SHORT SEA SHIPPING IN CANADA: LESSONS LEARNED AND RESEARCH MODEL FOR THE DEVELOPMENT OF NEW SERVICES

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Introduction

Short sea shipping (SSS) has been the subject of significant research and analysis in Canada over the last decade. Few of these studies have led to the development of new SSS services, and even fewer of these services have been successful. This paper examines some of the challenges facing the development of new SSS operations in Canada and related key success factors, and puts forth research and business planning models to identify and capitalize on opportunities to promote a modal shift to marine, where SSS could provide a competitive alternative.

Background

The authors of this paper were part of the CPCS team that recently completed a number of studies for federal, provincial and municipal government clients, to assess opportunities for the development of SSS in eastern Canada.

These studies explored a number of new markets for SSS in Atlantic Canada, along the St. Lawrence Seaway, and in the Great Lakes, as well as for the movement of a range of commodities, from aggregate and grain to containers and project cargo. Different SSS concepts were also assessed, including classic port to port short sea shipping,

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hub-and-spoke style feeder services, and various ferry configurations for the movement of freight, including roll-on-roll-off and drop trailer services.

The majority of these studies assessed the market for and potential competitiveness of SSS relative to rail and truck transport, using a range of alternative service and vessel options, in line with the needs and conditions of the markets in question. Some of these studies identified legitimate opportunities for a modal shift to marine transport and the development of new SSS services, while others confirmed that SSS is not viable for particular markets and/or regions.

This paper does not highlight the results of specific SSS studies. Rather, it draws out the broader findings on the necessary conditions for viable SSS and puts forth a research and planning approach, based on these findings, to identify and promote the development of new SSS initiatives.

Short Sea Shipping Operating Models

Short sea shipping is not new. Indeed, it pre-dates road and rail transportation. In simplest terms, SSS is marine transportation between two or more points on the same continent. It does not involve crossing an ocean.

There are a number of alternative SSS operating models. The classic regional SSS model involves the movement of freight, typically bulk or break-bulk cargo, between regional ports. Regional SSS can cater to both inter-company and intra-company moves. Examples include McKeil Marine's tug-and-barge movement of aluminum ingots between Sept-Îles and Trois-Rivières, or the passenger and cargo service operated by Relais Nordik between Rimouski and 12 ports and communities along the north shore of the St. Lawrence River.

An alternative model is hub-and-spoke or feeder-style SSS. This concept involves the transhipment (from one vessel to another) of cargo, often containers, from large ocean-going vessels and "feedering" of this traffic via smaller vessels to and from regional

ports. There have been few successful feeder services in Canada, though there have been several attempts to develop a feeder-style service using the Port of Halifax as a transhipment hub. This model has had more success in Europe. Successful examples include the Port of Hamburg, which serves as a hub for traffic destined to the Baltic and the "pure" transhipment hub model, such as Gioia Tauro in Italy, where over 95 percent of traffic is transshipped to other vessels.

Though different in a number of respects, ferry service for the movement of freight can also be characterized as a form of SSS. Ferry services for the movement freight typically involves moving trucks or truck trailers between two points according to a fixed schedule. These services are often combined with passenger service. A Canadian example is the Saint John, NB to Digby, NS service operated by Bay Ferries.

The following provides a summary of some of the operating characteristics distinguishing different SSS models.

Characteristics	**Regional Short Sea Services**	**Hub-and-Spoke Feeder Services**	**Ferry Services**
Market served	Regional or intra-company cargo	Feeder cargo (arriving via mother ship)	Regional cargo
Service anchored to	Fixed schedule, lower frequency	Mainline ship calls	Fixed schedule, frequent
Origination of service	Region of cargo or hinterland	Transhipped to/from mother ship	Point to point
Type of cargo	Container, Ro-Ro, break-bulk	Containers	Truck/truck trailers, passengers
Typical service	End-end, Quay-quay, Door-door	Hub port to/from regional port	Port to port
Route/network	May/may not be linked to hub	Link to "hub" port	Link between two regions
Competes primarily	Road and rail transport	Direct call, common use vs. dedicated	Road (where road alternative exists), air

More detail on these models can be found in a recent CPCS study published by Transport Canada entitled "Hub & Spoke Container Trans-shipment Operations in Eastern Canada for Marine Movements of Freight (Short Sea Shipping)".

