



# Innovation in Railways

ITF 2010 discussion

Transport and Innovation: Unleashing the Potential

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# Railway Innovation: The High Points

- Evolution **not** Revolution
- Lots of railways, few big systems: high concentration
- Traffic growth, loss of mkt. share
- Evolutionary innovation last 4 decades, technology and policy
- Basic projections: significant growth in freight and passenger
- Projected future conflicts with policy?
  - What policy?
  - Some capacity issues (China, India, Russia, maybe U.S. in freight, HSR in a number of areas)
  - Carbon dilemma (traffic vs. emissions)
- Game changers?
  - **Carbon sequestration** if GHG limits are implemented
  - Continuing evolution in energy/efficiency/safety technology
  - Significant improvement in systems integration (IT and GPS)
  - Policy: pricing systems, rail structures, franchising, regulation
- Innovation can not be guaranteed – but it can be hindered

# Rail Innovation: 1970 to 2008

Technical Innovations	Impact	
	Freight	Passenger
HSR	Reduce Frt/pass congestion	Weight, aerodynamics, 200 to 350 km/hr
IT	Cargo mgt. improved, costing systems, better pricing, digital Comm, AEI	Efficient ticketing and reservations. Digital communications. Permits revenue maximization
Intermodal	Rails participate in containerization trends	Better connections to air and bus
Energy Efficiency	US energy intensity reduced by half. AC traction on diesel locomotives.	A.C. traction, solid state controls. Shinkansen energy intensity cut by half.
Hvy Haul/Infrastr	Higher axle loads, longer trains, larger locomotives, rail metallurgy. U.S. operating cost/tonne-km reduced by 59% 1978 to 2007	Continuous welded rail reduces maintenance and energy.
Signalling	Higher traffic density and improved safety: accident rates down by 2/3	Improved capacity and safety, especially with mixed freight and passenger traffic.
Policy/Managerial	Freight	Passenger
Structure	US/Canada approach: freight dominant, passenger pays as tenant. E.U. freight operators can serve Europe-wide	EU model of infra separation permits franchising and cross-border operation. Introduces competition for markets as well as in markets
Private sector	Privatization of CN, concessioning in Latin America, privatization in UK and EU	Franchising in E.U., privatization of JNR
Dereg.	Staggers Act in U.S.: tariffs fell in real terms by half. Permits contract tariffs and customer investments.	Amtrak and VIA deregulated.