Assessing the robustness of Dutch Inland Ports

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Introduction

In the present turbulent environment highlighted by energy transition, disruptive technology, and climate change impacts, adaptability and robustness are essential in long-term planning of infrastructures. This also applies to inland ports, which play an important role in the Dutch transport system. Inland ports have three major functions, i.e., transfer of goods, storage of goods, and eventually, facilitating (industrial) production of goods. A well-functioning inland port can contribute to efficient supply chains by offering multi-modal capabilities and value-added services, and importantly, contribute to a modal shift from road to environmentally friendly inland shipping.

Planning an inland port for the future depends on anticipating change and answering questions such as, is the plan robust, i.e., can the port fulfill its functions in the face of (uncertain) future changes, in a cost-effective manner? Are the current activities likely to be threatened in the future? Are there sufficient opportunities in the future? Can the port adapt to seize these opportunities? Creating a strategic and long-term view requires us to draw on tools, techniques, and methodologies from other fields. SWOT (Strengths-Weaknesses-Opportunities-Threats) analysis is commonly applied to develop both long and short term strategies for a port through identifying factors, trends, and events internal and external to the environment of the ports. In this paper, we present a method combining the well-known SWOT analysis with a method for anticipating the future from the futures field (Van Dorsser, 2018b), and an approach for dealing with uncertainty from the field of policymaking (Walker, 2013).

Proposed Method

The method constitutes the following steps. First, an analysis of the external environment is carried out to anticipate a wide range of plausible long-term developments of significance for the port. Subsequently, a Meta-trend analysis (Van Dorsser, 2018a), which is a foresight method associated with level 3 uncertainty (Van Dorsser, 2018b) is carried out. This results in a narrower and more manageable set of plausible developments significant for the port. Next, an internal analysis is carried out to identify the characteristics of the port. Special attention is paid to flexibility and adaptability in keeping with the recommended approach for dealing with level 4 uncertainty (Walker, 2013). These characteristics equip a port to reduce its vulnerability to potential future threats and seize new opportunities, for instance, through investing in new activities and services (Taneja, 2013). Finally, the robustness of the port can be assessed by examining if the

identified new services or activities can be established by using or adapting the existing infrastructure and facilities of the port. The method is applied to a case study for illustration.

Case study

The selected case study was the cargo-handling Dutch port of Wageningen and the steps described above were applied systematically to assess the robustness (detailed analysis can be found in Dekker (2018)). Though various information sources were approached, e.g. port authorities, Nederlandse Vereniging van Binnenhavens, Centraal Bureau Statistiek, and Eurostat, a qualitative approach was adopted due to lack of monitored data, such as port performance indicators.

The inland port of Wageningen (Rijnhaven) is located on the northern bank of the Nederrijn. There are five terminals located in the port: two agro-bulk terminals, one concrete plant, one dry bulk terminal for sand/gravel, and one liquid bulk terminal. It has no train connection, is less accessible by road, but well accessible by inland transport. The port has a reasonably large hinterland with the nearest inland ports at a distance of 25 km. The strengths and weaknesses of the port were investigated in detail, including the space for expansion (terminal area, quay length, quay equipment), activity type and demand throughput, and the type of quay equipment. There is flexibility to expand the existing activities or create new ones: the area can be increased 2.25 times, and the quay length can be doubled. Large inland vessels can access the inland port which can be seen as a strength.

An analysis of the external environment helped to arrive at a set of trends/ long-term developments significant for inland ports. These included: relocation of low-value industrial processes, specialized industries, economies of scale in small inland vessels, gradual stagnation of demand growth, energy transition, transition to sustainable and recycled resources, increasing number of construction activities, increasing supply of food from the Netherlands, climate change impact, big data sharing, synchromodality, autonomous shipping, energy transition, smart- infrastructure and equipment, and 3D-printing. The potential impacts of the developments relevant to the port of Wageningen were examined to distinguish them into threats and opportunities. The small number of companies established in the inland port makes it vulnerable to the departure of (a few) companies. More than 50% of the throughput volumes are dedicated to agro-bulk activities, making it vulnerable to reduced demand for this activity. The port has the opportunity to produce and/or handle more sand, gravel construction materials since the demand is anticipated to increase until 2050. The decrease in liquid bulk activities due to the transition towards sustainable energy sources and raw materials poses a threat. The identified opportunities included facilities for containers, break-bulk, neo-bulk or special goods, renewable energy production, and recycling.

It could be concluded that the inland port of Wageningen is robust since there is a possibility to attract and accommodate new activities, in order to deal with potential future threats, such as a decline in of liquid- or agro-bulk.

Conclusions

This paper presents an extended SWOT analysis that combines methods from the futures field, and from the field of policymaking in order to assess the robustness of inland ports. Anticipating upon uncertain future developments which could be of significance for a port, examining the strengths and weaknesses of a port, and subsequently, strategising to seize opportunities, can make an inland port more robust, so that it can fulfill its functions in the face of (uncertain) future changes, in a cost-effective manner,

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