Increasing Policy Push for Short Sea Shipping

As roadways in North America become increasingly congested, there is a growing push among policy makers, at all levels of government, to promote a greater use of waterways to optimize transportation networks. The potential for marine transportation to reduce pollution from the movement of freight, to minimize the need for maintenance and/or capacity expansion of surface transportation infrastructure, and to spur regional economic development around port communities, further support the policy push to promote SSS.

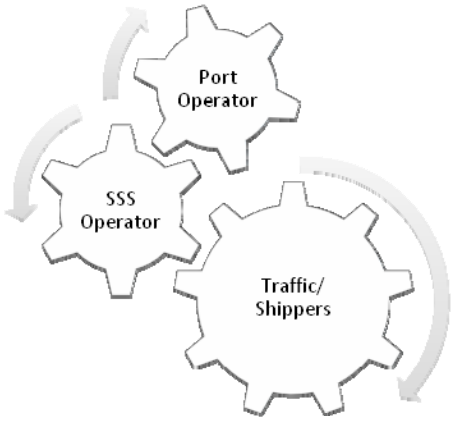
This push is further bolstered by the growing evidence of the success and benefits of SSS in Europe and elsewhere. Though SSS is much more advanced in Europe for a variety of historical, geographic and market reasons, recent initiatives such as the EU's Marco Polo and Motorways of the Sea programs suggest the potential for policy to influence modal shift to marine transportation. It should be noted too, that private initiatives by European shippers and transportation logistics providers (including in some cases trucking companies) have also led to the development of new and successful SSS operations.

The key question for Canadian policy makers and researchers is how to best identify and capitalize on new opportunities to realize value from SSS, within the Canadian context.

This has been the focus of much recent effort and analysis. However, the uptake of new SSS operations in Canada has been slow, and several startup initiatives have failed or otherwise not realized their full potential. The service offered by Great Lakes Feeder Lines is a case in point. As the name suggests, the intent of the service was to provide feeder service to the Great Lakes, though the service has struggled to develop this market.

Key Success Factors and Challenges to Development of SSS

The viability of SSS depends on the collaboration of a number of parties: shippers, freight forwarders and/or ocean shipping lines willing to move product by marine transportation, a marine transport operator willing to serve this traffic, port terminal operators willing to load and unload cargo, and inland transport operators moving product from door to port and port to door. The collaboration of these SSS stakeholders must be cemented by mutual interests. In most cases, this means financial gain, or strategic advantage.



The key success factors and challenges for the three most significant stakeholder groups in a SSS operation are outlined below.

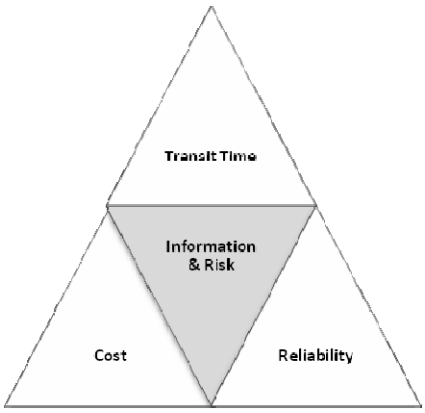
Traffic/ Shippers

As with any freight transportation operation, success is predicated on a market need, competitive service and the movement of sufficient volumes of traffic to ensure the long term viability of a SSS service. In this respect traffic, or more specifically the rate payer, is and will always be king.

Depending on the SSS model in question, traffic may be generated by shippers directly (e.g. in the case of the classic port to port SSS

model), by ocean shipping lines (e.g. in the case of the hub-and-spoke feeder model), by truck transport operators (e.g. in the case of ferry services), or some combination thereof.

To succeed in capturing traffic, a SSS service, whatever its configuration, must offer a clear value proposition to the rate payer relative to alternative modes of transportation. The value proposition will depend on the specific supply chain needs of the shipper(s), but would likely be expressed by some combination of total logistics costs, transit time and reliability of service relative to alternatives. Information about the transportation market and related service risks could also influence perceptions of marine transportation, and ultimately, the potential for modal shift to SSS.



In recent surveys led by CPCS, shippers underscored the importance of reliability and cost savings, though the importance shippers assigned to these characteristics differed by the nature of the cargo and related supply chain requirements. For example, shippers of higher value of just-in-time cargo were generally not interested in SSS given generally longer transit times and the lumpier nature of SSS shipments relative to truck transport. As with any new idea, risks also weighed heavily on shippers when they considered the potential of SSS. One shipper noted that he would want to see a scheduled SSS service operating without missing a sailing for three years before he would consider using it.

