Building a Model of National Shipping Centre

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Abstract

National shipping centres comprise both upstream and downstream firms in the logistics chain to conduct shipping and trade-related activities. Users of national shipping centres include traders, logistics service providers, shipping lines, terminal operators, and other actors. Shipping is the business of transporting goods to facilitate trade. Shipping and trade are closely associated. Shipping centres are located in transport complex economies that are desirable for their users to perform various shipping related business activities. To explore the formation of national shipping centres, this study identifies trade facilitation measures at both the macro and micro levels that enhance economic performance.

To build the model of national shipping centre, hypotheses have been developed to illustrate the relationship between trade facilitation activities and trade costs. Furthermore, the economic outcomes are also examined in this theoretical model. To validate the proposed research model, data are collected from the World Bank, and analytical tool is used for data analysis. The results suggest that trade facilitation measures are negatively associated with trade costs. The results also suggest that the trade facilitation measures of a country are positively associated with its economic performance.

The findings of this study are useful for both business managers and policy makers. Based on the finding, managers can formulate effective business strategies to select a location for their firms to conduct their business activities. On the other hand, policy makers can formulate relevant measures to attract business firms to locate at their countries. In studying the formation of national shipping centres, the importance of developing social capital for trade facilitation is also emphasized. To illustrate the validity of the findings, two case studies are presented. The first case study examines countries with more than one port. These countries are China, Japan, and Korea. The second case study look into areas with single port (i.e., Hong Kong and Singapore).

Overall, this study builds a theoretical model and validates the model to seek answers to the following questions:

- What are the roles of trade facilitation at the macro-level and micro-level in the development of national shipping centres?
- Does trade facilitation influence the economic development of a country?
- What is the link between the development of social capita (in terms of trade facilitation measures) and the economic performance of a country?
- What are the differences national shipping centres between developed and developing countries?

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1.1 Background of Research

This study aims to build a theoretical model of national shipping centre. Key variables to be examined include (1) trade facilitation activities to develop national shipping centre, and (2) trade cost to transport goods. The theoretical model also extend to examine the economic performance. Chapter 1.1 provides the background on the study of "building a model of national shipping centre". To begin, the concept of location is examined in Chapter 1.1.1. Then, the selection of location from the perspective of social capital, and the application of the concept of location to the selection decision is discussed. The application of the concept of social capital to shipping activities is discussed in Chapter 1.1.2.

1.1.1 Location and Social Capital

International trading operates under a competitive business environment. To remain competitive, it is essential for private business firms to look for ways perform their business activities cost effectively and efficiently. The growing importance of global competition in international business has stimulated research on topics related to decisions on business location. Location decision refers to decision made by business managers to select an appropriate place for their business firm. It is important for international business operators to select appropriate locations to conduct their business activities across the globe.

Generally speaking, research on location aims to examine (1) the reasons for firms to conduct business activities in a particular area, and (2) the area for firms to select for their business operations. From a firm perspective, location theory assumes that firms identify important factors for them to make decision on where to locate. From an industrial perspective, location decision of firms promote agglomerative tendencies. With agglomeration effects, closely related firms are located in jointly located. As the concept of location is important to explore, it is critical for policy makers to understand why business activities are conducted in a particular area so that effective measures can be

formulated to attract global firms to conduct their business operators. Attracting successful firms to perform business activities can enhance economic performance in the territory. Hence, the decision of location has been a topic of interest (Alcacer and Chung 2007[1] and Lorenen and Mudambi 2013[2]) from various perspectives.

Global business operations and level of economic development in a country are closely associated. For instance, Johanson and Vahlne (1997[3]) examine the relationship between economic development and internationalisation. Internationalization to the tendency of business operators to operator across the globe. Trade facilitation activities are important for firms pursue internationalization strategies. Global business operators conduct their trading and shipping business activities across national boundaries. In the context of shipping operations, shipping and logistics service providers select locations to access the markets where traders are performing their business activities.

National shipping centres with trade facilitation activities to support business operations are ideal locations for traders and shipping service providers to conduct their business operations. The development of shipping centre is the result of agglomeration effect. Agglomeration results when business operators perceive that certain locations offer special advantages. In the context of shipping and trading operations, business operators determine the factors for them to select superior location to conduct their business operations. One of these location identify factors is social capital. The concept of social capital focuses on relational resources (Ziółkowska 2014[4]) and value creation from such resources (Tsai and Ghoshal, 1998[5]).

The existence of social capital explains a wide range of relations beyond the firm. Social capital is useful to illustrate relationships beyond the boundaries of a firm by examining how external resources influence firm behaviour (Hillman 2009[6]). Social capital in this study is defined in the context of national shipping centre as “resources that actors in the shipping industry derive from shipping related networks to reduce trade costs and enhance

the economic performance of a country". Studies on social capital are mainly concerned with the significance of relationships that provide resources for various activities (Baker 1990[7]). Social capital describes the value creation on the one hand and the relational resources on the other hand. The relational resources are linked the resource dependency. The aim of the resource dependency theory is to examine the relationship between external resources and organizational behaviour. For any firm, the deployment of external resources is important at both the strategic and tactical levels. This is because firms rely on various external resources to function. For instance, traders require transportation services to move goods from the production to the consumption areas.

