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PORTS IN GLOBAL SUPPLY CHAINS

CHALLENGES AND OPPORTUNITIES

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Ports have become increasingly aware of their role in global supply chains, and they commit to supply chain collaboration, including exchange of information, to help create value [1]. There is only one problem. Port supply chains, which comprise of maritime transport, port handling, and hinterland transport, are not identical to shipper supply chains, as they manifest themselves at another scale level [2]. This is best illustrated by considering the arrival of a deep sea vessel at a main seaport with call size of thousands of containers. Typically, thousands of consigners and consignees have their particular interests in the forwarding of the goods in these containers. However, port supply chain decisions usually follow a one-size-fits-all approach. This is enabled by the container as standardized loading unit and creates huge cost and time savings [3], but individual shippers face lack of control in an important part of their supply chain. This is a fundamental issue that cannot be resolved merely by the application of

technologies. It implies, for example, that many shippers face uncertain arrival of their goods at their final destinations.

CONTAINER LOGISTICS MARKETS

Both shippers and providers of logistics services are confronted with a complicated container logistics market. First, the markets of maritime transport services and port handling services are dominated by a limited amount of players [4], while hinterland logistics services are provided by many firms, where even the largest players hold only small market shares. Second, container logistics is operated on networks, which adds to the complexity of the market structure [5]. At the demand side, as argued above, shippers represent a lot of customer accounts of which only a few are of considerable size [6]. Serving those customers comprehensively requires an approach beyond the management of individual accounts, i.e. the identification of market segments or customer classes [6]. As a consequence, the organization of container logistics is complex.

PLANNING AND EXECUTION

The planning of intermodal transport is sensitive to disruptions, as there are dependencies between the planned consecutive transport and handling activities. A delayed arrival of a container disrupts the planning of the equipment that handles and forwards the container in ensuing stages. Quite a few shippers therefore resort to direct truck transport, although truck transport is associated with more negative externalities. These issues have motivated the more dynamic planning of resources, referred to as synchromodal transport [7].

DIGITAL PLATFORMS

There are a variety of services that are offered via multisided digital platforms [8]. These platforms allow producers and consumers of e.g. logistics services to connect with each other, moderated by information services offered on the platform, and reap the benefits of the network effect: The more users make use of the platform,

the more value the platform may offer to its users. Companies such as Booking.com and Uber.com have transformed industries exploiting these benefits. The question emerges: In what manner could the container logistics industry make further use of these multisided digital platforms to resolve some of the aforementioned issues, and what could information services offered on such platforms look like?

MARKET MEDIATION

Container logistics market mediation may follow two distinct strategies [9]. First of all, an intermediary may procure logistics capacities and transform them into logistics services on a network. Secondly, an intermediary may choose to offer information services on a multi-sided platform that help connect the various stakeholders. In container transport, both models appear in practice. Deep sea container terminal operator Europe Container Terminals in the port of Rotterdam has developed European Gateway Services, offering transportation services while procuring inland handling and transportation capacities. Terminal operators are also exploring information brokerage to smoothen container logistics between sea side and land side, without direct involvement in inland transport or inland terminal handling.

In the container logistics industry, multi-sided platforms have emerged. For example, TEUbooker.com offers on-line booking services for container transport, together with monitoring services, for transport between terminals within the port of Rotterdam by means of various modes of transport. In this example, demand for and supply of container transport is matched. Companies like Matchbacksystems.com and Boxreload.com offer on-line matching between import and export orders to

reduce empty mileage of container truck drayage. Here matches are made to consolidate transport. We now explore the opportunities to further develop multi-sided platforms for container logistics, in particular synchromodal transport.

Synchromodal planning implies that containers are booked without specification of the mode of transport. A booking service on the digital platform will specify the needs of the customer, e.g. timely delivery of the goods at the destination, but not the capacity reservations on the modes of transport. Also the payment service will not be driven by the tariff of the capacity reserved, but by the opportunity to deploy resources in a flexible way; a more restrictive transport request will result in a higher tariff. The routing service will be dynamic and will depend on the booking requirements and the available resources.

Synchromodal transport not only requires vertical collaboration among providers of transport and handling capacity in consecutive stages in the transport chain. It also requires horizontal collaboration between providers of capacity as alternatives, to allow optimal routing of containers through the network. The digital platform creates value by allowing such collaborative arrangements to be dynamic as well. The routing of the container through the network requires the deployment of various transport and handling resources on road, rail, waterways, and terminals. A route is feasible only when the required capacity of resources are actually available. Although no capacity has been reserved in the booking stage, the capacities of these resources still need to be planned ahead. Capacity planning is not based on reservations made in advance, but on prognostics regarding the potential to deploy particular resources to accommodate arriving containers. Additional

value added services on the digital platform provide, among other things, the required information to comply with regulations enforced by governmental agencies such as customs, and agreements made between supply chain partners.

Such analysis may use historical data next to data on the current status of the transportation network to predict costs, throughput time, and reliability of door-to-door solutions. Providers of logistics services may benefit from such analyses to plan their resources in an optimal way, and route containers optimally. Customers may rely on those service providers that have demonstrated to be cost effective, fast, and reliable, according to the monitoring and analysis dashboards offered by the digital platform.

CONCLUSIONS

We have started to identify a number of challenges for global container logistics related to the differences between port and shipper supply chains, the structure of container logistics markets, and the complexity of container logistics planning and execution. In response to these challenges, we have sketched the deployment of multi-sided (digital) platforms.

ABOUT THE AUTHOR

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Professor Rob Zuidwijk is Endowed Professor of Ports in Global Networks at Rotterdam School of Management. Zuidwijk received his PhD from Erasmus University and studied in Mathematics. He has held a one year visiting position at University of California at Los Angeles and presently supervises a number of PhD students on port related research. His work has been published in journals such as the California Management Review, Transportation Science, Manufacturing & Service Operations Management, Communications of the ACM, and Production and Operations Management.

ABOUT THE ORGANIZATION

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ENQUIRIES

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