

Enhancing terminal operations, hinterland access and logistics chains

Dr Jean-Paul Rodrigue, *Professor, Hofstra University, New York, United States of America*

The value of a chain

It is difficult to argue against strategies that reduce costs while improving the performance of supply chains. However, assessing the value of such improvements is challenging. While 'beauty is in the eye of the beholder', value is relative to the stakeholder. For instance, a port terminal operator has its own criteria to consider since the value of its capital intensive assets can be derived from the rate of return. Strategies improving this rate of return are therefore judged to be of high value. For a port authority, the concept of value may be more complex and include social welfare objectives such as employment and environmental mitigation. Wherever one looks, it is important to realise that value is a relative concept. The positive point is that a growing emphasis on the logistics chain favours the convergence of respective value systems.

From an operational standpoint, three value systems are widely recognised. The monetary value focuses on costs and the

return for each unit of input (eg. capital or labour). The time value refers to the duration that a shipment is within the custody of an element of the transport chain with turnaround time a common focus. The reliability value considers a more comprehensive set of criteria related to the operational stability of the transport chain. Consistent costs and time tends to be preferred. While cost and time have always been of importance, supply chain management has increasingly focused on the value of reliability. Thus, the reliability criteria are where logistics chains impose the management of this value system with criteria such as asset management, responsiveness and customer satisfaction.

The term supply chain integration has often been used, and abused, to reflect the alignment of supply-chain goals and objectives along with the related information and physical linkages. The alignment illustrates the shared goals among the elements of the supply

chain, often aimed at reducing their costs and improving their performance. Alignment insures a consistency in the strategy pursued by the actors involved; how their value systems correspond. Information and physical flows can be operationalised through the management of orders, tracking, as well as the modes and terminals involved. Although the concept of supply chain integration is an old one since any business relation involves a form of integration (supplier/customer), containerisation, information and communication technologies and changes in port governance (eg. the landlord model) have enabled expanded forms of integration.

Ports and value generation

Ports are locations competing to attract, expand and retain economic activities since they provide employment and generate value for an economy. The generation of value in a supply chain is a process that mainly takes three major forms (see Figure 1).

Value creation or capture

Value creation concerns the formation of new activities within a supply chain, such as manufacturing, distribution and transport. It is often linked with a paradigm shift such as a new terminal, lower distribution costs, a new technology, or new market opportunities. Value capture attracts activities from another location, a process which can be incited through various costs and infrastructure advantages that may include improved intermodal facilities or logistics zones.

Value expansion

The growth of existing strengths, mainly in relation to the growth of traffic along a supply chain. Therefore, growing port traffic is generally contingent to more value generated for the local economy.

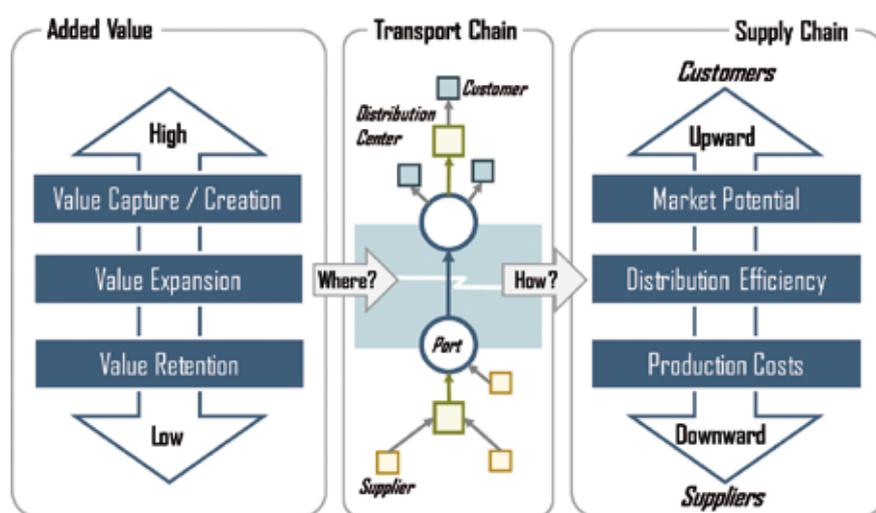
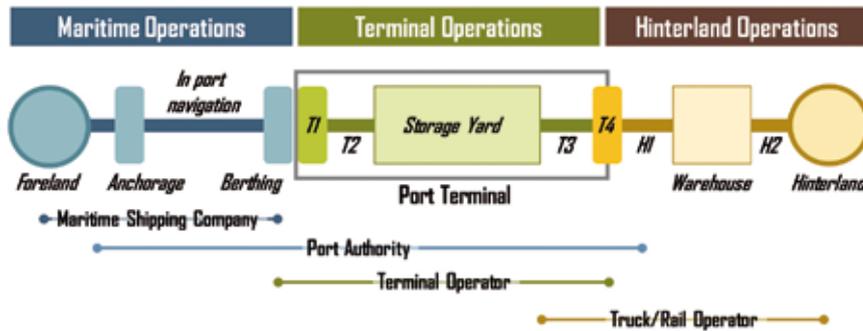