According to Pfeffer (1987[8]), "the fundamental units for understanding inter-corporate relations and society are organizations; and these organizations are not autonomous, but rather are constrained by a network of interdependencies with other organizations". These relationships or networks beyond the firm are driven by resource dependency, i.e., actors who are network members provide functions that are complementary to other actors in the network and synergistic with their contributions (Richardson 1972[9]). For instance, actors in the trade and related industries (e.g., traders and transport service providers) are key members who provide trading and supporting services that are complementary to each other in a network.

To examine location selection and its linkage to social network, the concept of external economies of scale should be explored. Economy of scale refers to increasing returns to scale of operations if firms are able to operate under increasing increase to scale in a substantial expansion in the industry (Chipman 1970[10]). To enjoy external economies of scale, it is desirable for the actors in the shipping and trade related fields to conduct their business operations in the same area. For instance, the availability of shipping service is important to support trading activities.

Another factor affecting location section is the resource dependency. The resource dependency theory characterizes "the corporation as an open system, dependent on contingencies in the external environment" (Hillman 2009[11]). Social capital is not only significant in illustrating the relationships of mixed resources to carry out various actions (Baker 1990[12]), it is also applicable to national location selection based on a number of factors external to their firms. Social capital is not only linked to national location selection, it is also broadened to extensive network beyond firms. Actors select locations where they have extensive networks to conduct their business because of the agglomeration effects. They are then able to enjoy an external economy of scale, and the anticipated result is an even better economic performance in these locations. For example, liner shipping companies and container terminal operators are operating in the same locations, where liner shipping companies receive booking from shippers and container terminal operators load/discharge containers on/from ships. With the shipping services from liner shipping containers and supporting services from terminal operators, traders select these locations to conduct their trading related business activities. This simple example explains the agglomeration effects for the building of social capital to facilitate trading activities.

This study examine social capital from the perspective of national shipping centre. Social capital[*] is in this study is specifically defined as resources that actors in the shipping industry derive from shipping related networks to reduce trade costs and enhance the economic performance. Nevertheless, a number of definitions for social capital can be found in the existing literature. For instance, social capital is defined as "the norms and networks that enable people to act collectively" (Woolcock and Narayan 2000[13]). From this particular viewpoint, social capital focuses on resources, allows for different dimensions, and recognizes that communities access social capital. In the case of trading activities, transport services are a critical resource for trading firms so that they can operate their business. Transport services consist of different divisions, including logistics and

[*] Literature review on social capital is provided in Chapter 2

shipping services. Shipping and logistics firms act collectively to provide transport services to accelerate trading activities. Traders can access the service providers if these transport services are available in the country.

Hence, business operators tend to situate their firms with the operations of shipping-related activities that possess appropriate social capital. Furthermore, countries with substantial trading links (or extensive networks) with each other are ideal locations for business firms to perform their business operations. In the context of shipping centres, the operating environment comprises both upstream and downstream firms to conduct shipping and trade-related activities. These actors include traders, logistics service providers, shipping lines and terminal operators. Shipping is the business of transporting goods to facilitate trade. Shipping and trade are closely associated. To explore the formation of national shipping centres, this study identifies trade facilitation measures at both the macro and micro levels that enhance economic performance.

1.1.2 Formation of Shipping Centre

This section aims to apply the concept social capital to shipping activities. Specifically, the formation of shipping centres is discussed as grounded on the concept of social capital. Shipping and trading activities are closely linked and highly globalized industries. International shipping and trade activities contribute to economic development in many countries. For example, trade and logistics activities contribute to one quarter of the GDP of Hong Kong. Yet shipping and freight transport are widely under-represented in academic research (Hesse and Rodrigue, 2004[14]). Hence, this study fills the research gap in examining the formation of shipping centres.

As trading and its related activities are a fundamental component of contemporary changes in economic systems, it is essential to understand these issues from both structural and operational perspectives. From a structural perspective, globalization has led to changes in

production systems with the location of production in cost-effective areas. From an operational perspective, the changes in the modes of production are accompanied with new changes in the modes of transport to carry goods from the production areas to the consumption areas cost-effectively. Trade facilitation is important for countries to enhance their national competitiveness structurally and operationally.

