



Norwegian
Business School

This file was downloaded from BI Open, the institutional repository (open access) at BI Norwegian Business School <https://biopen.bi.no>.

It contains the accepted and peer reviewed manuscript to the article cited below. It may contain minor differences from the journal's pdf version.

Osman, S., Sundarakani, B., & Reve, T. (2022). Benchmarking of Singapore maritime cluster: The role of cluster facilitators. *Benchmarking: An International Journal*, 29(5), 1452–1483.

<https://doi.org/10.1108/BIJ-11-2020-0574>

Copyright policy of *Emerald Publishing Group*, the publisher of this journal:

As soon as we've published an article, the version of the article that has been accepted for publication, the Author Accepted Manuscript (AAM) can be used for a variety of non-commercial scholarly purposes, subject to full attribution. An author may deposit and use their AAM (aka post-print)

http://www.emeraldgrouppublishing.com/openaccess/oa_policies.htm

Benchmarking of Singapore Maritime Cluster: The role of cluster facilitators

Purpose: This article analyses the role of cluster facilitators in the Singapore Maritime Cluster. Singapore has been recognized for its pro-business policies and its ability to attract international shipping companies to set up the ship ownership headquarters and ship management activities in Singapore.

Design/methodology/approach: The research is an empirical investigation on the approach for industrial cluster development of the Singapore maritime cluster, using the case study research methodology. The case study approach leverages on multiple sources of evidence from deep interviews (of 24 Singaporean firms and 13 Norwegian firms) related observations, documentation and archival records. As a means of contributing to the cluster renewal process, Singapore as the country embarks on the next stage of maritime cluster development, a benchmarking against the Norwegian Innovation Cluster has been incorporated.

Findings: Research findings reveals that Singapore is lacking in innovation activities that entails multi-firms collaborations and collaboration between multi-firms and research institutions. The existence of Cluster Organisation to facilitate collaborations between firms in the cluster and between firms in the cluster with research institutions is another contributing factor that are not institutionalised in the Singapore maritime cluster.

Research implications: Though the research is grounded primarily on the International Business Theory, particularly from Firm Specific Advantage (FSA) and Country Specific Advantages (CSAs) of location decisions, Economic Geography Theory and Cluster theory also complement the theoretical grounding.

Practical implications: The findings derived from this research aim to facilitate policy makers, maritime leaders and practitioners to develop effective courses of action in current and future maritime industry development.

Originality/value: The research provides value to maritime industry stakeholders, maritime leaders and policy makers in their firm positioning strategy. Thus, the research adds values to the maritime industry with similar country perspectives and firm values for developing policies.

Keywords: Cluster facilitator, Singapore maritime cluster, policy formulation, international maritime centre

Paper type: Research paper

1. Introduction

This research is an empirical investigation of the Singapore maritime cluster dynamics and the influencing factors that makes Singapore successful in attracting international shipping companies. Industrial clusters are important for the creation of economic value and the prosperity of nations (Benito et al, 2003, Porter 1990, 1998). Countries and cities continue to evaluate and refine their public policy measures to attract investments to create employment and wealth for its citizens, amongst others to ensure that the electorates will continue to support the incumbent governments, either through democratic means or avoiding dissent among its population.

The motivation of the study originates from the success of the Singapore maritime cluster being a leading international maritime centre, based on industry publications and reports from research institutions. The authors consider that Singapore's success in this area should be of interest to other policy makers and industry practitioners, in addition to its potential contribution to academic literature. The initial review of the literature indicates a gap in identifying the cluster dynamics, particularly the interaction within the cluster actors and the role of the cluster facilitators (Zhang and Lam, 2013; Pereira et al. (2020); Prakash and Ambekar, (2021); Akpinar and Ozer-Caylan (2021) and Lee et al., (2021)). This identified gap has some complimented dimension to the policy initiatives and measures in order for the Singapore maritime cluster to be recognised as a leading maritime capital (Menon Economics, 2012, 2015, 2017) and shipping centre (Xinhua-Baltic Exchange Shipping Centre Development Index, 2016).

In early 2000s, about a decade after Porter had published his famous book on "The Competitive Advantage of Nations" (1990), and further publications and articles on cluster and competitiveness in the late 90s, we have seen emerging literature on the maritime cluster competitiveness and benchmarking among different maritime clusters in Europe (Jakobsen et al, 2003, Monteiro et al, 2013). In recent years, there has been a heighten interest among stakeholders in different geographical locations, to improve the maritime cluster performance and how their own cities or

countries performed with other locations (Koliouisis et al, 2017, Doloreux 2017). This interest could be observed with the recent developments in the topic of ranking cities and locations within the maritime cluster context (Verhetsel & Sel 2009, Jacobs et al, 2011, Zhang & Lam 2013). The rankings use diverse set of indicators, with benchmarking reports produced by research organisations, economic consulting organisations, maritime industry organisation and major global consulting organisations. These international studies and publications of ranking maritime locations have garnered widespread international business media coverage, reflecting the interest of business communities on this subject, as MNEs continue to search and source for locations that will contribute to their own competence creation through their subsidiaries (Meyer et al, 2011, Mudambi et al, 2012, Narula 2014) and hence build competitive advantage by integrating the knowledge attained at its subsidiaries with its international operations (Andersson, 2014).

In the late 2000s, there are more international shipping companies establishing offices in Singapore with global responsibilities, beyond the regional coordination activities. This development coincided with Singapore's status from hub port to an international maritime centre, and the city-state started to receive top ranking in international comparative and benchmarking studies by several industry or economic publications such as Menon Economics Leading Maritime Capitals of World series starting in 2012, the Xinhua-Baltic Exchange International Shipping Hub Index since 2014, as well in academic journals (Verhetsel & Sel 2009, Jacobs et al, 2011, Zhang & Lam 2013), using different set of indicators.

The early literature on International Business (IB) focused on national competitiveness at the country level (Rugman & Verbeke, 2001; Rugman et al., 2012). The country factors were used as the unit of analysis, using national statistics on trade and foreign direct investment (FDI). Rugman (1981) considered IB's three basic unit of analysis incorporating the Firm Specific Advantage (FSA), with respect to the Country Specific Advantage (CSA) and also the firm's overseas subsidiary.

In this research, the overall aim is to understand on the influencing factors that makes Singapore an attractive location for the international shipping activities, and how it has attained its recognition as top rank in the international benchmarking of maritime capitals or shipping centre. The research question is to understand the specific cluster development approach, in particular the policy

formulation process, the actors involved in the process, and other dynamics that may have contributed to achieving the desired effect on location attractiveness.

1.1 Singapore Maritime Cluster

Among the comprehensive study conducted on the Singapore Maritime Cluster was undertaken by Wong et al (2010). The authors segmented the maritime cluster into two groups: the core maritime sectors which include the traditional water transportation sectors which is also known as the shipping sector, and the non-core maritime sectors which include marine and offshore engineering and services that support marine transportation and shipping.

Wong et al (2010) further described the conceptual framework for the development of knowledge-based industrial clusters such as the marine and offshore engineering segment. To develop knowledge-based clusters, several components needs to be in place;

- a. Establishment of public knowledge infrastructure i.e. universities and public research institutions
- b. Attracting private sector actors to the cluster, which should include both knowledge intensive firms and commercializing entities
- c. Establishing linkage with external demand markets, which entails links to overseas market, for small, open economy such as Singapore
- d. Facilitating knowledge flows and network links among the key actors within the selected clusters, especially within the private firms and the universities and public research institutions.
- e. Establishing a pro-business regulatory framework and public policies.

On the last point, Wong et al (2010) further expanded on the key role of the state in developing knowledge-based clusters. For the Singapore maritime cluster, MPA was appointed as the “champion agency” for the comprehensive development of Singapore from a primarily hub seaport to a leading comprehensive integrated international maritime centre (IMC) in Asia. The authors further described the IMC development strategy to expand from the core port and shipping activities to attract advance maritime ancillary services such as maritime insurance, finance and legal, and MPA taking a multi-agency coordination approach, involving active engagement with several governmental agencies and multiple ministries.

1.2 Location attractiveness for the maritime cluster

The benchmarking study of 5 European maritime nations by Jakobsen et al (2003) provides better understanding on the implication of governmental policy towards location attractiveness, hence the strength and development of the maritime cluster; cost of production is influenced by the governmental taxes while “the quality of the resource is affected by (government) investments in education, research and infrastructure”. Another similar research that was published a decade later, Monteiro et al (2013) benchmarking of the maritime sector in four European countries (Spain, Germany, Netherlands and Norway) identify several critical factors for the cluster success:

- Focus on the importance of the maritime cluster involving educational and research institutions, trade and labour associations, financial institutions and other private and government institutions, labour force, entrepreneurs and the public (Netherlands and Norway);
- Acknowledge the maritime cluster as an important building block of the economy (Basque Country, the Netherlands, Norway and Schleswig-Holstein);
- Create the right conditions for the maritime sector to adapt to a competitive environment that is changing continuously (Basque Country, the Netherlands, Norway and Schleswig-Holstein);
- Existence of an overall industrial policy for the maritime sector (Basque Country, Norway and Schleswig-Holstein);
- Networking/alliances/close contacts with other international maritime clusters (the Netherlands and Schleswig-Holstein).

