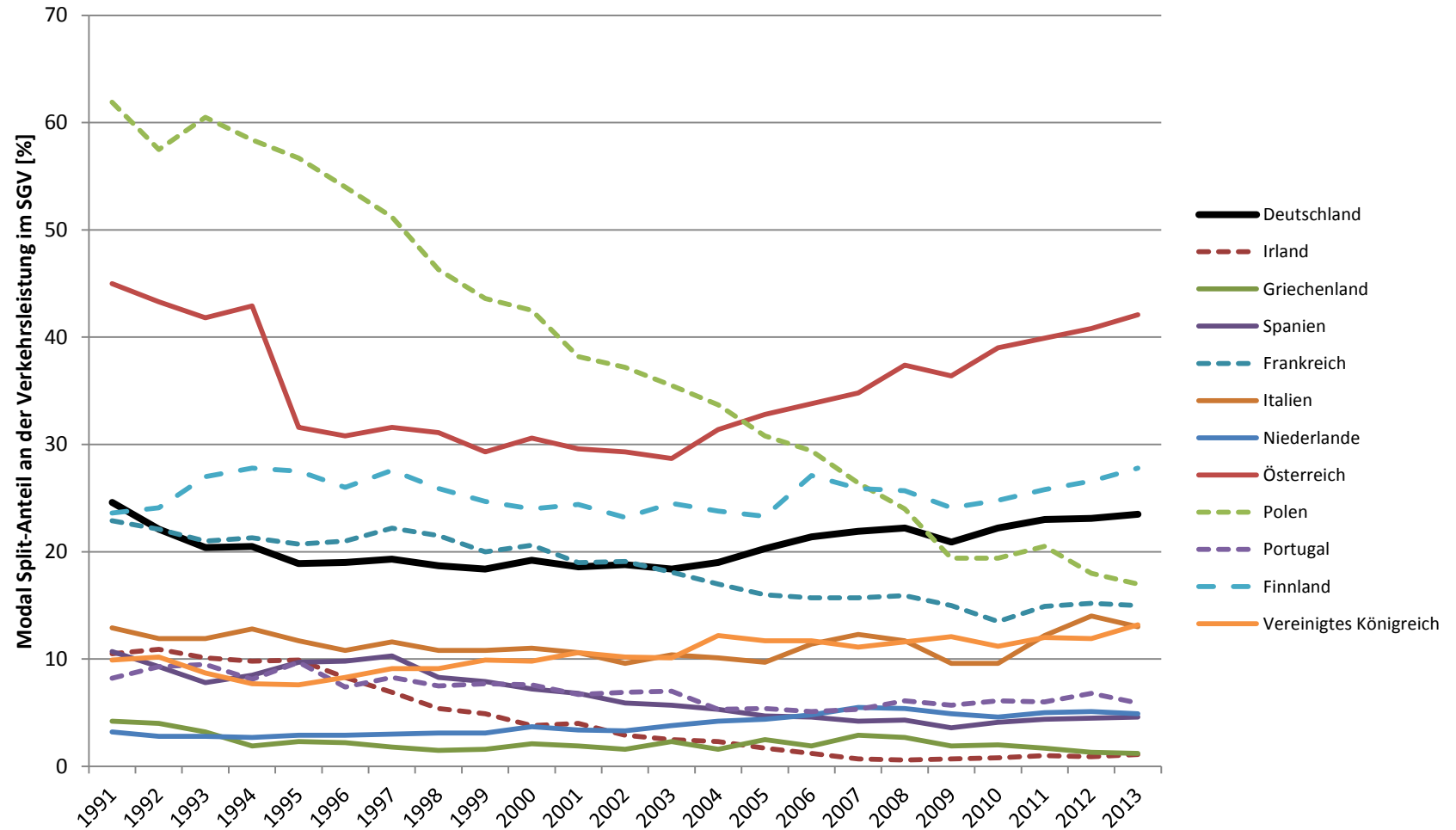


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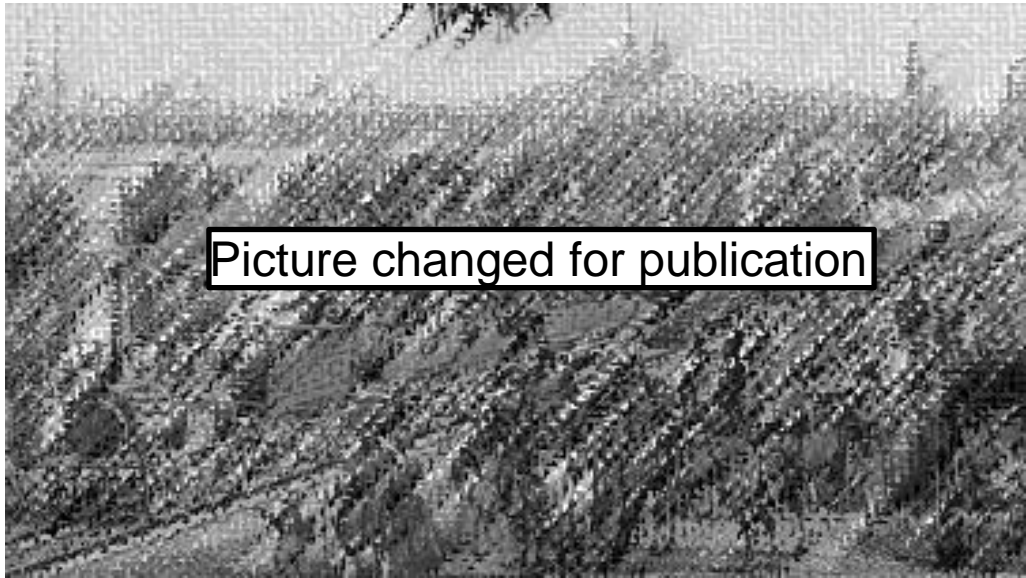
# Introduction

- What is the rationale behind this development?
- What hinders innovations?
- Moreover: What can we do?