Globalization is discussed with emphasis on its impacts on trading and goods exchange (Janelle and Beuthe 1997[15]; McCray, 1998[16]; Pedersen, 2000[17]; Woudsma, 1999[18]) from both the structural and operations perspectives. With the emergence of global trade and production networks, research interest has been extended to complex economies and their related issues (Nuhn, 1999[19]). Furthermore, there is an increasing amount of work on intermodal freight transport and international trade (Klink and Berg 1998[20]). Among the significant amount of work on the impacts of internationalization and free trade agreements, related studies on transport are still minimal, and they only examine issues such as transport costs and traffic constraints. Due to the importance of shipping and trade in global economic operations, it is essential to look into the trade facilitation activities and their linkage with economic performance.

Grounded on a previous scholarly research outputs, national shipping centre[†] in this study is specifically defined as an economy that emerges from the joint location of shipping-related activities that have substantial trading links with one another (Lun et al., 2010[21]). Users with substantial trading links in shipping centres include those who are involved in trading activities, provide shipping related support services and regular sea transport services, and handle containers and ships. These users have substantial trading links with each another and select a joint location to conduct transport-related activities. In the context of shipping centres, users (e.g., traders, shipping lines, terminal operators, and logistics service providers) are core elements to conduct business activities.

[†] Literature review on national shipping centre is provided in Chapter 2

These users also generate micro-level trade facilitation activities. Examples of these micro-level trade facilitation activities include the availability of efficient shipping service. To attract business operators to locate in the countries, policy makers develop macro-level trade facilitation measures. Examples of these measures include the improvement of transport infrastructure and the enhancement of customs clearance procedures. These micro-level trade facilitation and macro-level trade facilitation activities contribute to the improvement of national economic performance.

From a national perspective, trade liberalization and trade facilitation are essential to economic growth (Winters 2004[22]). The successfulness of shipping centres is closed linked to national competitiveness. To evaluate the contribution of shipping centres, national performance outcomes are important indictors. Economic performance in terms of the gross domestic product (GDP) are important outcome from both the academia and industry experts. GDP is commonly used at national level to examine national performance and economic growth (Robbins and Pettinicchio 2012[23]). The GDP is an important indicator because it illustrates the gross valued added to the economy.

Successful shipping centres are able to attract and maintain successful firms for their business operations. These shipping centres possess such social capital as excellent infrastructure for further economic development. The formation of shipping centres from macro level involves the investment from public sectors in social capital. From a macro level, trade facilitation activities (e.g., development transport infrastructure and enhancement of customs clearance) are essential to the formation national shipping centres and the improvements in economic performance. The relationship between social capital and economic performance are important to support the formation of shipping centres. Previous studies found that social capital affects economic performance (Westund and Adam 2010[24]). As the formation of shipping centres focuses on trading and related services, the share of the GDP plays an important role when examining the performance outcomes

of a country. GDP is the sum of the gross value added to an economy. Shipping and trading are typical servicing activities. Shipping centres are service-oriented economies. In a service-oriented economy, the competitiveness of firms depends on the availability of supporting services for their cost-effective operations (Eschenbach and Hoekman 2006[25]). Service-oriented firm select locations with low operating to performance their business activities. If trade costs in shipping centres are lower, the level of service orientation (i.e., value added from services) will be higher. National shipping centre with a lower operating cost and trade facilitation activities are attractive places to conduct business operations.

1.2 Research Objectives

Grounded on the concept of location, the significance of shipping centres is highlighted. Location decision is important from the perspectives of both business decision makers and policy makers. The concept of location also extends from national to global level. From the business operation perspective, global actors conduct their business operations internationally make decision to select location to perform their business activities. From the perspective of policy makers, the provision of business service by global actors contribute to economic development.

To develop shipping centres, it is important for both business operators and policy makers to find out the answers for the following question:

- Where to conduct business activities?
- Why do firms conduct their business activities in particular countries?

These two questions are critical for both private and public sectors. The private sectors make decision to identify location to conduct their business activities. On the other hand, the public sectors need to find out the why firms locate in particular countries and formulate measures to attract them.

Shipping centres are made of the various users of shipping and trade related activities. These users include traders, transport operators, logistics services providers, terminal operators, liner shipping companies, and other firms providing related supporting services. These inter-firm related activities are connected in terms of trading links and very much affect the economic performance of a country. The patterns of these trading relations have considerable links with the development social capital.

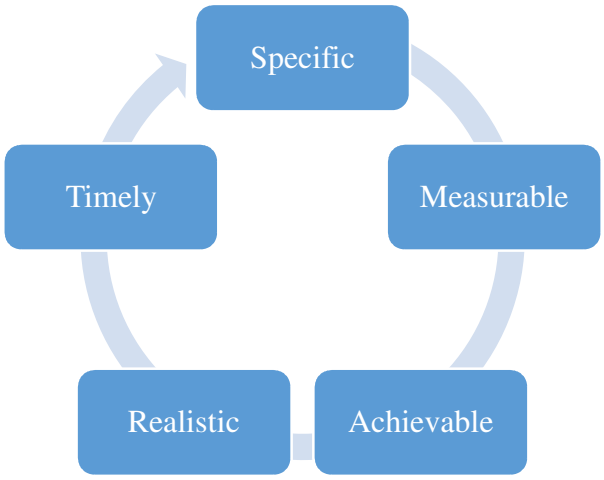
Topics related to shipping centres are therefore an important topic that warrants further examination. Grounded on Doran's (1981[26]) SMART factors, the SMART framework

(which incorporates specific, measurable, achievable, realistic, and timely criteria) is developed in Section 1.2.1 to guide the development of the research objectives. Then, the eight study objectives are provided in Section 1.2.2.