In addition, the following areas have been identified as part of the cooperation framework among industry and other stakeholders:

- Strengthening the public/private cooperation through centers of maritime excellence (Basque Country, the Netherlands, Norway and Schleswig-Holstein);
- Accessing and sharing information on technology change (the Netherlands, Schleswig-Holstein and Norway);

- Risk sharing on the development of R&D activities and accessing new markets (the Netherlands, Norway and Schleswig-Holstein);

Singapore has not been included in the earlier maritime cluster benchmarking studies. However, recent studies conducted and published by different entities indicates Singapore Maritime Sector's success. Singapore's location attractiveness for the maritime sector had been undisputed in several industry publications such Menon's Leading Maritime Capitals of the World (ranked Singapore number 1 for the last three issues starting in 2012) and Xinhua-Baltic International Shipping Centre Development Index Report which had ranked Singapore as number 1 for the last five years since 2014. Other independent reports issued by consultancy firms such BMT Asia (2014) and Monitor Deloitte benchmark (2016/2017), have also ranked Singapore as top. From the policy formulation perspective, this article aims to examine the approach and strategies that have influenced the policy measures, the actors that have contributed to the policy formulation, and what other locational or institutional dynamics that contributed to Singapore's success.

1.3 Cluster Organisation and Cluster Facilitators

Clusters do not always develop and grow by themselves, and not necessarily at the expected speed and comprehensiveness depending throughout the cluster life cycle (Rosenfeld, 1995, Instrup, 2010). In 2009, the European Commission initiated the European Cluster Excellence Initiative (ECEI), "aiming for the development of methodologies and tools to support cluster organisations improve their capabilities in the management of networks and clusters". In 2012, ECEI established the standard on quality label for cluster organisation, by evaluating the cluster organisations and managers based on selected criteria, processes and framework of implementation for the cluster initiatives. This standard aimed to continuously improve the maturity and capabilities of the cluster organisations to achieve "Cluster Management Excellence", assigning "Bronze" for recently established cluster organisations to "GOLD" for matured organisations with more than three years, and successfully meeting the benchmarking criteria of high performing cluster organisations (Akpinar and Ozer-Caylan, 2021).

1.4 Research objective

However, there had been limited academic literature on cluster organisations, or the institutions specific to develop and grow a cluster. The concept of cluster facilitators had been used to specify the actors who engage in developing clusters. Ingstrup (2010) considers a "more precise and

holistic picture of the cluster facilitator is needed as it takes time to create the trust, relationship ties, and the atmosphere needed to establish the platform on which the cluster can develop”. The role of cluster facilitators is multifaceted, and Instrup (2010) considers cluster facilitators will have significant consequence on the development of clusters, and deeper insight will be required to determine the advantages and (potentially any) drawbacks of the defined role of clusters facilitators and its tasks. It is necessary to understand the role of cluster facilitators also from a cluster life cycle perspective and these facilitators and actors and associates within the cluster continuously improving the potential and competitiveness of the cluster throughout their life cycle (Aziz & Norhashim, 2008, Instrup & Damgaard, 2001, Ketels, 2003).

For public sector cluster facilitator, several competencies will be required such as relationship management, market understanding, problem solving skills, flexibility, trustworthiness, and holistic outlook (Instrup, 2013), with a clear understanding and insight concerning the market which the cluster targets (Younis and Sundarakani, 2020).

For innovation clusters, the cluster organisations can also facilitate links through seven innovation gaps as illustrated by Ketels et al on “The role of cluster organisations” (2012).

1. The research gap, limiting interaction between firms and research organisations
2. The education gap, limiting interaction between firms and education organisations
3. The capital gap, limiting interaction between firms and financial organisations
4. The government gap, limiting interaction between firms and public bodies
5. The firm-to-firm gap, limiting interaction among firms
6. The cross-cluster gap, limiting connections between firms in one cluster and another
7. The global market gap, limiting connections between cluster firms and global markets

Therefore, the research aims to assess the role of various cluster facilitators as well as the interactions between them contribute to Singapore’s location attractiveness. The study advocates that industrial cluster development requires conscious effort by several stakeholders and actors for the cluster to be successful in achieving the cluster aims and objectives.

2. Literature Review

The literature review starts with early studies on the topic of strategy followed by Porter's literature, including his famous books on strategy, "Competitive Strategy" (1980) and "Competitive Advantage" (1985). Porter has shaped the approach to strategy by producing a considerable number of articles where he was the author, co-author or editor of 17 books and more than 100 academic articles (Stonehouse & Snowden, 2007).

To ensure a longer term and sustainable development of the maritime cluster, Shinohara (2010) argues that strong governmental support is necessary at the initial stage to incubate each industry segment within the maritime sector. It is probable that this requirement is true for Japan and other nations that intend to develop their maritime clusters. In the case of Scotland, lack of government support or intervention through a comprehensive maritime policy and implementation has been observed by Baird (2005) as a barrier to promotion of shipping as the preferred mode of economic transport.

Recent years, the discussions on maritime clusters have extended to the evolution of global maritime cities in different continents and geographies. Maritime cities are locations with strong interconnectivity with other maritime cities (Verhetsel & Sel, 2009). The location of maritime cities has grown from coastal developments such as New York to a thriving financial and business hub. However, Verhetsel and Sel (2009) indicate that over a period of time, the location port infrastructure and activities may not be a necessary condition for a city to be classified as a global maritime city. London has been mentioned as a prime example since it has entrenched its strong position in maritime activities even though it now has a very limited port infrastructure (Akpinar, and Ozer-Caylan, 2021). The recent literature on maritime cluster evaluation and location attractiveness is mapped in Table 1 below.

[Table 1 placeholder]

As it is identified that most of the literature focusses the need of the initiatives include promoting R&D through developing a public R&D infrastructure, investment promotion, workforce development, and overall maritime infrastructure (Jacobs et al., 2010, Jakobsen et al. 2003, Othman et al., 2011)

To provide a world maritime city perspective, researchers have applied the methods of the Globalisation and World Cities Study Group & Network (GaWC) but have included other criteria to identify the top maritime cities in the world. Verhetsel and Sel (2009) used additional factors such as presence of container shipping companies and container terminal operators. Jacobs et al. (2011) claim that the presence of ship owners and port related industries have a stronger relationship with strength of the maritime cities, and less with the cargo flows through the ports. Jacobs et al. (2011) suggest locations identified as world maritime cities has strong relationship with the number of Advance Producer Services (APS) specifically for the maritime sector such as marine insurance, ship financing, maritime legal services, ship brokers, maritime consultants and classification societies.

The clustering of advanced maritime producer services in the world maritime cities has been evaluated by Zhang and Lam (2013) using dynamic symbiosis derived from maritime cluster evolution. The interactive relationship among the different parts of the maritime sector has been further analysed using the Lotka-Volterra model by grouping the revenues of maritime sectors into pairs and then further grouping the pairs into several comparative pairs. The authors introduce symbiosis theory in biological science to the study of maritime cluster from the economic development perspective (Zhang and Lam, 2013). Another form of the Lotka-Volterra model has been applied in Singapore logistics study by Sundarakani et al. (2019) where a two-species system behaviour of small and medium logistics service providers (SMLSPs as the prey) and the lead logistics providers (LLPs as the predator) are gauged according to the firm size in Singapore context in which significant portion of maritime industry have been considered. Table 2 provides a summary of the ranking of world cities using different research methods, in which the maritime cities were then categorised into international maritime service centres.

[Table 2 placeholder]

The commonalities from the above Table 2 classification indicate that the top maritime cities are London, New York, Hong Kong, Tokyo and Singapore. Out of these five maritime cities, only Hong Kong and Singapore are ranked among the world top ten ports based on containerised cargo that flows through the ports. These observations re-affirm the assessment of Verhetsel and Sel (2009) and Jacobs et al. (2011) that port activities may not be the central driver for recognition as a world maritime city.

Singapore has been identified as one of the top three leading maritime cities in the world (Verhestsel & Sel, 2009) based on the presence of container shipping companies and container terminal operators. This strong global position was re-affirmed by Jacobs et al. (2010) when evaluating the location of headquarters for maritime companies; Singapore has been ranked second behind London. Singapore's strength as an important command centre for Advanced Maritime Producer Services (AMPS) is partly because it is a large port in terms of throughputs (Wong et al., 2010). This assessment of Singapore has been reaffirmed in reports presented by various maritime specific entities, such as the Xinhua – Baltic Exchange Shipping Centre Development Index (2016) that ranked Singapore as the top international shipping centre. Hence, it further re-affirms the reason to further investigate and develop a deep understanding of the development of the Singapore maritime cluster to its premier position.