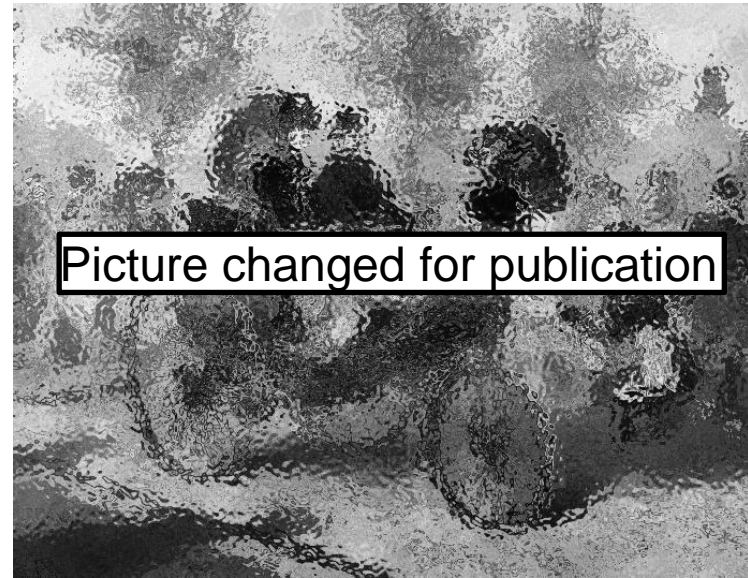


# Neo-classic arguments versus evolutionary arguments

- Huge efforts for the shift to rail on EU and national level
- It needs a qualitative analysis: learnings from evolutionary economics and innovation research