1.2.1 SMART Framework

Prior to examining the details in research work, the establishment of the research objectives is important for overall guiding the project. The SMART acronym is generally accepted as key elements for business objectives. According to Doran (1981[27]), the SMART composes of five criteria, i.e., specific, measurable, assignable, realistic, and time-related. However, the criteria of "assignable" may not be suitable in the formulation of research objectives in this study, as research elements should not be assigned. Instead, "achievable" is more appropriate as the identified research objectives need to be realistic and attainable. Achievable is important to close the loop to provide empirical findings. Grounded on the criteria put forth by Doran (1981[28]), the research approach of this study is formulated by adopting four of the five components. The criteria of assignable is replaced by achievable.

Figure 1.1 SMART Framework



In this study, the SMART framework incorporates specific, measurable, achievable, realistic, and timely criteria. As shown in Figure 1.1, the development of research objectives of this study based on the following five criteria:

- Specific: This study specifically identifies macro-level trade facilitation TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) activities in the development of national shipping centres. Measurement of these two variables is then formulated. Empirical data are collected from the World Bank to verify the identified TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) activities.
- Measurable: The theoretical modelling of national shipping centres is conducted by using various measureable variables, i.e., TF-MA (macro-level trade facilitation), TF-MI (micro-level trade facilitation), trade costs and economic performance. A series of hypotheses are also developed.
- Achievable: The proposed model is validated through empirical data. Relevant statistical tools (e.g., structural equation modelling and correlation analysis) are used to test the model.
- Realistic: The findings are determined by using real-life examples (i.e., case countries of China, Japan and Korea).
- Timely: It is time for a study to be implemented, which examines the implications of national shipping centres from the perspective of national competitiveness, and provide managerial guidelines for managers to make their location decision, and policy implications for policy makers to develop national shipping centres.

1.2.2 Study Objectives

With the discussion of location selection as background, the concept of national shipping centres is introduced and defined. The importance of shipping centres is also briefly

examined. Based on the five key criteria of the SMART framework, research objectives are set in this study.

Accordingly, the following eight study objectives are identified:

1. The first research objective is to identify the macro level trade facilitation (TF-MA) activities in the development of national shipping centres.
2. The second research objective is to identify the micro level trade facilitation (TF-MI) activities in the development of national shipping centres.
3. The third research objective is to build a theoretical model for national shipping centres by developing the hypotheses in this study.
4. The forth research objective is to empirically validate the proposed theoretical model which will reveal the relationship between macro level trade facilitation (TF-MA) and micro level trade facilitation (TF-MI) and how they are associated with trade costs and economic performance.
5. The fifth research objective is to validate the findings by using three countries (i.e., China, Japan and Korea) as case studies.
6. The sixth research objective is to examine the implications of shipping centres from the perspective of national competitiveness.
7. The seventh research objective is to provide guidelines for managers to make their location decision.
8. The eighth research objective is to provide policy implications for policy makers to develop national shipping centres.

Specifically, this study primarily aims to identify the macro-level trade facilitation (TF-MA) and micro-level trade facilitation (TF-MI) activities in the development of national shipping centres. The measurability of these activities is important since the theoretical modelling of national shipping centres is made possible with the use of measureable variables (i.e., TF-MA, TF-MI, trade costs and economic performance). To build the model of national shipping centres, various hypotheses are developed.

The validation of the proposed theoretical model can be achieved by using relevant statistical tools with empirical data. The findings represent real life situations, and the representation of the findings is further demonstrated by using the case countries of China, Japan and Korea. Finally, this study is timely as it is now the time to examine the implications of shipping centres from the perspective of national competitiveness, and provide guidelines for managers to make their location decision, and policy implications for policy makers to develop national shipping centres.

Chapter 2: Literature Review

2.1 Trade Facilitation

2.2 Concept of Location

2.3 Social Capital

- 2.3.1 Concept of Social Capital
- 2.3.2 Social Capital and Trade
- 2.3.3 Opportunity-motivation-ability Framework
- 2.3.4 Defining Social Capital

2.4 National Shipping Centres (NSCs) and Economic Development

- 2.4.1 Defining Shipping Centres
- 2.4.2 Key Features of Shipping Centres
- 2.4.3 Importance of Shipping Centres

2.1 Trade Facilitation

Social capital in the context of shipping centres can be seen as resources that users in a particular location, deriving from shipping related networks to reduce trade costs and enhance the economic performance of a country. Trade facilitation activities are social capital of a country to build shipping centres. In this section, a review on trade facilitation is conducted. The discussion focuses on the macro-level and micro-level trade facilitation activities. The impacts of trade facilitation activities on trade cost and economic development from a national perspective are also discussed.

