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Industrial ecosystems: major opportunities for port authorities

By Rick M.A. Hollen, Frans A.J. Van Den Bosch and Henk W. Volberda

Port authorities are faced with the challenge of boosting both the international competitiveness and environmental performance of their complex. Getting firms within these complexes to engage in “co-creation” via the development of industrial ecosystems offers a way out for port authorities fearful of losing out financially in an effort to keep their port green.

There is an undeniable and perfectly justifiable need for businesses to buy into the reduce-reuse-recycle concept, regardless of industry. Port authorities and the firms established upon port complexes are no more immune to this than any other, meaning that the traditional port business model has become anathema.

No longer can port authorities focus primarily on renting out terrain for business use where productivity and cost minimisation are the sole goals while not taking into strategic account the environmental consequences of such a way of working. More interestingly still, a new co-creative set-up via the development of so-called “industrial ecosystems” offers not only eco-friendly business opportunities but also enables profiting from innovative inter-

firm collaboration aimed at enhanced energy and resource efficiency along the way.

Green partnerships

The need for ports to operate in a more environmentally-friendly way is by no means a passing trend – the pressure to reduce emissions and reuse waste as effectively as possible originates from regulations and a rising level of socio-political demand of the stakeholders involved. Within this climate (in all senses of the word), port authorities are increasingly forced to re-assess the way they go about their business with the firms implanted upon their complex. The development of “industrial ecosystems” has emerged as an innovative and strategic option for improving resource productivity, corpo-

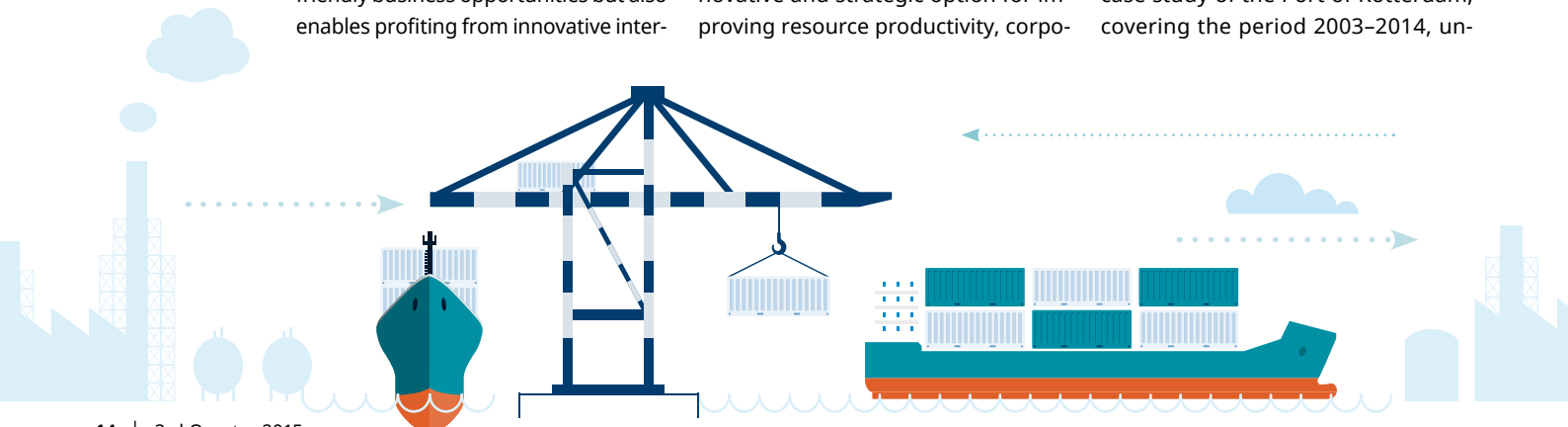
rate environmental performance, and competitive advantage.

Industrial ecosystems usually comprise networks of legally autonomous firms, which, in most cases, are physically interconnected by pipelines that use one another’s residual energy and chemical effluents as input for their own production process. Such a set-up provides an economical substitute for virgin materials, as well as enabling firms to reduce waste disposal and emissions in an innovative way.

However, some firms are reluctant to buy into this way of working together due to the increased interfirm dependence involved, in addition to the infrastructure investment required. These firms run the risk of not being able to cope effectively with new strategic challenges in time, and hence losing their competitive edge.

The role of port authorities

Whilst the expression “port of call” refers to a temporary stop-off, an industrial ecosystem benchmark could point towards a rather more permanent alternative for port authorities faced with the productivity-versus-environment quandary. Both prior literature and a case study of the Port of Rotterdam, covering the period 2003–2014, un-



derline the importance of investing on several fronts to realise the potentially complicated business of co-creating industrial ecosystems.

Key strategic levers for port authorities for pulling off such multi-partner alliance initiatives are to be found at infrastructural (both physical and knowledge-related) and land allocation policy levels. On the former point, seemingly promising actions include the laying of common carrier pipeline bundles and devising a “plug and play” set-up whereby bundled services such as power supply, waste water processing and tank storage are made available to arriving firms.