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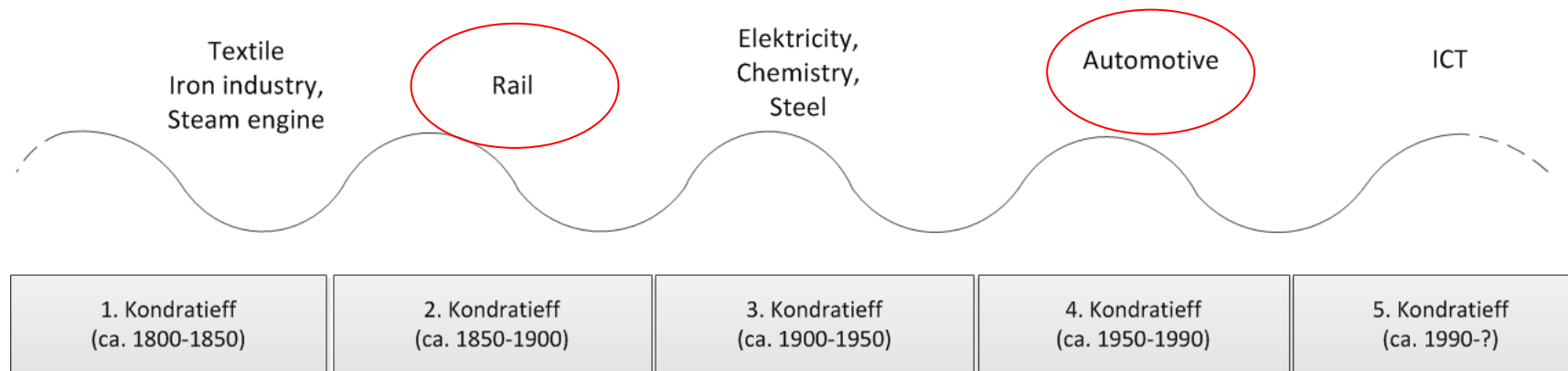
**These illustrations show the rail and automobile as a basic innovation in the beginning with huge public interest**



# Basic innovations: the engine of industrial revolutions

- **Kondratieff cycles (long waves):**

- Economic cycles about 40-60 years
- Driven by basic innovations (totally new innovation with parapount input factors)
- Socio-technical paradigm is shifting to the basic innovation (creative destruction)
- Transport systems were such basic innovations

