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

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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

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 paramount input factors)
  - Socio-technical paradigm is shifting to the basic innovation (creative destruction)
  - Transport systems were such basic innovations

Kondratieff cycles until „today“

1. Kondratieff (ca. 1800-1850)
2. Kondratieff (ca. 1850-1900)
3. Kondratieff (ca. 1900-1950)
5. Kondratieff (ca. 1990-?)
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

Nach Müller, Liedtke und Lobig 2016
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

Nach Müller, Liedtke und Lobig 2016
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
