

Development of Ports and its Socio Economic Effects on Hinterland

1.Karthik.R, Dhivahar.S, Gopinath.R

Email ID: karthik1493@gmail.com

Department of Marine Engineering,

2.Sri Venkateswara College of Engineering

Pennalur, Sriperumbudur-602105.

Abstract:

Ports are widely recognized as crucial nodes in international trade and transport. The competitiveness of a seaport depends on the extent of the cargo handled in the port can reach its hinterland destination. The importance of hinterland connections has been recognized as one of the most critical issues in port competitiveness and development in most ports around the world. Among the notable challenges are attempts to capture a greater share of added value by favoring the development of logistical zones in the vicinity of port sites. Further, the development of better hinterland connections in many cases has become as important as the port facilities themselves to secure additional traffic. This operating approach assumes that the 'port entry' is shifted to an inland location. This location acts as a regional collection and distribution point for trucking operations, but should also be equipped to provide a rapid transfer to and from the port, to support a fast movement of containers through the port, and to avoid long storage in the port. The shift of 'port entry' can be accompanied by moving beside container storage also a number of other activities to an inland site that traditionally take place in the seaport, such as stuffing and stripping and warehousing, but possibly also customs clearance.

This paper explores the opportunities of such a hinterland transport concept by focusing on the type of transport system to operate this concept. It discusses the possibilities and limitations to use existing conventional intermodal modes, i.e. rail and barge transport, and evaluates the potential role of new transport technologies in such a hinterland transport and port regionalization is discussed as a paradigm to understand the fundamental changes in port hinterlands.

Keywords: Hinterland, Regionalization, Maritime Transportation, Sagarmala, Congestion.

Introduction:

Increasing container throughput in the ports also leads to increasing transport volumes in their hinterlands and this has also brought the issue of capacity and quality of the hinterland transport system to the fore. Containerization has increased the geographical market coverage of seaports substantially and as a result the hinterlands of seaports have transformed from captive regions to contestable regions. That is to say, ports are much more in competition to serve the same inland areas.

These circumstances make hinterland accessibility increasingly important for the competitiveness of a seaport. Basic requirement of a successful, competitive hinterland transport system is the ability to offer services, which are cost-effective, reliable and have a short transit time.

In addition, the system should be able to serve many destinations and as a part of these criteria the interface between the seaport terminal and the hinterland modes should be efficient, fast and reliable. The development of intermodal hinterland transport (rail and barge), enabling large-scale transport services, is gaining importance to keep the port accessible by shifting cargo away from the congested roads to the railways and waterways. Regionalization represents a new phase in the development of port systems, which has traditionally focused on the port itself. In this phase, inland distribution becomes of foremost importance in port competition, favoring the emergence of transport corridors and logistics poles. The port itself is not the chief motivator for and instigator of regionalization. Regionalization results from logistics decisions and subsequent actions of shippers and third party logistics providers. Port authorities are invited to embrace and enhance the regionalization process in view of addressing current port-related challenges, mainly congestion, growing costs, limited handling capacity and the generation of additional traffic while being able to answer the requirements of modern freight distribution.

Dry Port

The bottom line of the extended gateway concept is that the container transshipment function in the seaport is separated from the container storage and sorting function. The container storage and sorting function should be transferred to strategic located inland locations, where space is not restricted. These locations can be sites just outside the seaport (which much resembles the well-known concept of off-dock terminals) or they can be situated at greater distance in the hinterland, i.e. closer to the market than the seaport (which could give the concept some additional added value). Together with container storage also a number of other activities that traditionally take place in the seaport (for instance customs), but also logistical added value services (e.g. warehousing) can be transferred to these inland sites. This relieves the spatial pressure in the port. A key element of this concept is however the transport connection between seaport and inland terminals. Low cost, fast and reliable services are required to facilitate this concept. As a result of good direct connections these hinterland sites can profile themselves as a real extension of the main port (gateway): the 'port entry' is virtually shifted to an inland location. This means that it provides a way to tie up cargo flows in the hinterland to the seaport, and so it can improve the competitive position of the seaport.

Transport technologies:

One of the merits of rail and barge transport is to offer large-scale operations and hence low unit transport costs. This holds in particular for barge transport. The presence of an extensive national and international waterway network with good navigation condition enables to operate vessels of 90 to 208 TEU capacity in the national trade to 400 TEU. The capacity of trains is generally limited to 90 TEU, because of the maximum train length (700 meter) and the impossibility of double stacking. The average speed of both modes, however, is limited (about 15-20 km/h). With respect to barge transport this is inherent to system characteristics, but regarding rail it is caused by operational procedures and transport policies.

Since deep sea vessels have priority in handling barges are frequently faced with waiting times at terminals, and moreover barge handling in the port is a time consuming and not so efficient process. It affects not only the productivity of the barge operators negatively, but also the marine terminal productivity, because the call size of these barges is generally small.

The large number of trains negatively affects the optimal use of rail infrastructure capacity. While the rail infrastructure requires space at the port that cannot be used for port activities. These kinds of inefficiencies are expected to increase if shipping lines operating their own deep sea terminal are likely to claim an own on-dock rail facility. To overcome these problems it is conceivable to develop large capacity shuttle services by rail and/or barge from marine terminals to an off-dock terminal nearby the port or even to a more distant located inland terminal, which acts as a sorting point for flows between marine terminals and hinterland origins/destinations.