Infrastructure does not exclude the sharing of knowledge and expertise. Indeed, the development of industrial ecosystems may be further enhanced through, for instance, bringing together firms present on the complex via innovation platforms dedicated to energy efficiency, engaging in enhanced mapping of intra-port streams of energy and raw materials (thereby exploring new potential interfirm energy and resource exchanges), investing in open research and development facilities, and linking up with knowledge providers (such as SmartPort in the Port of Rotterdam). In this way, port authori-

ties continue to explore new ways of working and the required management innovation.

The allocation of land and, above all, its subsequent use, besides investments in physical and knowledge infrastructure, are crucial to the success of industrial ecosystem development and, in turn, of a port complex in general. A purely “landlord” role is no longer tenable for port authorities in today’s business environment. In particular, port authorities need to become more innovative in terms of raising a port’s sustainable competitiveness.

In this vein, they should no longer look to establish policy based upon primarily financial concerns in land allocation but also by applying strategic value creating criteria, ie, with respect to expected contributions to the port’s innovation-driven sustainable international competitiveness. This issue has been pointed out before in our research report on strategic value creation of ports for their country (see reference below).

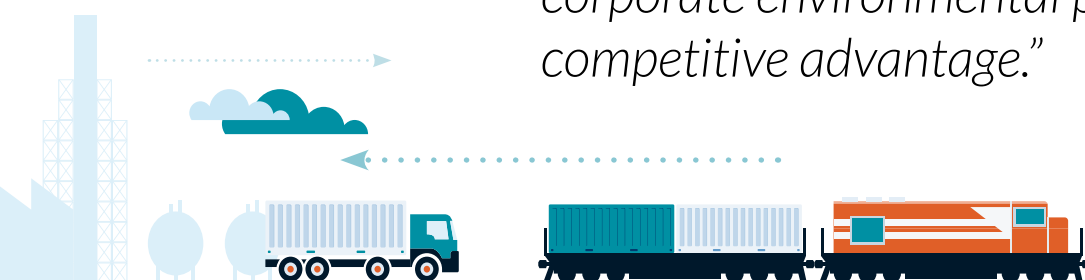
Implications and challenges

Rotterdam is not the only standout case of a port complex working effectively in the spirit of innovative ways of interfirm collaboration aimed at enhanced resource productivity. Antwerp (Belgium) and Kalundborg (Denmark) are other cases in point, as are multiple in-land sites within Germany, to name just a few examples.

What various success stories have in common is their ability to put into question the more traditional landlord role and associated business model that port authorities – as well as other types of local or regional authorities – assumed in the past. However, the process of business model innovation does not come without complications and challenges.

Many firms are put off by the idea of “co-creation” as, by definition as well as in practice, such an approach involves firms relinquishing complete control over their business operations, be it from an infrastructural perspective ▶

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and/or the reality of sharing knowledge and expertise with other firms. For port authorities this also represents a different ball game as, once an ecosystem is in place, their role is no longer one of control and surveillance only, as in the “landlord” case.

They should therefore be prepared to act in a more open and collaborative spirit with a view to sharing know-how and encouraging new ways of enhancing resource productivity by, for instance, experimenting with different environmental regulations and compliance systems. Business associations representing port-related firms, such as Deltalinqs in the Port of Rotterdam, can be strategic partners in this endeavour.

Major opportunity

The creation and managing of industrial ecosystems represents a major opportunity for previously stand-alone firms to create added value, become more energy-efficient, reduce feedstock costs, and lower emissions and waste disposal levels and, by doing so, become more innovative. For energy hub ports and those located near residential areas, the eco-interests of such a set-up is even more attractive still, despite some of the initial uncertainty

organisations may have about embarking upon a multi-organisational collaboration rather than “going it alone”.

The future of industrial ecosystems does not stop here. For instance, further strategic efforts need to be made into the possibility of separate port complexes – such as the Port of Rotterdam and the Port of Antwerp – collaborating in a way similar to that which separate firms within the same port have so far managed with success. In this way, industrial ecosystems may cross the border of a single port complex, benefitting both the port complexes involved and the surrounding urban areas.

However, what emerges very clearly already at this stage of research and actual business practice is that the business model upon which port authorities and firms in the port operated in the past is no longer a viable option to create a sustainable competitive advantage. Partnering with other firms within and beyond the port complex in the form of industrial ecosystems carries certain complications but ultimately fewer risks than going it alone.

In this connection, the conducted research suggests that port authorities need to strategise beyond their tradi-

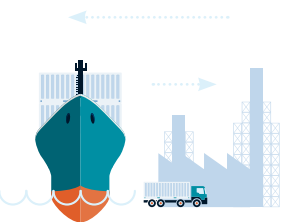
tional landlord business model by contributing to the development of such industrial ecosystems, thereby enhancing ports’ environmental performance and innovation-driven international competitiveness. ■

This article draws inspiration from the paper *Strategic levers of port authorities for industrial ecosystem development*, written by Rick M.A. Hollen, Frans A.J. Van Den Bosch & Henk W. Volberda and published in *Maritime Economics & Logistics*, vol. 17 (2015). See also F.A.J. Van Den Bosch, Rick M.A. Hollen, H.W. Volberda & M.G. Baaij (2011), *The strategic value of the Port of Rotterdam for the international competitiveness of the Netherlands: A first exploration*. Rotterdam: INSCOPE/RSM Erasmus University, ISBN 978-90-817220-2-5.

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