Short-Sea Transport and Economic Development in Penang

Chang Kah Loon, (MPhil)

Sea transport or simply shipping is essential to the functioning not just of modern society generally, but of the global economy in particular. For international trade, sea transport remains the most economical mode of transportation that moves all kinds of goods around the world. For example, shipping makes possible the bulk movements of raw materials and primary commodities to sites of manufacturing, and manufactured products to their markets. Moreover, the movement of forms of fuel and energy, especially petroleum and natural gas, is also largely dependent on shipping. Without effective and economical sea transport, therefore, the viability and efficiency of the world economy would be adversely affected. Indeed, economic growth has become closely related to developments and improvements in sea transportation (Tirschwell 2004).

In recent times, developments and advancements in sea transportation have had profound impacts upon international trade. To take an important example, the conversion of merchandising from break-bulk shipping to containerization now permits goods dispatched from their point of origin to reach their intended destination more efficiently, and with much less risk of damage to the goods. There are also clear benefits to exporters and importers when sea transportation costs less while facilitating 'Just-In-Time' stock management. Presently, traders can expect relatively safe, easy and economical access to international markets through a combination of deep-sea and short-sea shipping that utilizes container transshipment opportunities.

Within the very broad area of sea transportation, short-sea shipping – also called short-haul sea transport – has become increasingly important because most trunk or deep-sea vessels do not call at small or "off-line" ports. At such ports, the depth may be insufficient to accommodate large vessels, or the cargo amounts are too limited to justify the use of large vessels. Instead, "feeder operators" provide separate short-sea shipping services that mediate between small ports and large vessels. Since small ports greatly outnumber major ports in the world, short-sea transport is an indispensable part of the growth in sea transportation.

This study of short-sea transport has two main objectives: to show the importance of short-sea transport to the economic development of Penang and to investigate the potential of improving short-sea transport services in the state of Penang.

Research Statement

Despite its relatively small size, Malaysia is an important trading nation, with exports and imports playing an important role in its traditionally open economy. Over the years, the types, amounts and monetary value of goods exported and imported have changed and varied. However, although sea transport has contributed significantly to Malaysia's economic development, the links between changes in the sea transport or shipping sector and the evolving patterns of economic development within the area served have not been much studied. Even less well understood is the role and influence of short-sea transport in view of the growing market tendency to increase the capacity of deploying vessels as the search for economies of scale moves sea transport operators to look to larger containerships.

It is expected that the shipping industry's need to maximize the utilization of larger vessels will in turn reduce the number of port calls on major or trunk routes. Consequently, there will be a greater need and enhanced role for short-sea transport that plies between small or off-line ports and transshipment hub port within a particular region. In other words, the short-sea shipping sector does not operate in isolation but as an integral part of a variety of shipping services within fully integrated global transport networks.

Not surprisingly, then, short-sea shipping has received increasing attention from governments in the Asian region. For instance, the government of Malaysia has sought to expand the nation's port capacity and to upgrade port equipment and facilities. In addition, niche ports have been established at Port Klang and Port of Tanjung Pelepas (PTP), the designated "load center for Malaysia and transshipment hubs for the region." Even so, the government recognizes the need

to develop and improve the overall short-sea transport system in the country.

The attention paid to short-sea shipping is particularly important for Penang. Short-sea transport or shipping, operated by feeder operators, typically carries cargo from Penang port and delivers the cargo at a transshipment port, like Port Klang or PTP or Singapore. Under normal circumstances, the short-sea cargo must wait for one to two days before being transshipped onto a trunk or deep-sea vessel. A separate shipping line, the Main Line Operator (MLO) that carries the cargo to its intended final destination, operates the deep-sea vessel. Without short-sea transport operators to serve between Penang – a relatively small port with relatively limited cargo volumes – and the transshipment hubs, the cargo cannot be moved. Even when the MLOs have secured transport contracts, their trunk or deep-sea containerships cannot or do not intend to call at Penang because their ships' sizes, the port's shallow drafts and the cargoes' low volumes.