SSS Operator

Ultimately, the success of SSS is contingent on the commercial viability of the service. Simply, there must be enough traffic to allow the SSS operator to generate enough revenue from operations to cover operating and capital costs. Critical mass and reliability of traffic are central to the success of a SSS operation.

One of the chief barriers to the further development of SSS in Canada is the high investment cost and significant risk inherent in starting up a service. Risks are particularly high given the need to bring in new vessels (given age of existing fleet) and that the market for new marine transportation services in Canada, and feeder style service in particular, is not yet well established as it is in Europe.

This creates a Catch 22 problem. On the one hand, most potential SSS operators are unwilling to shoulder the very significant risks inherent in developing a new SSS service, until traffic is proven. On the other hand, few shippers or ocean shipping lines are willing to commit to using a new SSS service until that service is proven.

The risks of starting up a new service have traditionally been much lower in Europe given the general acceptance of and market comfort with SSS shipping and a large pool of appropriate vessels for charter. In some cases, where feeder service start-up risks are high or cost-prohibitive, support programs, such as the Marco Polo Program in Europe (which covers a portion of start-up costs) can go some way toward facilitating the development of new services. It should be noted that the impact of these initiatives is still the subject of debate.

Recent policy changes in Canada, including plans to remove the 25 percent duty on the importation of new ships will go some way in mitigating the start-up risks. Whether this is enough to spur the development of SSS has yet to be seen. However, a number of other barriers remain, not least of which are the numerous regulations including crewing standards and pilotage, and the uncompensated social costs of road and rail transportation in terms of pollution, greenhouse gas emissions, and accidents.

Port Operator

Like the SSS operator, ports require a critical mass of traffic to warrant the investment required to serve this traffic. All things being equal, the development of SSS could promote greater flows through handling ports where these goods were previously moving by road or rail. The Port of Hamilton has reportedly been subsidizing the development of a new SSS service, Sea 3, to this end.

A key success factor in any SSS operation is competitive handling costs at ports. For example, it is understood that port lift costs are discounted relative to ocean-shipping lift costs for feeder operation in Europe, and that this differential pricing has been instrumental in growing SSS in the Baltic and perhaps elsewhere.

High port costs can be an issue in Canada where operational arrangements can increase costs with little added value. For instance, some of collective agreements for longshoremen are extremely restrictive with regard to minimum gang size, minimum notice period, minimum call out, cancellation, overtime and numerous other conditions. The result is that the handling of small quantities of cargo during a start up period, 20-40 containers at regional ports for example, can become expensive compared to other modes of transportation not faced with the same labour restrictions.

Mutual Interests of SSS Stakeholders and Importance for Research

What is important to note from the above is that a viable SSS operation requires that all key success factors be in place for each stakeholder group so that shippers/freight forwarders/ocean shipping lines, SSS operators, and port operators alike can benefit from SSS. And these mutual interests start with the value proposition to the shipper – the ultimate rate payer.

The importance of value to shippers and mutual interest among all SSS stakeholders is perhaps a point that has not received enough emphasis in some recent policy initiatives and research in Canada. It is not enough to focus on the needs of one stakeholder group or issue.

Having said this, Canada is moving in the right direction. Initiatives to improve the enabling environment for SSS, including addressing regulatory constraints to investment in SSS are steps forward. For SSS to achieve its full potential in Canada, two sets of actions that build on these initiatives are now required. First, we must identify specific opportunities for the development of SSS, and second we must address constraints to the attractiveness of SSS to shippers/shipping lines, potential SSS operators and ports alike.

While the latter set of actions are extremely important, they are relatively well understood, and relate to the plethora of legal/regulatory barriers to using foreign vessels and crew in Canadian service, among other things. The remainder of this paper focuses on how we can identify the best opportunities for SSS.

In the course of recent studies to identify opportunities for the development of SSS in eastern Canada, CPCS has developed research and business planning models to identify and capitalize on promising SSS opportunities. These research and business models are described in more detail below.

Research Model for Identification and Development of SSS Opportunities

The CPCS research model is aimed at identifying commodity flows that would benefit from a shift to marine transport. This research model can be applied to any jurisdiction with port access.[2]

It is based on a series of sequential steps, as presented in the figure below, and explained in the subsequent sub-sections.

[2] This Research Model is general in nature and intended as a guide. Readers should appreciate that specific regional contexts and goods flows will require approaches and analysis specific those regions.