Figure 1: Supply chains, transport chains and added value

Figure 2: The Port performance value chain



Value retention

This involves keeping desirable added-value activities which, under existing circumstances, would have ceased or relocated elsewhere (value capture by another location). It is a difficult process to mitigate since it is linked with competitiveness changes and shifting regional competitive advantages. However, value capture and expansion can have a significant impact on value retention since it creates local clusters of interdependent activities.

The structure of transport chains underlines how ports are able to capture, expand and retain value-added activities for their hinterland. It is in this context that policies, regulations and investments are articulated for the expected multiplying effects related to value capture. Since many supply chains are globally oriented, added value is performed at a wide array of locations, which is the outcome of decisions made by multinational corporations to maximise their revenue. For many sectors, added value activities have moved downward in the supply chain as a strategy to lower production (input) costs. In other cases, added value activities have moved upward to expand market potential, mainly through better freight distribution strategies. In almost all cases, improving the efficiency of freight distribution is a salient factor of added value.

Adding value through port regionalisation

It is often within a region - the port hinterland - that the integration of transport chains can be concretised the most effectively. Regional infrastructure strategies aim at establishing efficient and adequate port-hinterland facilities and systems, which are enhanced with the general development of the logistics and transport sector. This process has been labelled as port regionalisation [see Port Technology International No. 52, pp. 11-17]. The value of establishing port hinterland logistics integration is increasingly being recognised by different

levels of government and by the public.

The efficiency of a port is part of a value chain that includes maritime, terminal and hinterland operations (see Figure 2). These dimensions are interrelated since inefficiencies in one dimension are likely to impact the others. For instance, issues in terminal operations are most likely to negatively impact maritime and hinterland operations with delays.

Enhancing operational value

Maritime operations

The efficiency of the maritime access is a component of port performance, which includes anchorage where ships are waiting for an available berthing slot. Long waiting times at anchorage can be the outcome of a lack of berthing slots able to accommodate specific ship classes (eg. draft and cargo type) as well as terminal productivity issues. Ports, depending on their site and configuration, can have complex in-port navigation systems requiring pilotage and tugs through access channels and turn basins. The value of enhancing maritime operations is clearly to the benefit of maritime shipping companies.

Terminal operations

Terminal operations represent the most common performance indicator that is used to assess port efficiency and thus a core value shared by port authorities, terminal operators and their customers. Crane performance (T1 in Figure 2) is a common bottleneck in terms of the number of movements per crane per hour and the number of cranes available to service a containership. For maritime shipping companies, this is a crucial factor since it is related to the amount of time their ships are going to spend at the port. The manner in which cargo (containers) are brought back and forth to the storage yard (T2 in Figure 2) is also a component of port performance. Many container terminals use holsters or straddle carriers for such operations.

Container storage yard operations involve the organisation of stacking and its related stacking density, an important variable determining terminal capacity and value. Yard management systems are software applications that try to optimise storage, yard equipment, human resources and well as the transportation means (trucks, rail or barges) connecting the yard to its customers.