2.1 Review on Innovation System and Innovative Cluster

Earlier, Freeman (1987) introduced the term National System of Innovation from research of Japan as an economic superpower. Lundvall further highlighted the importance of social interactions within society, and between customers and suppliers in pursuing innovation in Denmark (Lundvall, 1992, 1998). Thereafter, the terminology of National Innovation System (NIS) was developed, which has some overlap with Freeman's National System of Innovation. The terminology includes network, relationship, private and public institutions that interacts, initiate, diffuse and modify technologies within the border of a nation. Cooke and Schienstock (2000, p 267) defined the Regional Innovation System as "geographically distinctive, interlinked organisations supporting innovation and those conducting it". This definition is consistent with the case study by Lawson and Lawrence (1999) for Cambridge in the UK and Minneapolis in the US, suggesting that the success of the regional innovation system needs to ensure continuity of what had been reproduced earlier, and transmitting the shared knowledge to the wider ecosystem. Similar findings have been found by Maurseth and Verspagen (2002) for Multi-National Enterprises (MNEs) in the central European countries.

Since the early 1990s, regional economists and economic geographers have increased awareness of innovative ecosystem and established that economic performance differs across regions that are interlinked and dependent on relatively immobile resources. These are knowledge, skills, institutional and organisational structures (Martin & Sunley, 1996) and related infrastructure for

entrepreneurship (Van de Ven, 1993) such as scientific and technological research, financing and insurance, and consumer demand. Marshall was one of the first economists to analyse the role of innovation within the context of location during the nineteenth and early twentieth century (Asheim et al., 2011). The role of government policies that aim to increase the innovatory capacity of a country is an important influence on MNEs as they create and locate their innovation activities (Dunning, 1994; Pinch et al., 2003). The study of Baptista and Swann (1998) of innovative activity of 248 manufacturing firms in the UK, re-affirms that firms within a specific geographical cluster are more likely to innovate than are firms in different geographical clusters. As these developments were unfolding, policy makers started giving technology, such as establishing science parks, venture capital and financial innovation support schemes, a prominent place in their policy measures (Breschi et al., 2001).

On the other hand, public innovation systems within the European regions are not competitive when compared with the private system in operation within the United States (Cooke, 2001). Porter (2001) re-emphasised that companies that introduce and commercialise innovation, even though the location innovation infrastructure sets the basic conditions when analysing different locations and regions, produce starkly different innovative performance. The research highlights that the significant innovative output of Israeli firms is derived by more than how its firms manage technology, but is also dependent on strong university-industry linkages and a large pool of highly trained scientists and engineers. Using Porter's (1990) Diamond model, the innovativeness of MNEs within a location can be referred to as dynamic advantages and MNEs benefit even though the location has a higher cost of factor conditions and small home demand (Solvell 2015).

The above has implications for MNEs location decisions about knowledge intensive and innovation activities. Silicon Valley has been the innovation cluster for Info-communication Technology (ICT) for several decades (Almeida and Kogut, 1999; Klepper, 2010; Reve et al., 2012) and Singapore has established itself as a biomedical science cluster attracting a considerable number of subsidiaries from large pharmaceutical companies (Wong et al., 2010). For MNEs, location choice requires firms to make choices which will also depend on the organisational structure of innovation activities (Leiponen & Helfat, 2011). Although the Triple Helix has contributed to the success of some knowledge intensive clusters such as the BMS, the intensity of R&D of public research institutions in a location may not be a determinant of innovation of manufacturing

activities (Love & Roper, 2001). This is highlighted by Lorenzen (2005) who argues that innovation and knowledge coordination and transfer, although a predominantly local phenomenon within a cluster, depends on reputation and social trust. For emerging countries MNEs, Elia and Santagelo (2017) explain that because of the weakness of home country National Innovation System (NIS), emerging country MNEs go beyond establishing a subsidiary for knowledge seeking purposes and acquire firms in stronger host NIS to accelerate their own technological capabilities to compensate for the weakness of the home country. Clark & Ramachandran (2019) suggest that there are much to explore on the type of opportunities that the subsidiaries of MNEs could create in the host country within the area of subsidiary entrepreneurship. These arguments warrant the research to assess the host country innovative competitiveness further.

2.2 Theoretical background

Further review on exploring the theory strengthens our understanding of the theoretical basis of the current research. It has also offered several additional theoretical insights for further development. These various elements have been considered and consolidated into an overall theoretical perspective for the present research. Following sections illustrate the main conclusions arising from the literature review. Firstly, this research is anchored in the international business branch of MNEs location decisions and value-creation of MNEs' subsidiaries. The Firm Specific Advantage (FSA)-Country Specific Advantage (CSA) framework (Rugman, 1981) has been applied to understand a firms' behaviour about international expansion outside the home country. Although the Diamond model has had significant impact on country competitiveness, Jakobsen et al. (2003) adapted this model for the maritime cluster and introduced the "Attracting the Winners" model. Figure 1. below is the theoretical framework developed by Jakobsen et al (2003) on relationship between Public Policy and country attractiveness.

[Figure 1 placeholder]

According to Jakobsen et al (2003), "the maritime companies consider a broad spectrum of factors in their location choices". Different segments of the maritime sector place different emphasis on the location decision, for example ship-owners consider tax level in a location as extremely important, whereas the shipbuilders and marine equipment manufacturers give higher importance to cluster factors. This model was applied in the study to benchmark five leading maritime nations in Europe to assess their location attractiveness. The key elements of the proposed model presented

in Figure 2, that highlights the importance of policy measures to ensure long-term industry performance.

[Figure 2 placeholder]

The literature review also served to establish key questions to take forward into the empirical studies, specifically focused on the intersection between theory and practice. Firstly, although there is a theoretical basis on the topic of cluster theory and public policy, the popularity and application of cluster policy is “by no means a guarantee of its profundity” (Martin & Sunley 2003, pp 5), and Fornahl & Hassink (2017) stated that the scholars and academic are divided on the benefits of clusters and their use in public policy. There is a need for better understanding on the real and changing rationales of cluster policy, and the need to consider on the institutional framework and role of actors within cluster development life cycle (Fornahl & Hassink, 2017). The outcome and application of the literature review can be illustrated in the following Figure 2:

[Figure 2 placeholder]

This research gap raises the question on the process of Singapore maritime cluster transforming from a hub port to a world leading International Maritime Centre. The question focuses on Singapore maritime cluster approach to public policy measures and explore other factors that may have contributed to its top ranking in various studies conducted by industry publications such as Menon Economics’ Leading Maritime Capitals of the World publications and Xinhua-Baltic Exchange Shipping Centre Development Index. This leads to the second question on the role undertaken by cluster actors in contributing to Singapore maritime cluster location attractiveness. This question focuses on identifying the main actors and the interactions between the actors. The third question is an extension to the main study, being forward looking as Singapore has decided to start a new transformation journey to be a leading centre for maritime innovation, and how the Singapore maritime cluster should adapt to achieve its new goal. This involve understanding of the Innovation Cluster through a case study approach focussing on the cluster framework including the institutions and role of cluster actors. The local environmental conditions where the subsidiaries operate is an important factor for the MNEs subsidiaries to create innovation that will benefit the host country as well as the MNEs global innovation capabilities (Pereira et al., 2020).

The research gaps are summarised as follows

- Discussions on location attractiveness are primarily focus on policy measures but limited research on the role of cluster actors
- Limited discussions on the role of cluster facilitators and their contribution to location attractiveness
- Deeper understanding required on cluster facilitators relationship with cluster life cycle

3. Research Methodology

Shipping was among the most highly mobile business within the maritime sector and compared to other service and manufacturing industries (Jakobsen et al. 2003). Traditionally, shipping has been centred around London, and the maritime capitals of other leading maritime nations such as Hamburg, New York, Rotterdam (Jacobs et al. 2010), and the nations are competing to attract international players and make its company competitive through various mechanism to increase its competitive advantage.

This research utilized the case study method which provides an in-depth understanding of contemporary issues (Ghauri and Gronhaug, 2005, Yin 2009) and 24 interviews in Singapore that yielded direct quotations from people about their feelings, opinions, knowledge and experience (Mason, 2002, Patton, 2002). The focus was on examining the policy formulation process, the actors involved in the process, and other dynamics that contributed to achieving the desired effect on location attractiveness. To address these issues, the thesis was designed as an exploratory approach within the conceptual framework between public policy process and actors within the (shipping) segment that the policy was intended to benefit, leveraging on the framework that was adapted from Jakobsen et al 2003 (below figure 3) :

[Figure 3 placeholder]

The data collection process involved (as shown in Figure 4) the primary research using interviews, and secondary research by reviewing the annual reports of the various organisations, research through the organisations' websites, news article from the primary media outlet in Singapore both print and online, and articles published in industry magazines.

