VERY LONG TERM DEVELOPMENT OF THE DUTCH INLAND WATERWAY TRANSPORT SYSTEM

Policy Analysis, Transport Projections and Shipping Scenarios up to the year 2100
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About the project

Rijkswaterstaat is responsible for the development and maintenance of the Dutch Inland Waterway System. Most hydraulic structures have an expected lifetime of about 50 to 100 years. One by one substitution of these structures would be like “Replacing all parts of an old car and obtaining a good as new old timer”. Rijkswaterstaat therefore desires to develop a more visionary integrated infrastructure development strategy, that considers the necessary replacements of the hydraulic structures as an opportunity to improve the network at a systems level.

This requires a very long term view on the development of the inland waterway system, but there lacked scenarios that look much further than about 20 to 40 years ahead, and in addition it was also unclear to what extent the existing models and policy methods are capable of taking very long term effects into account. This unconventional PhD study addresses the required ‘building blocks’ for the development of a new policy evaluation method, that is capable of taking such very long term effects into account for a single sub-system of the inland waterway system, namely the inland waterway transport (IWT) system.

The primary objective of this PhD project is to address the main research question: How can Rijkswaterstaat develop a workable method for taking the very long term development of the Dutch IWT system into account in the evaluation of integrated infrastructure development strategies with a very long term impact?

However, during the execution of this PhD project two additional research objectives were added:

• The 1st additional research objective followed from new insights that there is something fundamentally wrong with the present neo-classical paradigm of ongoing endogenous exponential economic growth. I propose a new post-neo-classical economic growth paradigm in which growth of the state-of-the-art labour productivity in technological frontier countries is constrained by physical limits and therefore bound to follow an s-shaped logistical transition curve that moves towards an unknown (and still unpredictable) horizontal asymptote on the very long run (say a few hundred years from now). This new paradigm has amongst others major implications for the outcome of the obtained transport projections in this study.

• The 2nd additional research objective concerns the development of the very long term Shipping Scenarios for the Dutch Delta Programme up to the year 2100. This objective was added in the year 2012 after a request to contribute to the Delta Scenarios. I personally drafted the Shipping Scenarios for the Dutch Delta Programme (https://delta programma.pleio.nl/file/download/159383322).

At the start of this PhD project a method for developing probabilistic very long term transport forecasts with a time span of almost 100 years did not yet exist. I proposed a new forecast method that is based on a strong causal relation between economic output and transport. This method was used to develop probabilistic very long term transport forecasts.

The development of major transport infrastructure networks is related to the about 50 years lasting Kondratieff waves that occur in the world economy. The pervasive drivers of these long waves provide valuable insights in the development of new transport infrastructure networks. The last two physical transport infrastructure networks were identified to be related to intermodal transport and avoiding transport.

On the basis of these insights a total of six qualitative and quantitative scenarios was developed of which four of them have now been adopted as the formal Planning Scenarios of the Dutch Delta Programme.

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