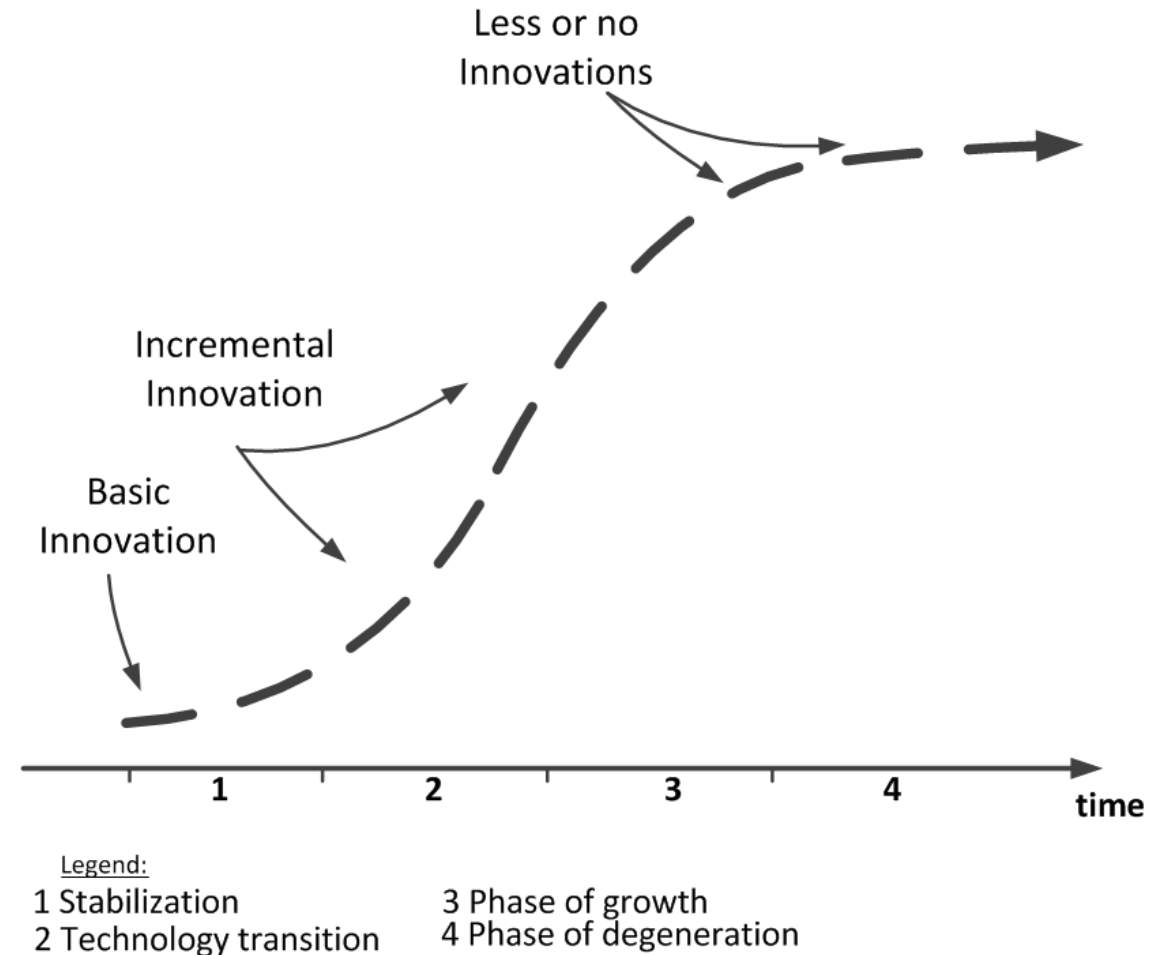


**Kondratieff cycles untill „today“**



# Evolution of a transport system

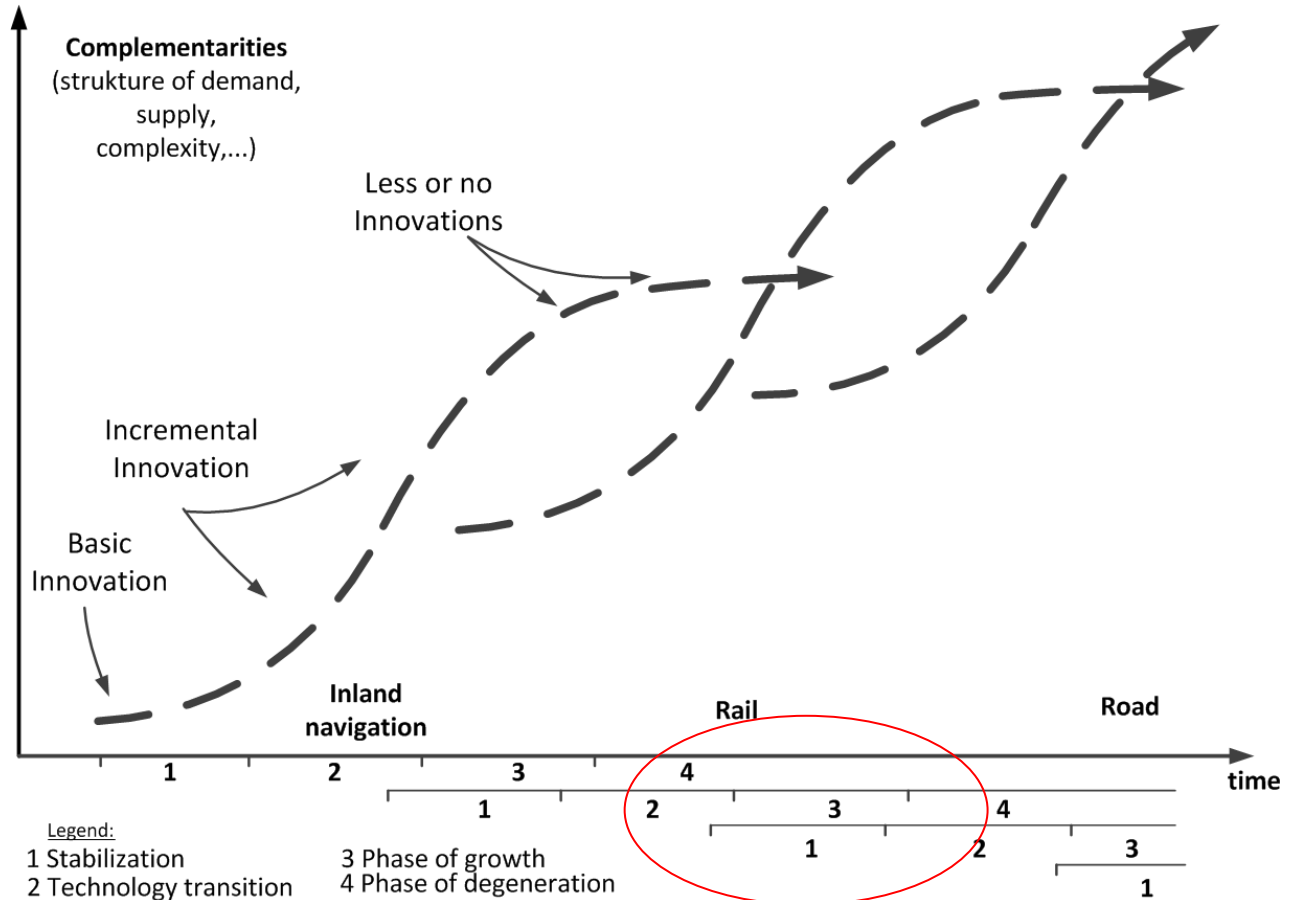
- **Phase of stabilization:** the Lock-In in a niche technology in a niche market
- **Phase of technology transition:** exploiting the Attacker's Advantage to develop a niche technology to a mass market
- **Phase of growth:** the product innovation competition (Innovator's Dilemma) leads to a mass technology in a mass market
- **Phase of degeneration:** the Stalemate in Technology impedes return on investment - no RoI means no innovation – no innovation means no market dynamic – no return on investment



