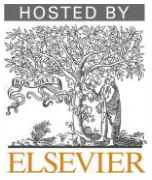
The Asian Journal of Shipping and Logistics 34(1) (2018) 033-042



Contents lists available at ScienceDirect

The Asian Journal of Shipping and Logistics

Journal homepage: www.elsevier.com/locate/ajsl

Decision Making Model for Ro-Ro Short Sea Shipping Operations in Archipelagic Southeast Asia*

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ARTICLE INFO

Article history:
Received 8 November 2017
Received in revised form 10 March 2018
Accepted 15 March 2018

Keywords:
Archipelagic Southeast Asia
Analytic Hierarchy Process (AHP)
ASEAN
Delphi
Ro-Ro
Short Sea Shipping (SSS)

ABSTRACT

This study aims to develop a decision-making model for determining the potential of interstate Ro-Ro Short Sea Shipping (SSS) operations in Archipelagic Southeast Asia (ASEA). It is expected to assist SSS authorities, private investors and financial institutions focus their limited resources on several key factors that could ensure the success of their undertakings. This study will begin with identifying the relevant factors that have contributed towards successful SSS operations through a process of literature review. Subsequently, a Delphi survey was conducted with sub-regional experts to identify any new determinants and assess their opinions on the relative importance of all the determinants involved. Finally the weightages of the determinants were ascertained through the Analytic Hierarchy Process (AHP). Twenty expert respondents from Brunei Darussalam. Indonesia, Malaysia and the Philippines were involved in the Delphi survey while 18 expert respondents continue to participate in the AHP survey. This study concludes with the development of a decision-making model that was tested on three interstate Ro-Ro SSS routes within the ASEA sub-region.

1. Introduction

Located on the south-eastern end of the Asian continent, Southeast Asia land mass geographically separates the Pacific and the Indian Oceans. It borders China to the north, Australia to the south, the Pacific Island Countries to the east, while India and Bangladesh are situated on its west. The region could be further divided into two sub-regions namely, mainland Southeast Asia and archipelagic Southeast Asia (ASEA). The states of Cambodia, Laos, Myanmar, Thailand, Vietnam, Peninsular Malaysia and Singapore formed mainland Southeast Asia. Although Singapore is an island state, it is connected to Peninsular Malaysia by a causeway and a bridge across the Johore Straits. Additionally, Indonesia,

* This study was supported by UniKL Short Term Research Grant.

http://dx.doi.org/10.1016/j.ajsl.2018.03.005
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Peer review under responsibility of the Korean Association of Shipping and Logistics, Inc.

the Philippines, Brunei, East Timor together with the eastern states of Malaysia that mostly lie on the eastern part of the region are categorised as ASEA. The Asian Development Bank (ADB) has characterised ASEA as a unique sub-region with more than 24,000 islands and long distances that demands a special approach to physical connectivity (ADB, 2010). Due to the archipelagic nature of ASEA, it could be observed that its intermodal transport system is primarily maritime-based to connect between the main ports within the sub-region. It is supported by a land-based transport system in the bigger islands such as Borneo, Java, Sulawesi, Mindanao and Luzon.

The term Short Sea Shipping (SSS) can be described as a modern equivalent of coastal shipping (Balduini, 1982) (Becker et al., 2004). The term can be traced from Balduini (1982) that refers SSS as a maritime transport between ports of a nation and between a country's port and the ports of adjacent countries. Musso, Paixao-Casaca and Lynce (2010), in their review of SSS definitions propose four classification criteria for SSS namely; (a) geographical based on route length; (b) supply approach, based on type-size containers; (c) commercial criteria or demand distinguishing between feeder traffic, intra-regional traffic and nature of the load; and (d) legal approach, according to member ports of the same state. In other literature, Kennedy (2008) broadly defines SSS as any waterborne transportation of commercial cargo between domestic ports over the US inland or coastal waterways system whilst Hennesey and Yonge (2006) define it as "the shipping of cargo or goods for relatively short distances or nearby coastal ports". In Europe, the European Shortsea Network (2014), defines SSS as the movement of cargo and passengers by sea between ports situated in geographical Europe or between those ports and ports situated in non- European countries having a coastline on the enclosed seas bordering Europe. Transport Canada (2006) interprets SSS as "a multi-modal concept involving the marine transportation of passengers and goods that does not cross oceans and takes place within and among Canada, the United States and Mexico". In the Association of Southeast Asian Nations (ASEAN) context, the establishment of a regional SSS has been divided into two components namely the establishment of "an efficient and integrated inland waterways network" and fostering "a competitive and efficient interstate shipping service in ASEAN" (ASEAN, 2011). From the definitions of SSS highlighted in this paragraph, it could be summarised that SSS is a domestic or interstate shipping operation that moves cargo and/or passenger between ports over a short distance that does not cross the ocean.