[Figure 4 placeholder]

3.1 Participants

The research employed a purposive sampling approach to identify the required data sources, to answer the research questions. The interviewees consist of decision makers within their respective organisations. The selection of the different group is based on the following;

- i. MPA's segmentation of the maritime cluster into four sub-clusters which consist of different components within the maritime sector (Wong et al, 2010)
- ii. The different pillars of the maritime cluster (Jakobsen et al 2003, 2017)
- iii. One group consisting of foreign owned shipping companies as they were within the top pyramid of the maritime value chain and considered to be highly mobile. Another group consisting of Advance Maritime Producers Services (AMPS), and other knowledge-based maritime activities such as maritime technology companies. The second group is also mobile and non-location-bound. The third group was location-bound maritime activities such as the port and marine engineering (shipyard and marine equipment). The 4th group representing the maritime industry association as they were considered as key actors within the Maritime eco-system in Singapore.

3.2 Sample Preparation and Data collection

The data collection process involved the primary research using interviews, and secondary research by reviewing the annual reports of the various organisations, research through the organisations' websites, news article from the primary media outlet in Singapore both print and online, and articles published in industry magazines. There are two rounds of interviews, the initial interview was conducted in 2016, and the subsequent interview was conducted in 2018. In addition to the formal interviews, the data collection consists of industry observations and informal interviews during the field research. The preparation process for the data collection involves several different areas. These include reevaluating the conceptual framework to identify the different areas that should be explored, identifying the different stakeholders within the maritime cluster and sub-clusters, the different focus or type of questions or emphasis for different stakeholders, the companies and organisation that the interviewer has access to, whether directly or indirectly.

[Table 3 placeholder]

The target group for the initial interviews is to identify potential entities and interviewees (Table 3) within different component of the maritime cluster. The main intention is to attain an initial overview of the interviewee's perception of the Singapore maritime cluster, the competition and interactions with relevant stakeholders in other parts of the Singapore cluster and key challenges. The data analysis from the initial interviews indicated that the process should be limited to few questions, but the need to go deeper. Thereafter the subsequent interviews aim to solicit the interviewees (Table 4) perspective of the evolution of the Singapore Maritime Cluster in the past 5-15 years, the policy measures and initiatives undertaken by the government as well as the role undertaken by the key stakeholders in Singapore, particularly MPA, SMF and SSA.

[Table 4 placeholder]

3.3 Interview Procedure

The primary data gathering using interviews are conducted through face-to-face meetings at the interviewee offices, or sometimes at another designated location such as during maritime industry events. Some of the interviews were conducted over skype or phone, and occasionally with follow-up clarifications using electronic mails.

A semi-structured interview process had been used to solicit feedback in a structured manner, but at the same allowing free flowing discussion about the perception of the interviewee, their experience, reflection and stories. Most interviews lasted between 45 minutes and an hour. However, some of the interviews lasted for almost 90 minutes as the interviewees had a significant amount of experience within the maritime industry and the interviewer did not interfere to cut short their response. Even though the interview guide was prepared (Table 5), but in most cases, it was only used sporadically to allow the interview process to be free flowing and flexible. Some questions were modified to fit well and additional new questions were developed based on the themes that had emerged from the phase I interviews, as well as the literature that was being reviewed further.

[Table 5 placeholder]

3.4 Data analysis

The interview transcripts from the primary data gathering had been uploaded to the NVivo software. The data has been coded and categorized based on topics and key themes and elements identified in the conceptual framework. The data analysis process also allowed emerging themes to develop in a systematic process. A general inductive approach had been used for analysing the qualitative data. This approach provided a simpler but yet “systematic set of procedures for analysing qualitative data that can produce reliable and valid findings” (Thomas, 2006). There were several important steps being applied when using this approach, as the method described by Thomas (2006): Condense extensive and varied raw text data into a brief, summary format, Establish clear links between the research objectives and the summary findings derived from the raw data to ensure that these links are both transparent (able to be demonstrated to others) and defensible (justifiable given the objectives of the research), and Develop a model or theory about the underlying structure of experience or processes that are evident in the text data.

3.5 Secondary Empirical Data

Hakanson (2005) indicates that the only empirical strategy that may help us to get a better understanding of the cluster growth and the emergent of industrial agglomeration is by way of longitudinal studies of cohorts of firms, professionals and entrepreneurs, though we need to keep in mind that the influences for individuals and firm differs. This research analyses the firms level data for new shipping companies that have been established in Singapore over a period of 20 years, from 1995 to 2015, using the IHS Fair play database, which is an authoritative database source for the maritime industry, linking of ships as a legal asset. The findings are discussed in the proceeding section.

3.6 Benchmarking with Norway

In order to extend the content validity and reliability of the data collected, we extended our interview approach by benchmarking with Norway. Because Norway has been recognised as a globally leading cluster in the maritime industry, a through cluster policy renewal would be approach to benchmark with Norway, as it has developed at high speed on maritime innovation (Fornahl & Hassink, 2017).

[Table 6 placeholder]

In addition, selected stakeholders (partners and board member within the respective clusters) were interviewed. The four maritime clusters are: 1. Maritime Blue in Aalesund, 2. Subsea in Bergen, 3. Seafood Innovation in Bergen and 4. Maritime Cleantech in Stord Island. Similar to the interviews conducted in Singapore, the researcher considered the data collected for the interviews in Norway to be extensive and of good quality as the interviewees were very candid and willing to spend additional time with the researcher. It was observed that data saturation was occurring, as the interview candidates started to re-iterate similar information to earlier interview candidates from the ninth or tenth interviewees. The researcher concluded that further interviewing was not required to complete the data set when reaching to the tenth or eleventh interviewees.

4. Findings and Discussion

The results indicated the key role undertaken by the Singapore MPA working closely with Singapore Shipping Association (SSA) and Singapore Maritime Foundation (SMF) in the formulation of favourable public policies to make Singapore an attractive location for foreign MNEs, in particular the international shipping companies, to establish their headquarters or operations in Singapore.

4.1 Cluster Dynamics

The cluster dynamics in Singapore show strong linkages between the actors in the cluster. MPA has taken a strategic decision to focus on the international shipowners to come to Singapore. This follows the Norwegian original model of having Shipping as the core of the maritime sector Reve (2009);

This perspective has been re-affirmed by a senior shipping executive;

..... “The policy to use beehive philosophy has worked. The core of the beehive is the shipowner. Once you have them the ancillaries – which are the bees such as bankers, equipment makers, service providers all will come” (S2017/06)

The above observation of other advance maritime service providers (AMPS) being established in Singapore attracted by the presence of shipping companies shared by another expert:

..... *“In early 2000s, there are not as many shipping companies or maritime services operating in Singapore. Furthermore, there are also limited maritime talents and research entities. Currently, there are more industry players as well as much wider range of players in Singapore” (S2017/04)*

Jakobsen et al (2003) describes the complementarity within the cluster dynamics such that the “growth and establishment of new companies give critical mass and realisation of investments and business ideas”. He further iterated the complementarity within the cluster dynamics will contribute to self-reinforcing growth. This includes having economies of scale, and within the Singapore’s maritime cluster context, the economies of scale by having multiple customers for the Advance Maritime Service Providers to establish an office in Singapore as compared to serving the clients based in Singapore from their HQ such as in Europe or from other locations. This point had been elaborated by one of the participant working in a large global Advance Maritime Producer Services:

..... *“In Singapore for 6 years and I observed that another day in Singapore comes a new opportunity. It is important to build relationship, which will be monetized in due course” and continue with the following input “Initially the business visitors come to Singapore once or twice a year, and subsequently increasing the intensity to 3-4 visits a year. Subsequently, when they become more aware on the business activities and what they are missing out, companies started to have on-site presence to keep themselves updated on the market development. It needs to have permanent local presence all the time so that it continuously engaged with the opportunities. It suddenly overtaken by events with competitors start to have own offices in Singapore as the number of clients located in it Singapore starting to increase” (S2017/05)*

4.2 MPA’s IMC Development role

MPA’s primary role is to regulate the maritime sector including taking up the role of maritime administrator. In this regard, it was given the responsibility to enforce the regulations that had been agreed by the International Maritime Organisation. Other countries have similar organisations such as the Maritime & Coastguard Authority (MCA) for United Kingdom, Norwegian Maritime Authority (NMA) for Norway, and the United States Coast Guard (USCG) for the United States of America (USA).

However, in Singapore, MPA takes another key role as the lead agency for the development of Singapore into an International Maritime Centre (IMC). The focus on positioning and developing Singapore into an IMC is taken very seriously by MPA to an extent that it had assigned the individual responsible for this role the job title of Assistant Chief Executive with four different divisions reporting to this role. This finding has also been compared with the organogram of MPA. On the left-hand side of the organogram in orange colour, is the traditional role of port and maritime administration, establishing and enforcing rules and regulations to ensure safety in navigation, and smooth movement of ships, as well as the maritime security. As the Port Industry Regulator, MPA is responsible for issuing and regulating the license for the port and marine services and facilities.