Promising future innovative technologies:

Automated freight transport is still in its infancy. Except for internal transport systems in factories and at some container yards, applications of automated freight transport are still rare. However, the benefits of automation (such as reduced labour cost, 24-hour continuous operations and higher reliability) have seriously raised the interest lately. Encouraged by successful applications in public transport and industry, during the last 10 to 15 years research and development in transport automation has substantially increased and many new technologies have been proposed.

For the purpose of this paper we concentrate on discussing transport technologies that could be considered for hinterland transport of containers, over medium distances (50 – 150 km), and be applied within a relatively short term.

The types of systems discussed are:

- Automated Trucks and Multi Trailer Systems
- Automated Trains
- Automated Barge Handling Systems
- Automated Capsule/alternative rail Systems

Although the tests have proved the technical feasibility, implementation remains a major issue. Up to now, automated trucks require a separate (dedicated) lane, and should not be mixed with normal traffic (due to safety and legal issues). Although one could build a new road or reserve and adapt a specific lane of the existing road infrastructure, this would be expensive and only viable if there is a sufficiently large market. Furthermore, as is often the case with new systems, there is the so called “chicken and egg” problem. Who will invest in new infrastructure if there are no vehicles to use it; and who will invest in new vehicles if there is no infrastructure to use it on.

Critical factors regarding the performance of a transport system between the marine terminals and off-dock terminals in the hinterland are:

1. Capacity: it concerns large flows, which have to be moved smoothly to and from the port to an inland off-dock terminal 50-150 km from the port.
2. Availability, reliability and continuity. Another requirement is that the containers must be moved on demand and must arrive as planned.
3. Speed: speed is of importance but is not a particularly critical factor, as long as distances are not too great and reliability and availability is guaranteed.

Another critical issue for implementation of a new transport technology are of course the financial conditions, such as the level of investment costs, the exploitation costs (including maintenance) and the revenues. The feasibility of a new system will in general strongly depend on its economic feasibility.

Port Regionalization:

All the scattered ports spread across the land must start penetrating deep and start capturing hinterland for increase in supplies which would in turn benefit the Hinterland's development also. Followed by penetration, interconnection between the hinterland and ports must be established through freight corridors and short sea feeder services between inland ports which would lead to centralization of the system. Once the centralization is achieved to augment more capacity an offshore hub has to be created. The offshore hub must be well connected through feeder services and must be developed into a load center from which deep sea liner can operate their services. By successful establishment of offshore hub, Regionalization of ports can be achieved with the help of freight corridors, shortsea liner services and deep sea liner services.

In the regionalization phase it is increasingly being acknowledged that land transport forms an important target for reducing logistics costs. Regionalization as such provides a strategic answer to the imperatives of the inland distribution segment of the supply chain in terms of improving its efficiency, enhancing logistics integration and reducing distribution costs. Globally, inland access costs account for 18% of the total logistics costs, and could be reduced by one third with appropriate regionalization strategies.

Competitive coastal shipping must be encouraged for this to actually work and the cabotage laws need to be tweaked to accommodate the foreign shipping lines and also protect the interest of our emerging Indian shipping lines.

Sagarmala Project:

It is a strategic and customer-oriented initiative of the Government of India to modernize India's ports so that port-led development can be augmented and coastlines can be developed to contribute to the development of Hinterlands.

Total of 173 projects have been initially identified under four projects archetypes of Sagarmala in National Perspective Plan, April 2016. The Project archetype and the number of projects identified are given below:

S.No	Project Archetype	Number of projects
1	Port Modernization	53
2	Port Connectivity	83
3	Port Led Industrialization	29
4	Coastal Community development	8

Source: Press information bureau, Ministry of shipping, Government of India.

Conclusion

Existing transport modes will always play a role in the movement of containers to and from the ports. Current congestion problems in ports and on the infrastructure near ports force us to look at new port concepts. New port concepts in which the 'port entry' is shifted to an inland location, accompanied by a movement of all kinds of operations, as buffering, stripping and stuffing and warehousing, contribute to solving the port problems, such as congestion and lack of space.

Very essential for these new concepts is that they requires highly reliable and on demand transportation between the marine terminal and the off-dock terminal. Any delays or loss of control within the system causes malfunctioning of the system. For this reason we looked at new innovative systems, such as automated trucks and multi trailer systems, automated trains, automated barge handling systems and automated capsule/alternative rail systems. We found different test and demonstration projects in this area. All of these new systems fit well within the extended gateway concept. The two elements: a dedicated lane, meaning a flexible and full continuous service and transport automation, meaning labour cost reduction, are important assets for this concept.

Port regionalization must be adopted and by enhancing the provisions under the cabotage laws our Nation can reap rich rewards and truly build the brand of Make in India. These initiatives would surely push the case for the project and provide employment opportunities to large number of people and also develop the hinterlands of our nation.

References

Hinterland transport concept and technological challenges
Johan Visser, Rob Konings, Ben-Jaap Pielage and Bart Wiegman
Delft University of Technology

UNCTAD (2002-2005), Review of Maritime Transport, Geneva

Spasovic, L. N., 2004, Innovative Technologies for Container Transportation System, final report, New Jersey Institute of Technology.

Munish Sharma, Dua Associates.
Financier worldwide.

Hinterland Connectivity Solutions,
By Capt. Rahul Ranjan Pathak
Mantrana Maritime Advisory

Port Hinterland Connectivity
By Olaf Merk
International transport forum