When making location decision to conduct trade and shipping related activities, business firms generally select locations with resources that contribute to lower their operating costs. From a macro level, public sectors formulate trade facilitation measures to attract the investment of business operators in a particular location. by improving their shipping networks so that trade costs are reduced to enhance economic performance. From a micro level, private sectors conduct trading and shipping business related activities to build up social capital. Examples of such social capital include: (1) availability of shipping and logistics services for traders to import and export goods, and (2) tracking ability to improve visibility and quality of shipping services.

At the macro level, public sectors play an important role in developing trade facilitation measures to boost the development of national shipping centres (Ioannou and Serafeim 2012[29]). An example of macro-level trade facilitation activity is the enhancement of customs efficiency to facilitate the movement of goods for global trade. Another important trade facilitation measure is the improvement of transport infrastructures including port facilities and other related intermodal transport facilities.

Both the TF-MA (macro-level trade facilitation) and the TF-MI (micro-level trade facilitation) activities are essential for users to select a location for their business operations.

From the micro level, the need for resources to perform business related activities make private sectors collaborate beyond firm boundaries to build the TF-MI (micro-level trade facilitation). From the macro level, public sectors build the TF-MA (macro-level trade facilitation) to retain existing users and attract new users.

The World Bank established the Logistics Performance Index (LPI), which provides useful information to measure the trade facilitation activities from both the TF-MI (micro-level trade facilitation) and the TF-MA (macro-level trade facilitation) perspectives across countries. The LPI is available from the Internet (source: http://lpi.worldbank.org). The six items of the LPI are: (1) customs, (2) infrastructure, (3) ease of arranging shipment, (4) quality of logistics services, (5) tracking and tracing, and (6) timeliness. The first of the two items are related to TF-MA (macro-level trade facilitation), while items 3-6 are related to TF-MA (macro-level trade facilitation). Both TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) are essential components for the formation of national shipping centres.

A number of trade facilitation activities exist in shipping centres across the globe. In general, public sectors are responsible to build the macro level social capital. Examples of these macro-level trade activities include efficiency of customs clearance, and high quality infrastructure. On the other hand, the micro-level trade facilitation social capital is built by private sectors. Examples of these micro-level trade activities include the available of shipping services to carry goods for traders, and provision of tracking and tracing services to enhance cargo visibility. Both macro-level and micro-level trade facilitation activities are essential for business operators to perform their trading and shipping related business operations. Hence, both public sectors and private sectors are important for the development of social capital to build shipping centres.

Social capital, in the form of trade facilitation, is an important resource that leads to positive outcomes. One of the goals to perform trade facilitation activities is to reduce the operating

cost in terms of costs to export and import (Portugal-Perez and Wilson 2012[30]). In examining trade facilitation, operating cost to import and export goods (i.e., trade cost) is an important variable to investigate. Profit is the difference between revenue and cost. In the context of shipping centres, trade cost significantly affects the firm performance in terms of profit (Brouthers 2002[31]).

Shipping centres with lower trade cost are preferable locations for private sectors to conduct trade related activities. Attracting private sectors to situate in a shipping centres also ease the building of social capital. Service providers in shipping centres compete among themselves to provide cost-effective and better services (e.g., higher sailing frequency, timely shipping service, and higher cargo visibility) to serve their customers. Traders can also easily arrange for competitively priced shipments in shipping centres. Under such circumstance, the business operations from private sectors build the social capital from the TF-MI (micro-level trade facilitation) perspective.

Development of shipping centres is associated national competitiveness. According to European Commission (1996[32]), features of national competitiveness are: (1) the increased ability of a country to provide integrated services that meet the needs of users, (2) address increasingly competitive pressure from their competitors, and (3) a country that is able to generate relatively high income at the same time. From the micro-level perspective, the increased ability of users to provide integrated supporting services that meet the needs of traders in shipping centres. The building of social capital, in terms of both TF-MA and TF-MI, addressed the competitive pressures from other competitors. Successful shipping centres with appropriate social capital are highly competitiveness in economic development and expected to have better economic performance.

The relationship between social capital and economic performance is interesting to examine. Most of existing studies support the argument that social capital positive affects national economic performance (Westund and Adam 2010[33]). To understand the

contribution of the building of social capital (in terms of micro-level and macro-level trade facilitation) for the formation of shipping centres, the national economic performance is an important indicator. The national performance to evaluate the successfulness of shipping centres indicators include GDP (Rawski 2001[34]; Robbins and Pettinicchio 2012[35]) and value added from service (Sin et al [36]).