In short, the level of economic growth of Penang is related to the development of sea transport too. However, functioning of sea transport or shipping at Penang cannot be performed smoothly and effectively without the integration of deep-sea and short-sea shipping. Since export cargoes from Penang require short-sea shipping for its deep-sea vessel connection at transshipment port, a large proportion of export cargo movement from Penang is directly dependent on efficient short-sea transport.

This relationship between short-sea vessels – also known as "feeder vessels" – and the trunk or deep-sea containerships – also termed "mother vessel" – is basic to an understanding of the role and importance of short-sea shipping. For a state like Penang, a gateway to the Northern Region of Peninsular Malaysia, maintaining viable and regularly improved short-sea shipping services should, therefore, would be critical to managing effectively economic growth.

This thesis plans to investigate various factors associated with the development of short-sea shipping services in Penang. In doing so, the thesis will focus on structural matters that are "external" to short-sea shipping services, as well as factors that are "internal" to the shipping sector.

The discussion of "external" factors will cover a range of issues, including the following:

i. The growth in trade and demand for shipping

Growth in trade, and especially exports, and the growth in shipping are closely related. Over the years, Malaysia's export trade has grown considerably. As an example, export movement from Southern Thailand through Malaysia's seaports has increased, too, with an appreciable impact on Penang-based shipping. Containerized cargo from Southern Thailand is sent to Penang Port by rail or road and then exported. In this connection, the thesis will investigate the connections between increased trade and the rise in demand for good sea transportation services and networks.

ii. Penang as a feeder port

Penang's export containers are largely dependent on short-sea shipping to carry them to designated transshipment ports for onward conveyance by externally-bound deep-sea vessels. This is mostly because deep-sea vessels or mother vessels do not usually call at Penang due to relatively limited container volumes and the limitation of depth required to serve large container vessels. In addition, the existing North Butterworth Container Terminal (NBCT), which does not have "Free Zone Status", is not in the position to attract deep-sea vessels for transshipment of cargo. Hence, Penang's role as a feeder port influences developments of short-sea shipping.

iii. High charter-hire cost for container vessel

Although there is a high demand for shipping, the shipping operators find that the present charter-hire cost for container vessel has risen quite considerably. For example, the cost of a charter-hire 500 TEU-capacity vessel has risen from about USD5,000 per day to USD10,000 per day over the past few years. As such, an operator may choose to terminate its service even though it is capable of filling a vessel to capacity.

iv. High fuel or bunker price

This is another important factor affecting the smooth operation shipping service, including short-sea shipping. The operators have experienced high fuel or bunker prices which, if unchecked, threaten the economic viability of short-sea shipping.

v. Cargo weight and affect load factor

Almost one-third of the Penang export volume comes from Southern Thailand, most of it in the form of heavy cargo (bearing about 24 tons per container compared to 14 tons per container, the latter being the standard weight for determining vessel capacity). Since vessels cannot be over-laden with cargo, the typical feeder vessel may have to carry less cargo in order to ensure its stability for smooth sailing. In short, instead of having 500 TEUs based on 14 ton eachs, an operator may be forced to accept less cargo booking (for instance, 300 TEU per vessel) to accommodate the heavy cargo from Southern Thailand. But this reduction in TEUs, that is, vessel utilization, does not help to reduce the high charter-hire and bunker costs.

vi. Expansion of non-sea modes of transport

Rail service now serves as an alternative to short-sea transport as far as transshipment movement between Penang and Port Klang is concerned. Rail service for container movement was not popular in Penang in the past, but it has become significant since last year as the export movement from Penang occasionally rose beyond the capacity of short-sea shipping and feeder vessels. Road transport is sometimes used to move cargo from Penang to Port Klang, Port of Tanjung Pelepas (PTP) and Singapore. However, this mode is unpopular with exporters due to various reasons including cumbersome documentation processes and high costs. Thus short-sea shipping must contend with competition from rail service in the immediate future.

vii. Port performances and "turn-around" time

Apart from high charter-hire cost, determined on a per-day basis, short-sea shipping involves short journeys that are time sensitive. In particular, a shipment's connectivity between feeder and mother vessels at transshipment ports is crucially dependent on a commitment to meeting the window vessel berth at every designated port within the short-sea routes. Thus, the performance of a port in supporting short-sea shipping operations has an immediate and significant impact in terms of the costs and quality of operations.