2. Aim

The aim of this study is to develop a decision-making model for determining the potential of interstate Ro-Ro Short Sea Shipping (SSS) operations in the ASEA sub-region, which is expected to assist SSS authorities, private investors and financial institutions to focus their limited resources on several key factors that could ensure the success of their undertakings.

3. ASEAN Ro-Ro Concept

In support of the establishment of an integrated, efficient and competitive maritime transport system, one of ASEAN key actions is to establish efficient and reliable shipping routes through the newly introduced ASEAN Nautical Highway (ANH) that involves the utilization of Roll-on Roll-off (Ro-Ro) vessels as the main platforms (ASEAN, 2011). The idea for the development of the ANH arose after the ASEAN authorities were convinced with the results of the initial impact assessment of the Philippines Nautical Highway (also known as Ro-Ro System) that demonstrated significant benefits in terms of reduction in transport costs, the creation of new regional links and expansion of regional markets (ASEAN, 2011). The shipping routes would connect the mainland Southeast Asia and ASEA in support of other sub-regional initiatives such as the Brunei-Indonesia-Malaysia-Philippines East ASEAN Growth Area (BIMP-EAGA) and Indonesia-Malaysia-Thailand Growth Triangle (IMT-GT) (ASEAN, 2011). ASEAN has designated 47 ports as the main ports in the trans-ASEAN transport network. Among the ports that lie in the ASEA sub-region are Kuching, Bintulu, Kota Kinabalu and Sandakan in Malaysia; Muara in Brunei; Subic Bay, Manila, Batangas, Cebu, Cagayan de Oro, Davao, General Santos and Zamboanga in the Phillippines; and Pontianak, Banjarmasin, Balikpapan, Makassar and Bitung in Indonesia (ASEAN, 2011). Besides the main ports identified for the trans-ASEAN network, other smaller ports such as Labuan, Menumbok, Kudat and Brooke's Point are also recognised as nearby ports to be connected in support of the main ports (ASEAN, 2011). The importance of the development of adequate infrastructure for Ro-Ro operations and improved institutional arrangements, such as the integrated CIQS facilities have been re-emphasized in MPAC 2025 by the leaders of ASEAN to ensure the realization of the ANH (ASEAN, 2016).

Fig. 1. Map of Southeast Asia

Source: Aseanup (2018)

4. Literature Review

Thus far, most contemporary studies concerning SSS that could be traced centred on the SSS operations in Europe and North America. Among others, in order to embark on a successful SSS operation, Psaraftis and Schinas (2000) recommend further cooperation among various transportation modes, alliances among ports and the development of a common system for freight transportation data. In evaluating the strengths and weaknesses of SSS in Europe, Paixao and Marlow (2001) reveal that the weaknesses are mostly due to the lack of efficient port operations, unreliable vessel schedules, excessive paperwork and high administrative cost. In their study of the economics of SSS, Musso and Marchese (2002) argue that in order to determine the competitiveness of SSS, both the internal and external costs must be included. They also theorise that SSS competitiveness depends directly on the sea-leg distances (Musso and Marchese, 2002). Similarly, Medda and Trujillo (2010) argue that SSS is competitive for a certain type of distance, product and with certain types of ships. In their subsequent research, Paixao Casaca and Marlow (2005) examine the competitiveness of SSS compared to other transport modes