On the right-hand side (green colour) in the organogram, reflects the MPA's IMC Development role. In this role, MPA's work with other governmental agencies and maritime industry partners (such as SMF, SSA) to attract international shipowners, ship managers and operators to set up their operations in Singapore, as well as improve the overall business environment for the maritime industry. As shown above, there are four different divisions to support this role, with each division staffed by senior resource holding the position of Divisional Director, reporting to the Assistant Chief Executive.

The extensive structure and resources allocated for the IMC's Development role was significant. One of expert cited that... *"MPA has done a great job in both regulatory role as well as industry promotion role"*.

Another expert further strengthened this observation that MPA had taken an additional and different focus by investing resources and capabilities on the IMC development role.... *"initial focus was to make Singapore into a hub port by building its capabilities within the port operations, and continuously updating and improving the regulations to make Singapore competitive. However, the government realized that primarily focusing on the port and improving the regulations will not be sufficient. Subsequently MPA started to focus on making Singapore as an International Maritime Centre"*. (S2017/07)

4.3 Singapore Maritime Foundation role

The Singapore Maritime Foundation (SMF) being established as a private sector-led body had been considered as a voice representing the maritime industry in Singapore, both locally and internationally. Its members cover the different spectrum of the maritime industry, and the Board of Directors consist of the top leaders of the maritime sector chaired by Mr Andreas Sohmen-Pao who is the Chairman of BW Group (major international shipping and offshore group). SMF takes a unique position as the bridge between the Singapore Government and the private sector (in the maritime industry), taking active role to initiate ideas and proposals to make Singapore into a premier International Maritime Centre.

.....“Industry associations plays a very important role as the place for the exchange of ideas, interactions between public and private entities – constants and continuous feedback channels both ways. The industry association such as SMF was leading the initiatives on talent development, working closely with all stakeholders, coordinating between industry needs, universities, developing incentive programs to promote courses for the maritime industry with sufficient funding, scholarships”. (S2017/04)

One of SMF focus areas is industry and public outreach program, and this includes student outreach as well as maritime education and training. SMF facilitated and administered the establishment of scholarship sponsored by various maritime industry partners to attract some of the best minds to join the industry.

The Board of SMF sets the direction on the industry promotion and initiatives, and it also taps the experience of members of the SMF Advisory Panel, consisting of seasoned professionals and practitioners in the local and global maritime industry.

One of most important achievement of SMF to position Singapore as the premier International Maritime Centre was its ability to be included in the world renowned BIMCO time charter form (NYPE 2015). The inclusion of Singapore as the place of arbitration (in addition to New York and London) in accordance to the Arbitration Rules of the Singapore Chamber of Maritime Arbitration (SCMA) was a significant recognition of Singapore’s position as a recognised maritime legal location globally, in the same category as the well-established international maritime legal centres

in London and New York. This achievement had been described by one of the expert with the following quote

“The activities and roles undertaken include promoting Singapore as the place to conduct business such as a dispute resolution centre, establishing the use of Singapore Ship Sale Form, and positioning Singapore’s brand name in documents used for international business such as the ASBA and BIMCO Time Charter contract. This also includes SMF logo for NYPE 2015 which produce a charter party document that reflects modern and current commercial practice and legal developments for the maritime industry in a clearly worded, comprehensive and balanced form “(S2017/07)

The role undertaken by SMF is unique, by continuously providing input and feedback to the government to constantly improve in making Singapore to a premier International Maritime Centre. One of the expert described on the role undertaken by SMF as the highly effective bridge and interface between the industry and MPA as well as the other governmental entities....
“Organisations such as SMF which receives the budget from MPA have the capability to perform various projects, bringing people together not just for the industry players but also the governmental bodies/ministry. The industry associations are also accessible to anyone coming to Singapore” (S2017/08)

4.4 Singapore Shipping Association role

The Singapore Shipping Association (SSA) represents a wide spectrum of shipping companies and other business entities that are closely related in their activities to the shipping sector. It was considered as a national trade association formed to serve and promote the interest of its members, and it had also included additional role to enhance the competitiveness of Singapore as an International Maritime Centre.

For its role to position Singapore as an IMC, SSA had made significant achievement in the marine insurance sector. Through the initiative of its members, SSA had launched the Singapore War Risk Mutual, a marine insurance product that is unique for a young maritime nation, for the benefit of ships operating the Singapore Flag (members of SSA). One expert shared the experience

..... *“The ability for the entire maritime industry to adapt and improve to make Singapore competitive. For example, in areas that MPA as a governmental body will not be able to execute,*

SSA as an industry association will work as a coherent and strong team to take the necessary initiatives. One of the most recent initiative undertaken by SSA is the introduction of the Singapore War Risk Mutual in 2014/2015. The idea was first mooted by SSA with the aim of strengthening Singapore's offering in the marine insurance sector. It now joins the rank of other maritime nations such as Greece and Norway in having its own dedicated war-risks facility" (S2017/11)

The SSA taken significant role to provide input to MPA and other governmental related entities to make Singapore competitive within the shipping sector. Figure 5 below is the structure of SSA Council which consist of top leaders of shipping and shipping related companies in Singapore. The SSA has eight operational committees focusing on different key elements or components of the Singapore Maritime Cluster such as marine fuel (as Singapore is the world largest ship bunkering port). The Council and the activities of the eight operational committees were being supported by fully a resourced SSA secretariat led by an Executive Director with twelve other support staff (working full-time).

[Figure 5 placeholder]

The output of SSA's eight operational committees provided significant contribution in constantly submitting recommendations to MPA and other governmental related entities to make Singapore competitive by removing impediments to the shipping business. One of the expert provides some insights

..... *"SSA works very closely with SMA (Singapore Maritime Academy) and SMF. Singapore is already number one but the people in these associations do not rest on their laurels" (S2016/07)*

The recommendations made by the SSA's operational committees were being taken seriously by MPA. By continuously receiving feedback and inputs from SSA, through the SSA council or operational committees, MPA made refinement to its policies or introduce new policy measures or initiatives to make Singapore competitive and attractive location for shipping companies to expand its activities or relocate from other countries. This view is being supported by an expert

..... *"SSA is working very close with MPA to provide industry inputs and feedback with regards to the issues, challenges and opportunities within the industry, which MPA will then develop new*

initiatives and programs from these feedback or channel upwards to the relevant government ministries”. (S2016/09)

National trade associations tend to focus on making its members competitive, and this could mean protecting its members from external competitions. It is worth to note that the President of SSA, Mr Esben Poulsen is non-native Singaporean, and sizeable portion of the Council members are MNEs with corporate headquarters outside Singapore. Therefore, SSA do not operate for the benefit of indigenous companies in Singapore even though it is established as a national trade association.

As SSA members represents all players of the shipping community in Singapore, the feedback to MPA provide an enormous contribution to develop policy measures that pro-business initiatives to make Singapore an attractive location for the shipping business, for local entities as well as international players. Following quotes from the interview participants reiterate the key role of SSA and other maritime industry associations in Singapore;

..... “without them communication will be scattered. MPA is taking the association very seriously and listen to them” (S2017/01)

..... “These associations are driven by self-motivated and energetic leaders even though its non-paid job” (S2017/02)

..... “The representatives or appointed holders in these associations are dominated by non-Singaporean, operates at highest level of professional” (S2017/04)

..... “SSA has taken a very active role, constantly informing and educating the industry stakeholders. SSA has been very visible, and no other countries has similar organization that are visible or proactive, not even in London” (S2017/11)

4.5 Integrated approach of the three cluster facilitators

The overall feedback loop from SMF and SSA to MPA’s Development unit for policy refinement and development to make Singapore an attractive location for shipping companies could be illustrated below Figure 6. Overall, the SSA has performed several key roles of a Cluster Organisation as a bridge builder and closing the gaps as described by Ketels et al. (2012); The

government gap, limiting interaction between firms and public bodies, secondly the firm-to-firm gap, limiting interaction among firms.