Source: Müller and Liedtke 2017

# Co-evolution of a transport systems

- **The mutual interdependent off-set of transport system evolution:**
  - The growth of a Transport system in the mass market opens up market niches for radical innovations (experimentation)
  - Technology transition phase of one transport system limits the growth and starts the degeneration of another (the former dominant)
  - A degenerating transport system needs basic innovation to overcome the stalemate in technology

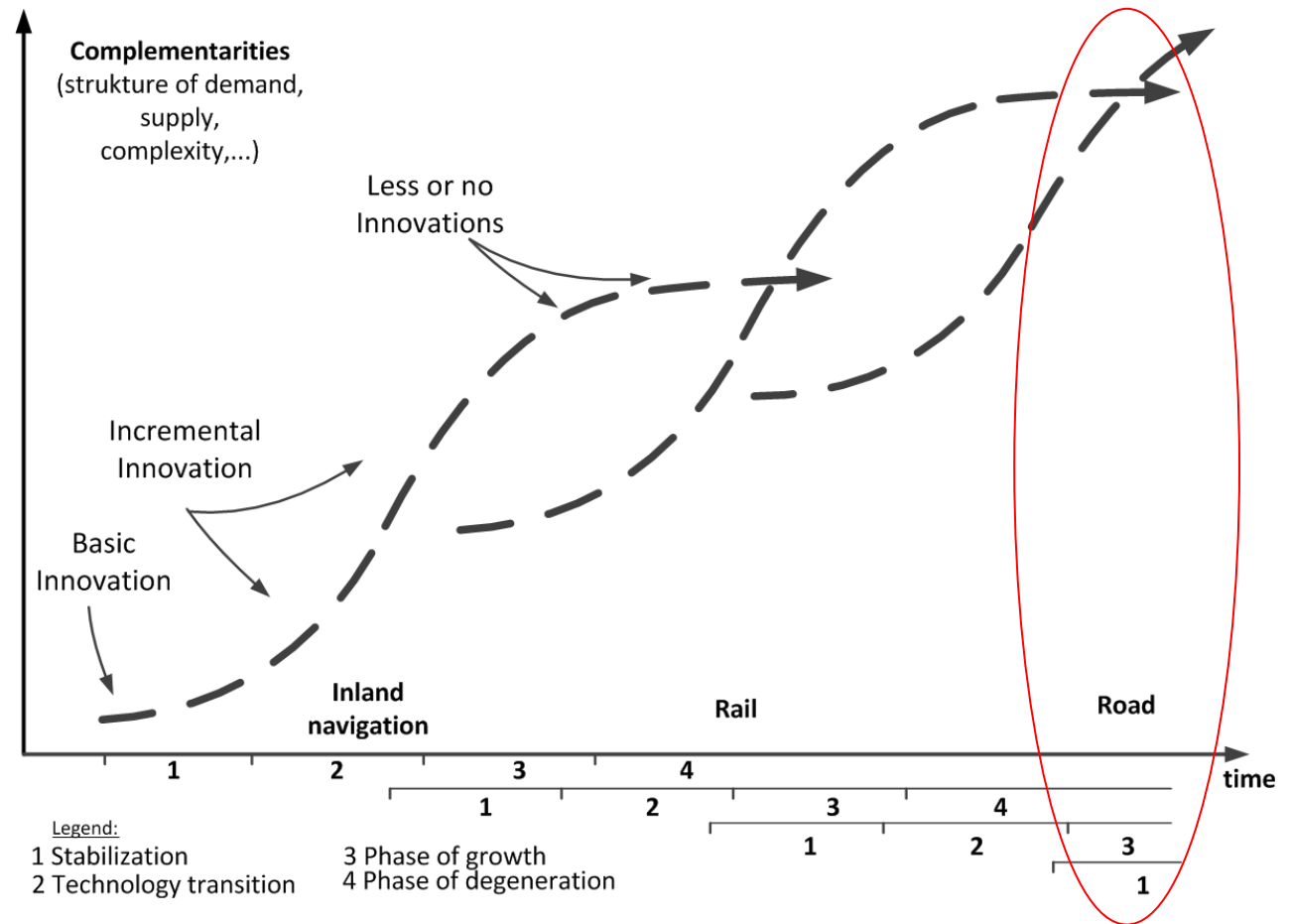


Source: Müller and Liedtke 2017

# Current constitution of the freight transport system as a whole

- **Major findings describing the innovation landscape today:**

- Road is the dominant transport mode
- Inland navigation and rail are in the Stalemate in Technology
- The market growths in logistics becomes saturated (profit expectations for ICT investments)
- Numerous innovations start to challenge the road's dominance (or its technology)



Source: Müller and Liedtke 2017



# Systematic approach to explain the lag of innovations in freight rail

Rail  
based  
logistics

- Still path dependent
- No expectation of market growth hinders every investment in innovations – no investment means no market growth: stalemate in technology
- High investments necessary (system innovation)

Truck  
based  
logistics

- Market growth is decreasing
- Future growth is by specialization (exploiting niches)
- Business models are based on the truck
  - Profit margins expected for investment in innovations (e.g..ICT)
  - Rejections of alternative





# Recommendations for actors in freight rail

- Canibalization of monopolist is not enduring
- Market offer must be revolutionized (the way out of the stalemate in technology)
  - New business models and technologies
    - Autonomous trains: CargoMover, Synchrotrain, u.a.
    - New goods handle concepts: CargoBeamer, LogXXNet, ModaLohr, RailRunner u.a.
    - New feeder systems for freight rail: CargoSprinter, NGT Cargo, NGT Cargo Link u.a.
    - Alternative cargo systems: CargoCap, Cargo Sous Terrain, Hyperloop One, CargoRapid u.a.
  - Develop niches first (before the truck)
    - Niche should be able to grow
    - Test functionality and business concept
    - Growth by further incremental innovations



# Recommendation for political actors

- Government is provider of risk capital when private sector lacks!
  - Condition of project funding
  - Funding of many project (stimulating market selection)
- Political commitment to the new!
  - Radical innovations must be promoted now, to be available in future
  - Intensification of te established pathway is advantage for other economies (who do not)
- Political protection of radical innovation!
  - Cluster/Networks for the radical innovations
  - Support/promotion of business concepts (characteristics of the entrepreneurs)

Nach Müller und Blanquart 2017



# Take-home Message

Future oriented innovation pathway in freight rail:

**Green logistics with market oriented services and  
Supporting radical technologies  
In a growing niche market applied first (with willingness to pay).**

Thank you for your attention !

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# Sources

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- Müller S. und Liedtke G. und Lobig A. (2016): Chancen und Barrieren für Innovationen im deutschen Schienengüterverkehr: Eine innovationstheoretische Perspektive. In: Zeitschrift für Verkehrswissenschaft (03/2016)

