Integrating the Extended Gateway Concept in Long-Term Strategic Seaport Planning: A European Case Study

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Agenda

- 1. Problems of port development
- 2. Longer-term strategic port planning
- 3. The port of Antwerp case
- 4. The port system and the extended gateay approach
- 5. The calculation model
- 6. Conclusion

Problem of port development (1)

- Large-scale port development in the EU is becoming increasingly difficult:
 - Long lead times due to legal uncertainties, court procedures, long planning processes
 - E.g. Maasvlakte 2 (Rotterdam), Deurganckdok (Antwerp), Port 2000 (Le Havre)
- Port authorities have become aware that spatial and environmental parameters must be included in the planning process in order to secure long-term port development

Problem of port development (2)

Long-term sustainable port development requires:

- A bottom-up approach to long-term planning
- An integrative approach, taking into account all stakeholders and the impacts they consider critical
- Some literature on stakeholder involvement in the port planning process
- Problem: lack of *integrative framework and operational calculation model* to assess impacts of long-term development choices throughout the *overall port system*, showing the unbundled contribution of choices to stakeholder goals

Long-term strategic port planning (1)

Two types of literature:

- Focus on the variety in port planning (e.g. Frankel, 1989; World Bank, 1993)
- Focus on the 'process' of strategic planning (Winkelmans and Notteboom, 2002; Pellegram, 2001; Dooms, Macharis, Verbeke, 2003, 2004)
- Dual focus: Moglia and Sanguineri (2003)
- Strategic planning types differ in function of:
 - □ *Time horizon* of the planning process
 - *Outputs* of the planning process

Long-term strategic port planning (2)

- Timing:
 - Short-term planning (1-3 years)
 - Medium-term planning (3-5 years)
 - Long-term planning (a) and (b) (10-25 years)
- Output long-term planning (a): Master plans
 - 10 year development options, with a concrete port development scheme and detailed projects with milestones
 - High level of site specificity
- Output long-term planning (b): Longer-term planning
 - 25 year time frame
 - Formulation and evaluation of alternative strategies
 - Identification of the general conditions to be fulfilled for each strategy to make sense
 - Absence of site specificity and detailed projects

Long-term strategic port planning (3)



Long-term strategic port planning beyond masterplans (4)

- Methodological problems:
 - Large number of parameters in 'partial' studies
 - Lack of integration as well as (explicitly or implicitly) conflicting results
- => Long and difficult planning processes (e.g., Maasvlakte 2)
- Integrative framework is beneficial as parameters, assumptions and outcomes are accepted by the community of stakeholders

7-step process

Long-term strategic port planning (5)

\$tep 1: Define integrative framework, that can 'absorb' partial studies

Step 2: Build an integrative calculation model; select parameters

Step 3: Define macro-economic demand-side scenarios

Step 4: Calculate impacts of demand scenarios

Step 5: Define alternative long-term port strategies (supply side)

Step 6: Evaluate demand/supply tensions in each port strategy

Step 7: Select long-term strategy and define boundary conditions

Background of Port of Antwerp case

• Flemish Port Decree:

- All seaports must implement a planning process with horizon 2030
- Different task-forces with stakeholders

Objective:

- Delineation of the port area, based on demand forecasts for 3 'functional areas':
 - 'Economy, Ecology, Mobility'.
- Creation of a long-term, stable regulatory framework
- Output: strategic environmental impact report (S-EIR) which sets the outer limits of the port area, adjudicates land to different functions and determines economic expansion possibilities.
- After 2 years of partial study work (more than a dozen studies), the lack of an integrative framework and calculation model became painfully apparent

The port system (1)

- Requirements for an integrative framework and calculation model for longer-term planning:
 - Systematic, structured approach, including all the *port 'activity legs'*
 - □ A minimum of site specificity
 - No detailed sectoral dis-aggregation (focus on a few principal sectors)
 - Calculation model must be transparent and easy to operate
 - Easily understandable, no 'black boxes' (presence of nonexperts in validating committees, e.g. green movement).

An Extended Gateway Approach to Longer-Term Planning



Table 1: A systematic approach to decompose the port system

The port system (3)

- Some *general modeling problems*:
 - Unclear linkage between traffic growth and land use requirements for some cargo categories
 - □ Some impacts have a high degree of *site specificity* (e.g., noise)
 - Definition of the *unit of land* (hectares):
 - Need for a transparent classification
 - Financial, social and economic impacts:
 - Particular sectoral *trends* can affect what activities are included in a specific cluster, and where these activities are performed (inside or outside the port)

The calculation model (1)

Distinction between primary and secondary modules

Primary modules:

- Describe the basic linkages
- Simple structure

Secondary modules:

- Are pegged onto the primary module system
- Are easy to define, as separate sequential 'spin-offs' of the primary modules
- This flexible structure allows for efficient recalculation during the planning process (stakeholder interaction)



Figure 4: Traffic forecast for the port of Antwerp (horizon 2030)



Evolution Value Added



Evolution Employment



Evolution Modal Split (%)



Evolution Modal Split (million tonnes)



The calculation model (3)

Secondary modules:

- Intermodal terminal capacity in the port network, including social and economic impacts
- Land requirements for economic activities in the port network (Value Added Logistics, European Distribution Centres), including social and economic impacts
- Emissions of the principal sectors based on parameter values that take into account the (expected) evolution of environmental performance

<u>Table 6</u>: Extended gateway impacts

(Additional impacts in the extended gateway)	High growth		Low growth	
	Horizon 2015	Horizon 2030	Horizon 2015	Horizon 2030
Intermodel capacity demand (in TEU)*	884,346	1,806,816	732,771	1,381,538
Intermodal capacity demand (in net metres)	2,954	5,902	1,979	3,869
Intermodal capacity demand (in net hectares)	33.7	78.3	23.7	54.0
Employment impact intermodal terminals (FTEs)	/	517	1	395
Added Value impact intermodal terminals (million euros)	12.7	25.9	10.5	19.8
Land requirements for VAL – EDC	833	1,218	504	676
Employment impact VAL – EDC (FTEs)	44,763	65,448	27,103	36,328
Added Value impact VAL – EDC (million euros)	4,102	5,997	2,482	3,329

Including the demand from the port of Rotterdam affecting the Belgium intermodal barge network

Conclusion

- An *integrative approach* to port planning, implemented after a preliminary phase within which a variety of focused, but partial studies are undertaken, can *enhance the validity and legitimacy of the long-term port planning* process
- Scarcity of land inside the port legitimizes the extended gateway perspective
- Developing such an integrative approach and *calculation model*, as well as *determining the value of parameters is time-consuming and costly*, given *multiple interactions* (both plenary and with individual stakeholder groups)
- The benefits of the integrative approach are high: the planning process is more efficient (approx. 3,5 years versus 7 years Maasvlakte 2)