[Figure 6 placeholder]

4.6 Company Competitiveness

For the firms operating within the Singapore maritime cluster, there are various policy incentives to increase competitiveness. Below is a senior executive describing how the maritime companies have benefitted from the policy measures:

“Initially, the Singapore government introduced the Approved International Scheme (AIS) sometime in 1989. The international ship owners were invited to Singapore. Torm was established in 2003-2004. At that time, there were around 30 (shipping) companies. In the 15 years to now, there are about 130 (shipping companies). These are truly international shipping companies with good domestic ship owners based here now, which was not there when it all started” (S2017/06)

Another expert was very enthusiastic with this response on the policy measures:

“Fantastic development, MPA and the other Government entities have taken initiatives such as providing subsidies, grants, which has invigorated interest in Singapore” (S2017/05)

Another senior executive shared why he considered Singapore to be a competitive maritime cluster:

“Singapore has all the moving parts of a maritime centre. It has a friendly tax environment, which is competitive. The government is pro-business” (S2017/06) and he continued, “Singapore is extremely efficient, with business friendly and long-term policies. People can rely on the policies that provide stability. The policies will be tweaked, depending on business environment, such as port dues discount. Such initiatives are helpful... The authorities are aware of the difficult times facing the industry and it will do what it takes to support the industry”

Based on the evidence from the interviews, documentation and observations, the consistent feedback from the study pointed towards the introduction of multiple initiatives over the years to enhance the competitiveness of the shipping companies operating in Singapore. The proactiveness of the MPA to introduce regulatory measures beyond just the tax policy is considered one of the

key attractiveness of Singapore as the regulatory environment “affects both the quality and price of the resources” (Jakobsen et al., 2003, pp237) The following two examples showed the initiatives undertaken by MPA to increase the MNEs’ competitiveness based on the industry feedback.

To support the talent development for MNEs’ internationalisation’s ambitions, MPA introduced the Global Internship Award program in 2013, committing 2 million Singapore dollars for undergraduates to experience the global nature of shipping, spending 6 weeks overseas with all the travel related expenses fully paid by MPA. Jakobsen et al. (2003) considers conquering international markets is an inherent ambition for most MNEs to utilise the economies of scale and to capitalise on strategic assets

Another initiative that MPA introduced to increase the competitiveness of MNEs operating in Singapore was to commit 200 million Singapore dollars in 2003 for the establishment of the Maritime Innovation & Technology (MINT) Fund. MPA further enhanced the MINT Fund with the expansion of the Fund’s focus areas to incorporate emerging technological developments, in addition to committing a further 50 million Singapore dollars. These enhancements were in response to industry feedback, and it also placed greater emphasis on translating R&D outputs into applicable products and solutions for the MNEs, as “Investments in R&D are perceived to be necessary to keep up the MNEs’ competitiveness” (Paul Stoneman, 1995 as cited Jakobsen et al., 2003). In order to validate our findings, we compared results with the findings of Norway and discussed as below.

4.7 Findings from Norway

Unlike Singapore, the Norwegian public policy framework was not focused on attracting foreign entities. Instead, it focused on increasing the competitiveness of the local entities by investing in the public research institutions, higher education and comprehensive research and innovation funding arrangements. This was how one of the experts described the key objective of public policy:

“The other thing is that the Norwegian government has never been concerned about being attracted. They have been concerned about having a competitive policy framework, but basically for the companies that are operating in Norway, of course, there have been a lot of foreign-owned companies, but that's primarily based on acquisitions, not on green field investments” (N2018/01)

On the other hand, the policy is considered transparent and applicable to both the local entities and foreign entities:

“A level playing field is very important in Norway and we are concerned about not discriminating foreign companies, but we have never had a strategy for attracting companies” (N2018/07)

This created positive result in a unique way with foreign entities acquiring local entities in Norway, making them much larger. As described by the same expert:

“But what we are seeing instead is that there have been a lot of small, medium sized companies that have been bought by foreign companies, and then they have been built up to become quite large companies, like for example, National Oilwell Varco, that became, by far the largest drilling equipment company in the world” (N2018/07)

The government also solicits feedback from the industry when it considers a need for new policy directions. An expert shared an experience in 2009 after the Lehman Brothers financial crisis when the shipping and other industries were in a difficult situation:

“When the government wants to change, or set a direction they are inviting the industry to contribute, and, and what we did in Maritime 21, which is maybe one of the projects which you could have a closer look at. That was, to interview the industry and ask, what do you as an industry need for us to be the most competitive country in the world in regard to maritime competence, and to be a leader export country for maritime components, competence in the 21st century?” (N2018/13)

In addition to engagement with the industries, the public policy framework creates the environment for application of new technologies to encourage smaller companies to develop. The smaller companies continue to grow, including companies that have been acquired by foreign entities, as described by another expert:

“It was a locally owned company by the Ulstein family. That was bought by Rolls Royce and invested heavily. So in that sense, I'm not really sure if it's been the intentional strategy. I don't think so. But, it has at least worked in that way, that we have had a very good environment for creating innovative technology, being very innovative, and there have been a lot of small,

medium sized companies that have grown with their own technology, then that have been bought by foreign entities” (N2018/02).

The government’s approach has been perceived by several experts as supportive and ensures a level playing field in the industry for both local and foreign entities. It provides the necessary support for research and innovation but it is the industry that comes together to create the opportunities, as described by another expert:

“We, we don’t wait for the government. We expect the government to help us to remove the barriers we need to have removed to compete, and we also help, we expect the government to ensure that the school system, the educational system and the funding for the basic needs of research and education system is taken care of. They should help to open doors, they should help to facilitate, but of course we have to do the hard work our self” (N2018/07).

Another expert considers the success had been due to strong collaboration among the players within the eco-system in Norway, and this had been facilitated by the Norwegian government’s cluster program. This approach resulted in cohesiveness of different industries in Norway, and the different clusters working together to generate new ideas or products and solutions. This was how one of the experts described the collaboration:

“Maybe one of the most important effects of the cluster program has been cluster to cluster collaboration” (N2018/07).

Another expert concurred with this important observation on industry collaboration:

“They have stimulated collaboration and strengthened collaboration. But the really added effect of the cluster programs has probably been in two areas, one is the cluster to cluster, as I said, because the clusters are complimentary. Not just the maritime clusters, but the different types of clusters. So different types of industrial areas that they're operating in, have found things to collaborate about” (N2018/09).

The expert elaborated further that the collaboration extended to universities and public research institutions; *“The other is the linkages between the companies and the regional research and education institutions. Probably most important there is that the companies have either made*

their education research institutions stronger, or more relevant, or both, through the collaboration” (N2018/09).

4.8 Cluster competitiveness

The size and completeness of the cluster provides a critical mass for agglomeration that will facilitate benefit as it will attract knowledge workers to alternative employment (Marshall, 1920), and knowledge spillovers (Jaffe et al., 2003; Frenken et al., 2007). It will also provide assurance for investors because of better assessment of overall cluster strength and talent availability to conduct activities in the cluster (Reve et al., 2012). One of the experts shared his view on all services required by ship owners available in Norway:

“when I took my education, one of the professors he said it this way, that please have in mind there students that when people ask why is Norway unique in shipping, I think the reasons is that if you want to build a ship anywhere in the world and say that I want everything to be delivered from the same country not many countries are able to say that I can deliver actually everything from my country. So, the fascinating stuff here is that, exactly like you say, you can have all the hardware, all the software, the people, the money, the companies, the finance, the bank, the legal, education. And not only technical education but also economic, logistic, legal, shipping, lawyers and everything. All of that has been kind of a national delivery. Yet it’s not coming from one city alone, it is coming from the nation, it is not coming from one geographical area alone, it is coming from the country.” (N2018/12)

The expert then expanded on why Norway had a comprehensive complement of maritime stakeholders and service providers, including global leaders in maritime finance:

“But the fact that all of them are located in Norway means that all of them need financial services, which is why we have some of the strongest banks in this. All of them will need legal advice, which is why we have an education system and the companies to provide them. And that mean that some of these service companies and service suppliers are the ones really, we are working with all of them and that mean that we see the best and we have an opportunity to share the best practices.”

When asked about the critical mass for the maritime technology areas, another expert provided similar insights:

“find the people that are delivering services, the design, analytics, components, systems, ships, whatever, shipyards, all the manufacturing processes and so on, the capital, the sea marines ... all those companies. The main purpose of those companies would be to serve in a dynamic manner the ship owners” (N2018/13)

This view was re-affirmed by another expert leading a cluster organisation in the South West Coast of Norway:

“I think there are two important things, and I probably already mentioned it. We need to keep these clusters complete on the maritime industry ... We have a complete set of industries” (N2018/09)

Thereafter, when asked about how Norway fitted to the evolving changes in the global maritime industry, and how the clusters in Norway were changing with global trends to ensure they maintain a critical mass and have a complete cluster.

“You might say that the shipyard industry has changed. You might say that the supplier industry has changed. You might say that ship owning, and ship management is changed” (N2018/09)

The public policy and transparent implementation set the priorities towards innovation in Norway. From the interviews conducted during the research process, the cluster dynamics in Norway, as depicted in the Emerald Model (Reve et al., 2012), indicates clearly the positive perception of the overall attractiveness of the Norwegian Maritime Cluster.