Goods Flow Review

Understanding the universe of what is moving to, from, and through a region is a prerequisite to being able to assess the potential for shifting some of these goods flows to the marine mode. It is also important to assess what shippers and logistics providers view as the most important goods flow constraints through the region in question.

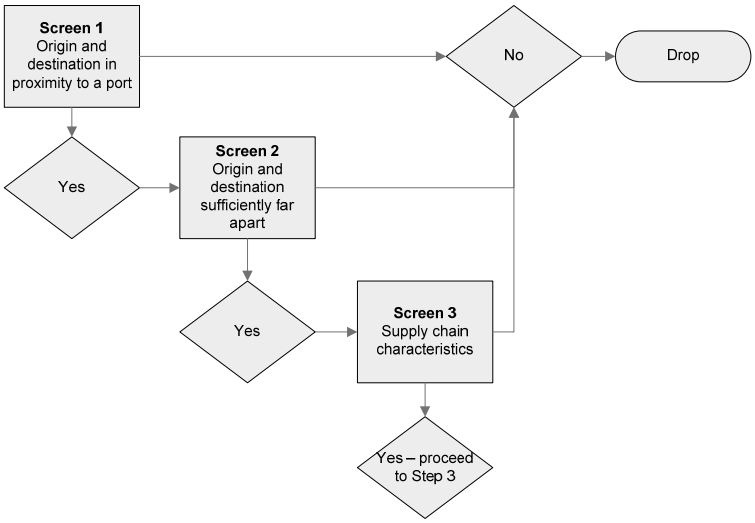
This research step involves four key activities:

- Review of region's transportation system – to understand existing routing patterns
- Define the region's catchment area – to focus on the companies operating within reach of a port and related goods flows
- Review goods flows, to, from and through the catchment area, by mode – to understand the universe of regional goods flows
- Review constraints to the current flow of goods – to determine the potential for marine transportation to help circumvent these constraints.

Data for this review can be obtained from a number of sources including Statistics Canada (for marine traffic) and from provincial governments or Transport Canada in the case of truck traffic. Rail traffic data are more difficult to obtain for reasons of confidentiality though this can be worked around through consultations with major shippers using rail transportation in the catchment area.

Goods Flow Screening

Once the major goods flows to, from and through a region have been identified, the next step is to identify the goods flows that have the greatest potential to shift from existing routings to the marine mode. A qualitative screening approach, like that illustrated below, is one way to efficiently identify the goods flows for which marine transportation could offer the most value.



The first screen will exclude any goods flows without origins and destinations in proximity to a port or marine facility. The second screen will exclude goods flows travelling insufficient distances to justify additional handling costs for SSS. The third screen assesses how good a fit marine transportation offers with the requirements of a supply chain for a particular goods flow. Those goods flows passing all three screens are those for which marine transportation has the most potential to be attractive.

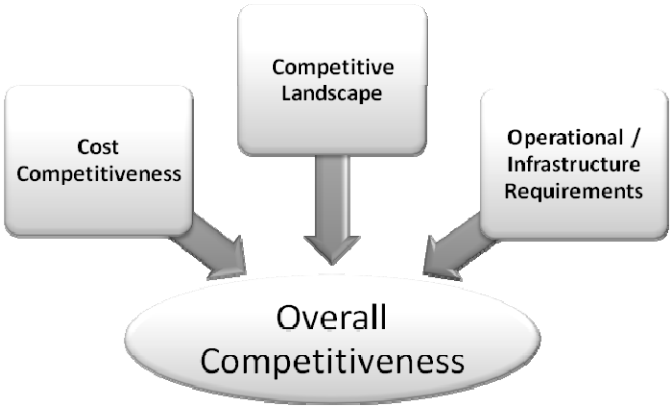
The actual likelihood of modal shift will depend on the competitiveness of marine transportation vis-à-vis alternatives.

Competitiveness Assessment

The Competitiveness Assessment can be applied to those goods flows that passed the Goods Flow Screening process; those goods flows that have been screened out need not be assessed further given that they do not lend themselves to marine transportation.

The purpose of the Competitiveness Assessment is to determine if marine transportation could provide a competitive means of transportation for the goods flows shortlisted in the Goods Flow Screening process in relation to other modes of transportation/routings.

At a macro-level, competitiveness largely depends on three key factors, as shown in the figure below.