Overall, trade facilitation (from both macro-level and micro-level) are essential social capital for the formation of national shipping centres. Both the public sectors and private sectors are important in the construction of the social capital. The expected outcomes of the development of these trade facilitation activities are lower trade cost and better economic performance, which further contribute to the enhancement of national competitiveness.

2.2 Concept of Location

Shipping operations is important to facilitate global trade. Shipping and international trading activities are highly correlated. International trading activities are operated under a competitive business environment. Business operators spent efforts to look for ways to conduct business activities cost effectively and efficiently. The growing importance of global competition in international business has stimulated research on the topic of decisions on business location (Anokhin and Wincent 2012[37]). It is important for international business operators to select appropriate locations to conduct their business activities across the globe. A number of studies have been therefore carried out to examine the selection of business locations (e.g. Ashayeri and Rongen 1997[38], Ozcan et al. 2011[39], and Yang and Lee 1997[40]) in the academic community. Concept of location is important to explore. In general, the location of a business is where business activities are conducted. Business managers put forth efforts to select an appropriate location to situate their business.

From the perspective of international business management, the decision on where to locate a business is an important strategic move as it involves a significant amount of resource commitment when investing in a particular location. It can be a risky investment if resources are deployed but the operating outcomes are not affirmed. As location decision is critical, some researchers have also conducted studies on location avoidance so that the risk of making the wrong decision on locating a business can be reduced (Schotter and Beamish 2013[41]). Although location decision is a business decision, it has significant implications for policy makers for national level development because of the importance of enhancement of the business environment to attract investment, which significantly affects the national economic performance (e.g., value-added to economic sector and GDP per capita). Policy makers therefore need to know about the factors that would deter business enterprises from choosing their location to conduct business to minimize the adverse effects and enhance economic performance.

Hence, the decision of location for businesses has been a topic of interest (Alcacer and Chung 2007[42] and Lorenen and Mudambi 2013[43]) from various perspectives. A number of existing studies have already been done to examine business locations (Ashayeri and Rongen 1997[44], Ozcan et al. 2011[45], and Yang and Lee 1997[46]). Since the 1920s (Marshall 1920[47]), topics related to economic agglomeration and location strategies have been examined from various perspectives. Recently, the study of location selection is an important issue to examine because of the competition among countries to attract global investors to enhance national economic performance. Emerging countries compete on attracting investors on such economic activities as production and infrastructure development to improve standard of living, while developed countries compete on high-end value-added activities to enhance national economic development.

According to Rajamanickam 2006[48], the location selection involves a number of decisional factors. The concept of location can be viewed from the commercial, economic and political perspectives:

- Commercially, decision makers make location decision based on a variety of commercial factors including corporate strategy, marketing, and finance and business operations.
- Economically, firms make decision to move to host countries when they can gain benefits. One of the most important concerns from business firms is cost advantages. To attract investment to boost the economic, it is important for policy makers to develop measures to reduce operating cost.
- Politically, the operating cost of host countries increase with increasing political risk. Hence, countries with high political risk are difficult to attract overseas investment. To attract business firms to locate in a particular area, it is essential to maintain political stability.

Although the concept of location can be viewed from different perspectives, it generally comprises two questions. The first question is "why do firms conduct business activities in a particular area?" The second question is "where do firms conduct business activities?" Policy makers are particularly interested in the first question and business decision makers in the second question. The policy makers are eager to determine the key factors that affect decision making on location for a particular industry, and then develop measures to increase the attractiveness of their countries. On the other hand, the business decision makers are interested in identifying the best location to conduct their business activities.

From the perspective of business decision makers, firms select location with positive externalities to conduct their business operations. Benefits of positive externalities exist due to the development of trade facilitation from both public and private sectors for the economy. Economies of scale also explain for the prevalence of international specialization and trade (Krugman 1979[49]). The growth of nations and economic development are linked to external economies of scale when co-location is taken into consideration. Some studies have also proceeded a step further to examine co-located buyers and suppliers. In the context of shipping operations, trading and shipping firms select an appropriate location to enjoy the external economies of scale.

External economies of scale and economic growth are associated. Global actors (e.g., traders involved in trading activities, logistics service providers who provide logistics related support services, liner shipping companies that provide regular sea transport services, container terminal operators who handle containers and ships) select appropriate location with positive externalities to conduct their business operations. Global actors select location internationally to conduct their trading and shipping activities internationally. These global business operators are generally better performed in terms of higher levels of growth and productivity (Ganotakis and Love 2012[50]).