4.9 Summary of major findings

There are a few key cluster actors that have taken a significant role in the process of transforming the Singapore maritime cluster into a world-leading International Maritime Centre. Wong et al. (2010) argues the important role the state plays in promoting the development of the International Maritime Centre in Singapore, with the MPA being appointed in 2003 “as the ‘champion agency’ for the comprehensive development of Singapore from a primarily sea-transport hub towards becoming the leading comprehensive integrated IMC in Asia” (Wong et al., 2010, p 90). The MPA has taken up this role seriously by working with other governmental agencies and stakeholders to

ensure an integrated development approach for the maritime cluster policy. As noted by Fornahl and Hassink (2017), cluster policy is comprised of all efforts of government to develop and support clusters in a particular location (Shankar et al. 2021). Within this role, the study also found that the MPA as an organisation has also transformed itself from operating as a governmental entity responsible for industry regulations into operating in an industry development role.

[Table 7 – placeholder]

The above findings of Table 7 reaffirmed from the other interviewees and documentary evidences reaffirmed that, Singapore is lacking in innovation activities that entails multi-firms collaborations and collaboration between multi-firms and research institutions. The existence of Cluster Organisation to facilitate collaborations between firms in the cluster and between firms in the cluster with research institutions is another contributing factor that are not institutionalised in the Singapore maritime cluster.

5. Conclusions

In this present research, the International Business theory was applied, with Singapore as the host country perspective, as the location that has successfully attract shipping MNEs. The pro-business policy measures and implementation has contributed to the significant number of shipping MNEs that have made Singapore as their home. Most of these attractive policies have been set since the establishment of the two cluster facilitators in 2004 (the MPA Development unit and the Singapore Maritime Foundation) after which the city state had seen an almost constant flow of new and existing ship owners and managers setting up or expanding their operations in Singapore. By the end of 2005, the country had 80 registered owners which scaled up to an impressive total of 282 by 2015. The ship managers followed a similar trajectory with a growth of almost 57% within the same timeframe.

The primary data gathered from the interviews strongly indicate the active role of the cluster facilitators (MPA, SMF and SSA), to solicit input and feedback from the industry for the government to continuously improve the policy measures and create the right conditions to make Singapore an attractive location for MNEs to establish their maritime business. Government could facilitate MNEs to upgrade its capabilities by offering conducive environment to recombine the FSAs (Lee et al., 2021). Within the shipping sector, the prominent role of the Singapore Shipping Association had been mentioned consistently by the experts, indicating its role as an effective cluster facilitator.

5.1 Theoretical contributions

The research strengthens the know-how of the theoretical basis of the current research. It has also offered several additional theoretical insights for further development. These various elements have been considered and consolidated into an overall theoretical perspective for the present research. Firstly, this research is anchored in the international business branch of MNEs location decisions and value-creation of MNEs' subsidiaries. The FSA-CSA framework (Rugman, 1981) has been applied to understand a firms' behaviour about international expansion outside the home country by extending the Jakobsen et al. (2003) approach on attracting the winners. The combination of IB and economic geography is re-visited in the research, with an interest in MNEs in the international shipping industry establishing subsidiaries or headquarter functions in the Singapore maritime cluster. The main interest is to add to the knowledge of location attractiveness from the perspective of cluster dynamics within the transformation of the maritime cluster in Singapore

5.2 Practical contributions

The research findings contribute to number of practical directions. As highlighted by the experts, most of the SSA appointment holders were professionals and dominated by non-Singaporeans. These non-Singaporean appointment holders provide an international perspective to make Singapore attractive for MNEs, in particular ship owners, ship managers and their size of fleet that are currently operating from their home based outside Singapore. These international perspectives were very critical, as quoted by one of the expert that industry/trade associations in other countries predominantly focusing on how to maintain the competitiveness of the indigenous companies locally to compete with other entities overseas. Whereas the feedback on policy measures provided by the non-Singapore appointment holders in SSA is focusing on how to make Singapore as an attractive location to attract international players (foreign based MNEs) to locate their business in Singapore, and in making Singapore an International Maritime Centre.

Ship-owners considered as one of the most international type of business and they can locate their business operations anywhere in the world. On global basis, most shipowners' origins were in United Kingdom, Scandinavian countries such as Norway and Denmark, Germany and Greece. The focus on policy measures that can make Singapore an attractive location for foreign based MNEs started with MPA being assigned as the lead role to make Singapore an International

Maritime Centre, and with the establishment of MPA's Development role in 2004, as well as SMF during the same year. This corresponds to the sharp growth rate in the number of ship owned by entities based in Singapore from 2005 onwards, about one year after the two entities established their role as cluster facilitators. In 2004, the number of new ships owned by a Singapore based entities are around 120 per year, which was at the same level of increase (or lower) for the past 10 years since 1995. From 2005 onwards, the increase in new ships owned by Singapore based entities have grown significantly on annual basis, reaching the amount of 390 additional new ships by end 2009, and thereafter the figures remain high with over 300 additional new ships annually.

Lastly, the size of ship owners fleet in gross tonnage (GT) or Deadweight Tonne (DWT) is an important measure use as a means of categorising vessels, especially those used for shipping cargo. It refers to the internal volume of a ship and includes all areas from the keel to the funnel and from bow to stern. This measurement has various use in the legal and administrative aspects of the maritime environment. The registered gross tonnage was use to determine safety rules, regulations, port and harbour dues. registrations fees, and insurance premiums for vessels. The GT of a vessel helps indicate the amount of space on the ship which in turn gives an indication of the value of the ship and cargo carrying capacity. All these factors make GT an ideal component in maritime statistics.

These three factors when applied to the world fleet and broken down into the selected countries in which ownership and control of the vessels were based, has offered revealing insights. It had revealed the countries that were dominating and investing in the business of shipping while others that are failing to make a mark. Of the top ship owning countries in the world in 2015, four are European: Greece, Germany, UK and Norway comprise of 21.9% of the world fleet but this dominance was largely bolstered by Greece which had always been a pre-eminent shipowner. Removing Greece from the picture decreases Europe's dominance to 13.6%. Asia in turn has become a dominant region, with key players in China, Japan and Singapore which alone hold 23.3% of the world fleet share.

However, if the growth rate of the key players in Asia is taken into consideration then Singapore has done better than China and Japan across all three factors. Furthermore, the shipowners in China and Japan are indigenous entities operating as home based whereas Singapore's growth is due to its ability to attract shipping MNEs. Singapore had managed to grow its fleet size under both

owners and managers significantly since 2004. Singapore's ability to grow against countries that had held a leading role in terms of the world fleet share over the past decade is a testimony to its attractive policies and the role undertaken by the three cluster facilitators (based on the findings from the interviews). Companies based in Singapore gain better competitiveness using the resources available in the country and as more companies relocate to Singapore, the city's attractiveness improves. All of this is further shaped by the cluster dynamics in Singapore with the cluster facilitators who work together with the companies and government to upgrade all resources.

Singapore has made significant achievement in the last decade, Nevertheless, MPA strives to continue to position Singapore to be a leading IMC. In early 2017, MPA had published a report: International Maritime Centre 2030 Strategic Review, that sets the direction of the future focus on the Singapore maritime cluster. The IMC 2030 Advisory committee consist of more than twenty maritime industry leaders worldwide. The committee recommended for the Singapore maritime cluster to adopt the vision for Singapore to be the Global Maritime Hub for Connectivity, Innovation and Talent, and to be a centre of excellence for shipping, port, offshore and maritime-related business. Singapore may need to evaluate on the role of the cluster facilitators to remain relevant within the areas of innovation, talent and becoming a global centre of maritime excellence.

5.3 Future research

There are several ways that this research could be extended and developed. For the international business theme, the focus of new research could involve longitudinal studies of individual MNE subsidiaries in different host countries and with different host country CSAs. This approach could further evaluate the evolution of the MNE subsidiaries from several perspectives such as correlation of the leadership and entrepreneurship of MNEs subsidiaries in relation to long term Subsidiary Specific Advantages of different host countries.