When trucks enter the terminal to pick up or drop off cargo (T3 in Figure 2), space and equipment is required to insure that this transloading operation (yard to truck or truck to yard) performs well. This is often a critical bottleneck for trucking companies since it dictates the amount of time they will spend at the terminal. Gate performance (T4 in Figure 2) concerns the efficiency of tasks related to document processing and security inspections so that a truck is admitted and cleared to pick up or drop cargo at the facility. Gates used above their capacity are characterised by long truck lines waiting to enter the terminal for cargo they are already chartered to handle. For terminals having on-dock rail facilities, the performance of the rail loading/unloading equipment is an important component of the terminal's performance. The value of enhancing these operations benefits terminal operators, but since the terminal is the interface, this value proposition benefits stakeholders that are both upstream and downstream.

Hinterland operations

Hinterland operations involve all the transport and distribution activities servicing the port's customers. However, for practical purposes, it generally focuses on inland operations adjacent to the port area (often labelled as back of port). The key factor in hinterland operations is the capacity of the local road network in areas adjacent to the port. Congestion and bottlenecks at street intersections impair the port's performance in many of the supply chain management strategies of the port's customers. This is where the value system faces a challenge as the provision of road infrastructure is commonly the jurisdiction of municipal, state or federal governments; entities that often derive limited value from these enhancements but that are compelled to assume their costs.

The growing role of the function of distribution has led to the setting of logistics zones in the vicinity of intermodal terminals. The performance of warehousing, particularly when linked with terminal operations has increased the value in supply chains. For instance, in many gateway ports transloading activities that are transferring the contents of maritime containers into domestic truckloads

(or domestic containers), or vice-versa, are an element of the performance of hinterland operations. In all circumstances, there are benefits to be derived from warehouse management systems that try to synchronise fluctuations in supply and demand through the tracking and control of the inventory and the management of the related tasks.

Value for whom?

While the value of enhancing terminal operations, hinterland access and the logistics chain is well understood, its implementation and the measurement of its benefits remains a challenge. This is even more so since investment decisions are commonly contingent upon a demonstrated value of a project and that the perception of this value will be contingent upon the stakeholder. While infrastructure investments are usually an easy sell, the value of promoting integration is less evident since the enhancements are shared along the transport chain, sometimes with no clear perspective about who benefits the most. The concept of integration itself is ill-defined, subject to much punditry and related to transactional, physical, information and even cultural relations in which ports are a nexus. On the positive side, the growing level of

integration within transport and supply chains, from a maritime, terminal and hinterland operations standpoint have made stakeholders much more aware of

their respective value systems. How far this convergence can go considering that competitiveness remains a core driver of port activity.

About the author



Dr Jean-Paul Rodrigue is a professor at Hofstra University, New York. His research interests mainly cover the fields of economic and transport geography as they relate to global freight distribution. Area interests involve North America and East and Southeast Asia, particularly China. Specific topics on which he has published extensively cover maritime transport systems and logistics, global supply chains and production networks, gateways and transport corridors, international trade and regional development.

About the organisation

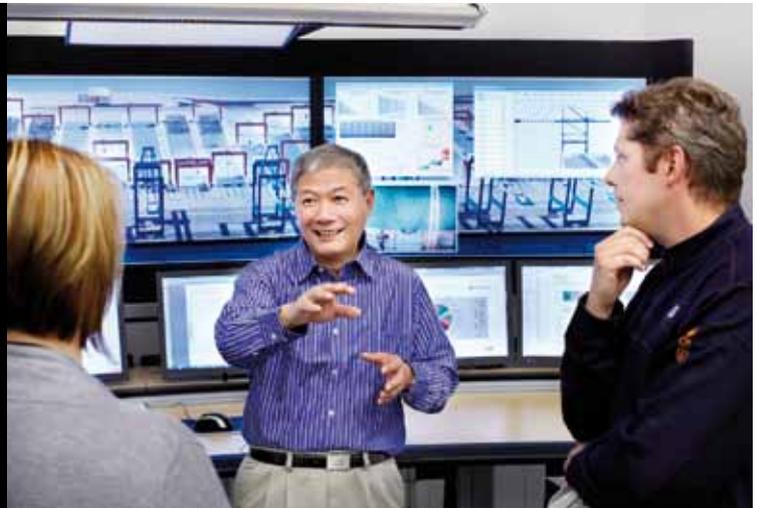


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Enquiries

Dr Jean-Paul Rodrigue
Department of Global Studies & Geography, Hofstra University
Hempstead, New York, US
Email: jean-paul.rodrigue@hofstra.edu

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