viii. Major shipping policy and trunk or deep-sea shipping

Global sea-borne trade has vastly expanded in volume. With that, however, most shipping lines and main line operators have emphasized the development of large capacity deep-sea and mother vessels to serve their trunk route trade, in order for their operations to achieve economies of scale. Presently, some vessels can load up to 8000 TEUs. Consequently, there is a "knock-on" demand for short-sea transport to serve smaller or off-line ports, like Penang. Yet major shipping and official policies have been slow to recognize this development.

The thesis will also pay attention to "internal" factors, that is, more technical factors related to the state and operation of short-sea transport services. In the relevant parts of the thesis, the technical meanings and significance of these "internal" factors will be duly made clear. The following "internal" factors will be considered:

i. Ship frequency and fixed-day sailing schedule

The above are very important to vessel operators and exporters or their planners. The vessel operator needs is constrained by ship frequency and the maintenance of fixed-day sailing schedules and must strive to ensure smooth and cost-effective vessel turn-around. On the other hand, an exporter's shipment or production planning is based on a vessel's sailing schedule and exporters prefer more frequent vessel calls for flexible planning.

ii. Connectivity between feeder and mother vessels

Apart from some direct-call vessels, a very high percentage of container movements from Penang involve transshipment at Port Klang,

PTP and Singapore. Hence, it is critical for ex-Penang shipment planning to achieve smooth connection with the intended mother vessel at the transshipment port. If the transshipment process or connectivity fails at any time, the operator would incur additional costs for the re-nomination of an alternative mother vessel.

iii. Stowage of containers for multi-port calling

Stowage planning should be perfect at all times. Otherwise, there would be wasteful extra space onboard that would necessitate extra ("land and reshift") work at the next port of call. In such a situation, the vessel's turn-around time will be affected leading to vessel delay and a probable misconnection with the intended mother vessel. Again, extra work and time would burden the operator financially.

iv. Schedule recovery, network design and deep-sea vessel deviation

Especially in the even of vessel delay or behind its window schedule, some immediate action like port omission and "cut & sail" may need to be taken place in order to ensure vessel comes back to its window schedule or so-called for schedule integrity. The moment the operator conduct port omission or even cut & sail exercise, there be extra costs to pay for shifting of containers to other alternative vessel. However, if the operator does not carry out the move, they may have to face another version of consequences such as losing of confidence of customer and extra burden if no cargo support.

Network design refers to routing of a short-sea shipping within the region, for example vessel calls Penang – Port Klang – PTP – Singapore – Penang. Flexibility to schedule of a short-sea shipping is equally essential, because short-sea transport operator may stand in need of scheduling its vessel to induce additional call at certain port to meet the requirement of the main line operator's deep-sea vessel deviation.

Literature review

In general, an understanding of transportation requires an understanding of its relation to the economy, including patterns of consumption and production (Faulks 1992, Sloman 2003). Globally, sea transport plays a critical role in facilitating the processes of matching the supply of goods with their demand. As Bell, Bowen and Fawcett (1984) suggested, manufactured goods are not worth their monetary value to a trader unless the goods can be made available to the latter's customer. To the extent that governments intervene in international trade, often by subsidizing their export sector (Sloman 2003), official support for sea transport development becomes an issue in economic development for countries, such as Malaysia, that depend very much on external trade for their growth. Sea transport, by linking traders of different countries, and producers and consumers in different locations, is both a necessity and catalyst of trade-based economic growth (Bell, Bowen and Fawcett 1984).

In particular, it has been suggested by Button (1993) that the demand for sea transport services reflects the long-term business cycles experienced by trading nations as sea transport bridges production and consumption. For many countries, moreover, Sloman (2003) observes, certain raw materials, capital equipments and intermediate products that are necessary for development can only be shipped from abroad. From another perspective, Ball et al (2002) found that as many companies strive for better quality and lower-cost products to improve their global competitiveness, they have shifted their production lines to lower-cost countries through acquisitions and mergers occasionally. This trend of relocation has opened up more opportunities for shipping to play a role in meeting ideal production objectives, opening new markets and attaining global economies of scale. In non-economic ways, organized sea transport can also move food and relief supplies and other forms of emergency aid efficiently.