References

- Akpınar, H. and Ozer-Caylan, D. (2021), "Managing complexity in maritime business: understanding the smart changes of globalization", *Competitiveness Review*, Vol. ahead-of-print No. ahead-of-print. <https://doi.org/10.1108/CR-10-2020-0128>
- Andersson, U, et al, 2014, The Contribution of Local Environments to Competence Creation in Multinational Enterprises, *Long Range Planning*, Vol 47, Issue1, pp87-99
- Aziz, K. A. & Norhashim, M. 2008, Cluster-based policy making: Assessing performance and sustaining competitiveness, *Review of Policy Research*, 25(4), pp. 349–375.
- Clark K and Ramachandran I, 2019, *Journal of International Management*, Volume 25, Issue 1,
- Djoumessi, A., Chen, S. L., & Cahoon, S. (2019). Factors influencing innovation in maritime clusters: An empirical study from Australia. *Marine Policy*, 108, 103558.
- Doloreux, D, 2017, What is a maritime cluster? *Marine Policy*, Vol 83, pp 215-220,
- Eisenhardt, K. (1989). Building Theories from Case Study Research. *The Academy of Management Review*, 14(4), 532-550.
- Fornahl, D, Hassink, R, 2017, *The Life Cycle of Clusters, A Policy Perspective*, Edward Elgar Publishing
- Ghuri, P. and Grønhaug, K. 2005, *Research Methods in Business Studies*, Financial Times Prentice Hall, Harlow
- Hakanson, L. 2005 Epistemic communities and cluster dynamics: on the role of knowledge in industrial districts. *Industry & Innovation*, 12: 433–463.
- Ingstrup, M, T, 2012, *Cluster Facilitation from a Cluster Life Cycle Perspective*, Routledge, *European Planning Studies*, Vol 21, Issue 4, pp556-574
- Ingstrup, M, 2010, The role of cluster facilitators, *International Journal Globalisation and Small Business*, Vol. 4, Issue 1, pp25-36

- Ingstrup, M, 2013, When Firms Take the Lead in Facilitating Clusters, Routledge, European Planning Studies, Vol 21, Issue 4, pp556-574
- Jacobs, W, Koster, H, Hall P 2010, The Location and Global Network Structure of Maritime Advanced Producer Services, Urban Studies Journal Foundation, Issue 48 (13), pp2759-2769, October 2011
- Jaffe, A.B., Trajtenberg, M. and Henderson, R. 1993, "Geographic localization of knowledge spill overs as evidenced by patent citations", Quarterly Journal of Economics, Vol. 63 No. 3, pp. 577-598.
- Jakobsen et al, 2003, Attracting the winners: The competitiveness of 5 European Maritime Industries, Centre for Value Creation, Norway.
- Jakobsen, E, Rotnes, R, 2012. Menon Publication NR. 1/2012. January 2012
- Ketels C, et al, 2012, Strengthening Clusters and Competitiveness in Europe, The Role of Cluster Organisations, Center for Strategy and Competitiveness, Stockholm School of Economics, The Cluster Observatory, October 2012
- Ketels, C, 2003, The development of the cluster concept: Present experiences and further developments.
Available at http://www.isc.hbs.edu/pdf/Frontiers_of_Cluster_Research_2003.11.23.pdf
- Lee J.M, Narula R, Hillemann, (2021) Unravelling asset recombination through the lens of firm-specific advantages: A dynamic capabilities perspective, Journal of World Business, Vol 56, Issue 2, Pages 37-50
- Mason, J, 2002, Qualitative Researching, (2nd ed.) Sage, Thousand Oaks, CA
- Meyer, K., E. Mudambi, and R. Narula. 2011. "Multinational Enterprises and Local Contexts: The Opportunities and Challenges of Multiple Embeddedness." Journal of Management Studies 48: 235–252
- Monteiro, P, et al 2013, A differentiation framework for maritime clusters: Comparison across Europe, Sustainability, Issue 5, pp4076-4105

- Mudambi, R. 2008. "Location, Control and Innovation in Knowledge-intensive Industries." *Journal of Economic Geography* 8: 699–725.
- Mudambi, R., and T. Swift. 2012. "Multinational Enterprises and the Geographic Clustering of Innovation." *Industry and Innovation* 19: 1–21.
- Narula, R. 2002. "Innovation Systems and 'Inertia' in R&D Location: Norwegian Firms and the Role of Systemic Lock-in." *Research Policy* 31: 795–816.
- Panayides, P., Borch, O. J., and Henk, A. (2018), "Measurement challenges of supply chain performance in complex shipping environments". *Maritime Business Review*, Vol 3 No. 4, pp. 431-448
- Patton, M.Q. 2002, *Qualitative Evaluation and Research Methods* (2nd ed.), Sage, Thousand, Oaks, CA
- Pereira, R.M., Borini, F.M., Santos, L.L. and Oliveira Jr, M.d.M. (2020), "Environmental conditions, subsidiaries' autonomy and global innovation in multinational enterprises", *Journal of Science and Technology Policy Management*, Vol. 11 No. 2, pp. 247-262.
- Porter M. 1985: *Competitive Advantage: Creating and Sustaining Superior Performance*
- Porter, M 1990a. *The Competitive Advantage of Nations*. New York: Free Press, Macmillan.
- Porter, M 1996, *What is Strategy?*, *Harvard Business Review*, November-December 1996 Issue Harvard Business School Publishing Corporation.
- Porter, M 1998, *Clusters and competition: new agenda for companies, governments, and institutions*. On *Competition*, *Harvard Business Review Book* (Boston, USA: Harvard Business School Press).
- Porter, M 2001, *Innovation: Location Matters*, *MIT Sloan Management Review*, Summer 2001, pp28-36.
- Porter, M 2008, *The Five Competitive Forces That Shape Strategy*, *Harvard Business Review*, January 2008 Issue Harvard Business School Publishing Corporation.

- Porter, M. 1995 The competitive advantage of the inner city. *Harvard Business Review*, May–June: 53–71
- Porter, M. 2003. “The Economic Performance of Regions.” *Regional Studies* 37: 549–578
- Porter, M.E. 1980, *Competitive Strategy: Techniques for Analyzing Industries and Competitors*, The Free Press, New York, NY
- Porter, M.E. 1998, “Clusters and the new economics of competition”, *Harvard Business Review*, Vol. 76 No. 6, pp. 77-90
- Porter, M.E. and Kramer, M.R. 2006, “Strategy and society: the link between competitive advantage and corporate”, *Harvard Business Review*, Vol 84,
- Prakash, A., & Ambekar, S. (2021). Digital transformation using blockchain technology in the construction industry, <https://doi.org/10.1080/15228053.2021.1880245>.
- Reve, T 2011, *From Industrial Clusters to Global Knowledge Hubs*. *Journal for Competiveness*, Institute for Competitiveness, pp65-75, January 2011
- Reve, T, 2011, *Norway – a global maritime knowledge hub*, BI Norwegian School of Management, Research Report 5/2009
- Reve, T, Sasson, A, 2015, *Theoretical and methodological advances in cluster research*, *Competitiveness Review*, Vol 25, Issue 5, pp524-539
- Rugman, A. M., & Verbeke, A. (2001). Subsidiary-specific advantages in multinational enterprises. *Strategic Management Journal*, 22(3), 237-250.
- Rugman, A. M., Oh, C. H., & Lim, D. S. (2012). The regional and global competitiveness of multinational firms. *Journal of the Academy of Marketing Science*, 40(2), 218-235.
- Rugman, Alan M., (1981), “*Inside the Multinationals: The Economics of Internal Markets*”, Columbia University Press; New York, N).
- Shankar, S., Punia, S., Singh, S.P. and Dong, J. (2021), "Trajectory of research on maritime transportation in the era of digitization, *Benchmarking: An International Journal*, Vol. ahead-of-print No. ahead-of-print. <https://doi.org/10.1108/BIJ-05-2020-0272>

Singapore International Maritime Centre 2030 Strategic Review. Published September 2017.

Singapore Maritime Foundation, www.smf.com.sg

Singapore Shipping Association : www.ssa.com.sg

Sundarakani, B; Sian-Lai, Y; Goh, M; de Souza, R. (2019), Studying the sustainability of third party logistics growth using system dynamics, *Journal of Modelling in Management*, Vol. 14 No. 4, pp. 872-895

VDI/VDE Innovation and Technik GmbH, 2012, European Cluster Excellence Initiative (ECEI): the quality label for cluster organizations – criteria, processes, Framework of implementation, pp1-25

Verhetsel, A, Sel S 2009, World maritime cities: From which cities do container shipping companies make decisions ? *Journal of the World Conference on Transport Research Society*, Transport Policy, Issue 16, pp240-250

Wijnolst et al, 2003, European maritime clusters; global trends, theoretical framework –The case of Norway and Netherlands – Policy Recommendations, Dutch Maritime Network Series Publication No. 29, Delft University Press

Wong P.K., 2007, Commercializing biomedical science in a rapidly changing “triple-hel” nexus: The experience of National University of Singapore, Springer, *Journal of Technology Transfer*, Issue 32, pp367-395

Wong P.K., Ho Y.P., Singh, A, 2010, Industrial Cluster Development and Innovation in Singapore, Institute of Developing Economies (IDE-JETRO), Palgrave and Macmillan, pp50-116.

Yin, R.K. 1989, *Case Study Research: Design and Methods*, Sage Publication, Newbury Park

Younis, H., Sundarakani, B., (2020) The Impact of firm size, firm age and environmental management certification on the relationship between green supply chain practices and corporate performance, *Benchmarking: An International Journal*, Vol. 27 No. 1, pp. 319-346

Zhang, W, Lan S L 2013, Maritime cluster evolution based on symbiosis theory and Lotka-Volterra model, *Maritime Policy & Management: The Flagship Journal of International Shipping and Port Research*, Issue 40:2, pp161-176.