The adoption of internationalization strategies to perform global operations affects corporate profit performance (Hitt 1997[51]). Studies on international expansion suggest that the continuation of international expansion improves firm performance as the yield incremental benefits exceed incremental costs (Contractor 2007[52]). A number of studies have examined this linkage between internationalization and performance (e.g., Johanson and Vahlne 1997[53], Ruigrok and Wagner 2003[54], and Kotabe et al. 2002[55]). Most of their findings indicate a positive relationship between internationalization and firm performance (Hsu and Pereira 2008[56]).

To plan for internationalization, location selection is an important decision for global business operators. There are number of study to explore the location selection criteria. According to Yang and Lee (1997[57]), major factors affecting location decision include access to market, access to resource, community and environmental factors, availability of labour, government support and transportation. In general, firms spend a significant amount of effort to select an appropriate location for their business operations. While location decision is an important business issue, public sectors also need to understand to location decision criteria in order formulate effective measures to retain existing business operations and attract new comers.

It is obviously that examining factors affecting location decision (MacCarthy and Atthirawong 2003[58]) is important for international firms for their global operations. In the context of trading and shipping related business, key factors that influence the decision of international location include operating cost, infrastructure, availability of labour, and national connectivity. Trade facilitation activities, from both macro-level and micro-level are also important factors affecting the location decision. Government or other public sectors generate macro-level trade facilitation activities, while business firms or private sectors generate micro-level trade facilitation activities.

Trade facilitation activities are important for firms pursue internationalization strategies. Internationalization refers to the tendency of business operators to perform their business activities across national boundaries. A number of studies examine the relationship between economic development and internationalisation (e.g., Johanson and Vahlne 1997 [59]). In generally, internationalisation and economic development are positively associated. Global business operators conduct their trading and shipping business activities globally. They select appropriate locations to conduct their business. The selected locations possess a number of favourable factors to attract global business firms to perform their tasks. As a result, the economic development of the selected locations is generally better than other countries.

Location decisions involve the selection of appropriate location for business operations. The decision processes involve identification and evaluation among alternatives. There are a number of selection criteria can be determined for location selection (Ertugrul and Karakasoglu 2008[60]). In general, traders select location across the globe to support their global operations. Selected locations are national centres possess good hard infrastructure (e.g., customs clearance and port facilities) and soft infrastructure (e.g., availability of competitive shipping services and high quality of logistics services) to support global trading and transport related operations.

Location selection is important to shipping and logistics activities. In the context of shipping centres, shipping and logistics service providers select locations to access the markets where traders are performing their business activities. Based on these agglomeration effects, national shipping centres (with sufficient macro-level and micro-level trade facilitation activities to support business operations) are ideal locations for traders and shipping/logistics service providers to conduct their business operations.

Agglomeration results when business operators perceive that certain locations offer special advantages, and make decision to conduct their business activities in the locations. Economies of agglomeration can be defined as the benefits that firms obtain by locating close to each other. The location theory (Mulligan 1984[61] ; Ellram et al 2013[62]) assumes that firms or industries in their decision to find a location identify factors that promote agglomerative tendencies. One of these location identify factors is social capital, which focuses on relational resources (Ziółkowska 2014[63]) and value creation from such resources (Tsai and Ghoshal, 1998[64]).

Both internal and external factors affect firms to make location decision. Social capital is important to examine because it offers a wide range of relations beyond the firm. Business managers may therefore be motivated to select a particular location to conduct their business operations based on the availability of social capital. Social capital is useful for describing relationships beyond the boundaries of a firm and best exemplified by the resource dependency theory, which studies how external resources influence firm behaviour (Hillman 2009[65]). Studies on social capital are mainly concerned with the significance of relationships that provide resources for various activities (Baker 1990[66]). Social capital describes the value creation on the one hand and the relational resources on the other hand.

The relational resources are linked the resource dependency. The aim of the resource dependency theory is to examine the relationship between external resources and organizational behaviour. For any firm, the deployment of external resources is important at both the strategic and tactical levels. This is because firms rely on various external resources to function. For instance, traders require transportation services to move goods from the production to the consumption areas. According to Pfeffer (1987[67]), "the fundamental units for understanding inter-corporate relations and society are organizations; and these organizations are not autonomous, but rather are constrained by a network of interdependencies with other organizations". These relationships or networks beyond the

firm are driven by resource dependency, i.e., actors who are network members provide functions that are complementary to other actors in the network and synergistic with their contributions (Richardson 1972[68]). For instance, actors in the trade and related industries (e.g., traders and transport service providers) are key members who provide trading and supporting services that are complementary to each other in a network.

To examine location selection and its linkage to social network, the concept of external economies of scale should be explored. Economy of scale refers to increasing returns to scale of operations if firms are able to operate under increasing increase to scale in a substantial expansion in the industry (Chipman 1970[69]). To enjoy external economies of scale, it is desirable for the actors in the shipping and trade related fields to conduct their business operations in the same area. For instance, the availability of shipping service is important to support trading related activities. These supporting trading related activities are important resources depending on one another. The resource dependency theory characterizes "the corporation as an open system, dependent on contingencies in the external environment" (Hillman 2009[70]). Social capital is not only significant in illustrating the relationships of mixed resources to carry out various actions (Baker 1990[71]), it is also applicable to national location selection based on a number of factors external to their firms. Social capital is not only linked to national location selection, it is also broadened to extensive network beyond firms. These extensive network firms is the result of agglomeration.