Thus, transport, including the important modes of sea transport, fulfills the needs of distributing

raw materials and exporting or importing finished products. In this basic way, sea transport connect areas of the world that are fortunate enough to possess sources of desirable raw materials like crude oil, iron ore and coal with places (like Japan) that have few local sources and must import large quantities of those materials to feed their industrial development (Faulks 1992). In conveying raw materials from their places of origin to their places of application (manufacturing sites, for example) shipping or sea transport helps to balance supply with demand and resource with use. Other than that, shipping also allows two-way transfer of goods between countries that produce a surplus with those that are in need of those goods. Thus shipping may be said to contain the seeds of world trade.

It is not surprising, therefore, that economists have long been concerned with assessing the interdependent links between changes in transport, including sea transport, and the pattern of economic development (Button 1993). Indeed, Button (1993) argued that transport provided an "initial experience" of business for many industrialists in the developed countries. Although its potential multiplier effects for third world countries are likely to be substantially less today, given the growth of international trade and tied development aid, nonetheless transport can still facilitate economic expansion. Economic development may, therefore, be seen as a complex process with an important role played by sea transport and shipping.

Within the modern shipping sector, the conversion of merchandising from break-bulk shipping to containerized shipping has had a tremendous impact in the organization of sea modes of cargo movement. Containerized cargo may be transported from the port of loading to its intended destination in the same condition. Significantly, containerization is also a method of transporting merchandise in a unitized form thereby permitting an inter-modal transport system and network to evolve that can combine different modes of transport, including rail, road, short-sea and deep-sea shipping (Branch 1989). Based on their expectations of efficient, rapid, and reliable transport supported by logistical systems and integrations, the providers of transport and logistics services constantly re-evaluate their strategies to derive competitive advantages from different combinations of modes and routes. Here, operators and users take into account such factors as transit time, cost, and frequency when judging the efficiency of transport services (UNCTAD/ RMT 2001).

One result has been the development and deployment of newer and bigger containerships to take advantage of the benefits of containerization. But containerization has benefited not just deep-sea shipping but short-sea operations, too. While deep-sea operators concentrate on handling of rising cargo volume and mother vessels call at transshipment hub ports, short-sea operations meet the requirement of traders for higher frequency and shorter vessel transit time. In summary, short-sea shipping offers better returns by serving more destinations, improving cargo transshipments and saving time and cost (Notteboom 2002). As current trends lead most shipping lines to introduce larger tonnage or capacity vessels to handle increasing cargo volumes, short-sea networks must develop, too, to connect to transshipment hub ports (Hartnoll 2002). Hence, as global shipping networks grow rapidly, the share of transshipment in world container traffic has also risen significantly.

Consequently, while global container carriers and deep-sea operators feature critically in the competition among ports, it is also crucial for them to be selective in their choice of transshipment ports (Lirn et al, 2004). This is because the processes of container transshipment need the integration of deep-sea *and* short-sea and shipping services. (These services may, of course, be inter-modal, that is, supplemented or partially replaced by non-sea modes of transport.) At the same time, the adoption of new technologies can reduce the time needed to transfer containers between inter-modal connections and speed up the transshipment of cargo to and from short-sea vessels so as to make these transport services competitive in costs and time (Tirschwell (2004). As traders demand more rapid transit for the shipping of cargo, in order to replenish stores while reducing inventory and warehousing costs, it is probable that the role of

short-sea shipping will expand to accommodate those needs (Tirschwell 2004).

Further, it is likely that short-sea shipping could be fully integrated into door-to-door transport services, as noted by the European Commission (1999). In fact, the more highly developed it is, the more likely freight inter-modality will benefit short-sea shipping. In practice, though, such modal integration is only possible when the individual modes, including shipping, are regularly developed to meet customers' service requirements. But, at least in overall transport planning, short sea shipping should be regarded as an integral component of comprehensive inter-modal approaches that attract higher cargo volumes, enhance networks and provide genuine door-to-door services.