First and foremost is cost competitiveness. Would marine transportation cost less than alternatives? This requires a detailed comparative analysis of the total logistics costs (door to door) by mode/routing for each goods flow passing the Goods Flow Screening process. This step is fairly data intensive and requires access to current transportation costs and rates, by mode and for each move in the transportation routing, including handling costs, wharfage and stevedoring costs. A database of proxy per tonne/kilometre costs per mode from similar routings can provide a useful basis for this

analysis. Input from stakeholders on current rates can also be insightful.

Second is the analysis of the competitive landscape. The analysis of market structure should examine key players in the market and existing relationships among these players. For instance, knowing that a large shipper is dissatisfied with an existing transportation arrangement could suggest an opportunity to attract the related goods flow to the marine mode. Conversely, if traffic is contracted for longer periods of time, this could be a barrier to modal shift to marine. The analysis of the competitive landscape should also identify likely competitors and partners to an initiative to shift goods flows to the marine mode. This assessment is likely best undertaken through consultation with regional shippers (representing flows shortlisted in the Goods Flow Screening process) and regional transportation providers.

Third and lastly, an analysis of the necessary operational and infrastructure requirements needed for a goods flow to shift to the marine mode, where these are not yet in place at the port(s) in question. Different goods flows have different operational and infrastructure requirements. For instance, the equipment required to receive asphalt is quite different from the equipment required to handle steel. This analysis should identify and cost at a conceptual level the infrastructure and operational changes that would be required to handle each goods flow. This step is a necessary input to determine investment needs (infrastructure and equipment), to inform the assessment of cost competitiveness and the economic analysis to be undertaken in the next step (should new infrastructure and equipment be required).

For each goods flow, the strengths and weaknesses over these three dimensions of the competitiveness assessment will lead to an assessment of whether there is an opportunity to shift the flow to the marine mode, as well as the infrastructure and operational requirements that would be involved in handling the flow.

Economic Analysis

Economic analysis in the form of both cost-benefit analysis and economic impact assessment can be undertaken to determine respectively the desirability of a project and its impact within a defined region. Both types of analysis will help guide government decision makers when analyzing SSS initiatives and any potential investment requirements to facilitate the development of the service.

Business Planning Model for Moving Forward

Once potential opportunities have been identified from the universe of commodity flows moving to, from and through a region, using the research model described above, a business plan can be developed to capitalize on these opportunities. In the context of a recent CPCS study for a municipal government, a business planning model was developed to this end. The three key objectives of this business plan were:

1. To set out strategies and plans to capitalize on identified opportunities to shift goods flows to the marine mode
2. To outline related infrastructure, operating and marketing needs to support the strategies and plans
3. To attract investment in the infrastructure required to support identified opportunities, if required.

In addressing these objectives, a number of principles were set out to guide the business planning process. These principles draw on the lessons learned from recent SSS experience in Canada, and related research and analysis.

- The Business Plan should be market driven, seeking to capitalize on opportunities to increase the value of transportation to, from and through a region, for shippers, where there is potential to do so (e.g. lower cost alternative).
- Strategies and plans should be commercially oriented, rather than requiring ongoing government financial support (i.e operating subsidies).

- Initial investments in infrastructure may require some form of up front government support, where such funding is justified by long term economic benefits.
- Investment plans should seek to limit the risks of investment in infrastructure and equipment (avoid "build it and they will come" model).
- Implementation of the business plan should be driven by the port(s) that stand to benefit most from the service.
- Operating plans should be supported by regional stakeholders, including local residents, regional interest groups, etc.

These principles are intended to focus SSS development plans on ensuring the ultimate sustainability of a new service in the long term.

Moving To Action

The Business Plan resulting from the above described process is a point of departure. It is intended to highlight a market opportunity where SSS can provide competitive service and set the strategic building blocks for capitalizing on these opportunities.

What is necessary to turn the Business Plan into reality is for the key actors in its implementation – shippers/shipping lines, potential SSS operator(s), and port operator(s) in particular - to come together to flesh out a concept from which each can realize value through collaboration. There could be a role for government to support the implementation of related SSS development plans, if new infrastructure is required, or to help shoulder some of the upfront capital costs or operating risks, where economic benefits so justify.

The development of one or more new successful SSS services even if on a pilot basis could help demonstrate the value of SSS to uninitiated shippers and related stakeholders and increase the critical mass of traffic required to help ensure the sustainability of these services in the longer term. This could also lead the way for the development of other SSS services elsewhere in Canada.