To that extent, it is important to analyze the prospects or problems facing the expansion of short sea shipping in a growing economy. This thesis plans to conduct such an analysis for the case of Penang. In this region, already a number of short-sea transport operators provide services that link Penang to Port Klang, PTP and Singapore. As such, short-sea operators perform the function of linking deep-sea operators to the port of Penang even when the latter's large vessels cannot physically perform effective vessel-turn-around for the long-haul or deep-sea routes. But while this function is performed by the existing short-sea shipping network, its scope for expansion is constrained by policy and practical matters, by "external" and "internal" factors. It is a major objective of this thesis to investigate these constraints on the further development of Penang-based short-sea shipping services. In this manner, it is hoped that the thesis will contribute to a clearer understanding of the economic growth of Penang and the development of short-sea shipping.

Methodology and sources of data

There has been very little research on sea transport in general and short-sea transport in particular in Malaysia. Hence, this thesis plans to provide a relatively new study of the field by undertaking an investigation of the short-sea shipping sector in Penang and its relation to the state's overall economic development. In doing so, the thesis will combine qualitative and quantitative analyses to pose and answer the following related questions:

1. How has short-sea shipping developed within the larger framework of sea transport in Malaysia?
2. Specifically for Penang's overall development, what is the role that is played by short-sea shipping?
3. How is the present short-sea shipping industry structured in terms of firms, types of services and range of operations?
4. What are the key issues, external and internal factors affecting the prospects for growth in the industry in the foreseeable future?
5. Can we anticipate a likely expansion of short-sea shipping in terms of the firms involved, human resources deployed or required and the industry's contribution to trade and growth in the state of Penang?
6. Which are the important areas within short-sea shipping to which government policy should pay particular attention?

These questions are based on a methodological approach that is exploratory and explanatory. It is not an approach that is oriented towards formulating and testing hypotheses. Fundamentally, this thesis hopes to map out how the short-sea industry works and to identify the kinds of issues that short-sea shipping services must address. In addition it plans to analyze the problems and prospects that the services face in the foreseeable future.

To this end, the methodological approach to be adopted comprises the following components:

To provide an account of the rise and development of short-sea shipping.

This account will be based on archival research directed mainly at primary documents, both from government and industry sources. Part of the information required will be qualitative, tracing the recent development of short-sea shipping. But

part of the information will be statistical, including data on trade and cargo volumes, establishment of firms and value of services provided. The use of quantitative information here will be mostly to trace the trends in short-sea shipping in Malaysia and Penang.

To provide an explanation of the structure of the industry and constraints upon it.

The researcher plans to interview various 'players' in short-sea shipping. They include: officers in relevant port authorities (especially the Penang Port Authority), key representatives of industry organizations (such as the International Ship-Owners' Association, North Malaysia Shipping Agents' Association, Chartered Institute of Logistics & Transport in Malaysia), local managers of selected shipping lines (covering deep-sea and short-sea transport), and traders and exporters. Given the small field of interested parties, it is not feasible to carry out any kind of systematic survey. Instead, the research will stress in-depth discussions that benefit from the experiences of the 'players' in short-sea shipping.

To offer an analysis of the problems and prospects short-sea shipping faces.

Part of the analysis will be drawn from the interviews mentioned above. Part of it will be based on the researcher's own evaluation of such matters as trends in charter-hire cost, fuel and bunker prices, changes in cargo weight, competition from non-sea modes transport, port development and deep-sea containerships, and the efficiency of networks of connectivity between feeder vessels and mother vessels. In addition, the researcher hopes to evaluate government measures related to the performance of the Penang Port, the likelihood of Penang Port's being granted Free Zone status, and government policies that may enhance or constrain the expansion of short-sea shipping services in the state.

The researcher will mainly consult the following sources of documented, published and/or unpublished information: port statistics, industry journals and periodicals, company reports, newspapers and magazines, official statements.

On the whole, it is planned that the thesis will be able to provide an updated appraisal of the state and directions of growth of short-sea shipping in ways that show the dynamic and changing opportunities and contributions of the sector.

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