Due to the agglomeration effects, actors select locations where they have extensive networks to conduct their business. They are then able to enjoy an external economy of scale, and the anticipated result is an even better economic performance in these locations. For example, liner shipping companies and container terminal operators are operating in the same locations, where liner shipping companies receive booking from shippers and container terminal operators load/discharge containers on/from ships. With the shipping services from liner shipping containers and supporting services from terminal operators,

traders select these locations to conduct their trading related business activities. This simple example explains the agglomeration effects for the building of social capital to facilitate trading activities.

2.3 Social Capital

This section aims to conduct a comprehensive review on social capital. Section 2.3.1 examines the concept of social capital and discusses its features. The association between social capital and trade is discussed in Section 2.3.2. Section 2.3.3 applies the opportunity-motivation-ability framework to examine the drivers that create social capital. Then, Section 2.2.4 comes up with a definition of social capital in this study.

2.3.1 Concept of Social Capital

The concept of social capital has been a popular topic of research and used to answer a range of questions (Rothstein and Stolle 2003[72], Ziółkowska 2014[73]). For instance, social capital is useful for explaining a number of situations that range from those at a firm to a national level (Tsai and Ghoshal, 1998[74]). The breadth of social capital demonstrates that social ties of one kind (e.g., shipping and transport operations in a country) can be used for different purposes (e.g., influence location decision at the firm level and affect policy making at the national level).

In the context of national shipping centres, most of the traders and shipping firms perform their business activities across the globe. The concept of social capital can also be extended from national level to international level. For instance, liner shipping companies provide Trans-Pacific service to carry containers between countries in Asia and countries in America across the Pacific Ocean. At the same time, these liner shipping companies also provide Trans-Atlantic service to carry containers between countries in Europe and countries in America across the Atlantic Ocean. The Trans-Pacifica and Trans-Atlantic services are global head-haul liner shipping services to serve international trade and related activities. These international commercial activities contribute to facilitate trading activities which enhancing economic performance.

Social capital is closely associated with network development. Networks are real-world linkages between groups or individuals. Networks can generally be classified into two categories, i.e., physical network and institutional network. From the perspective of institutional network, national shipping centres involve those in similar networks with complementing activities, such as trade, carriers, terminal operators, logistics service providers, and so on and so forth. From the perspective of physical network, national shipping centres are connected with another network via a number of transport services (e.g., liner shipping services and barge services).

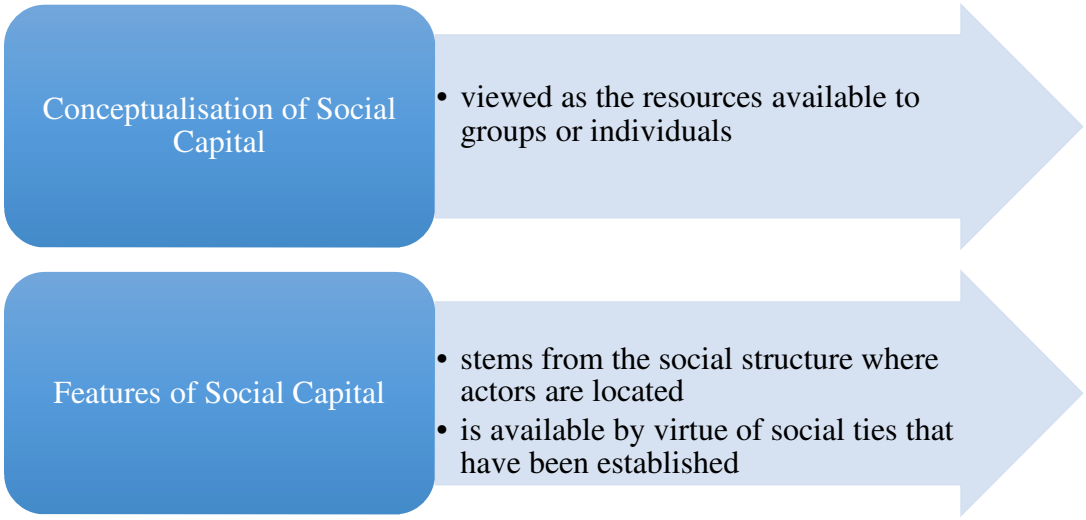
According to the OECD (2010[75]), social capital can be defined as "networks together with shared norms facilitate co-operation within or among groups". From this perspective, the core components of social capital consist of networks and norms. On the other hand, Norms are unspoken and unquestioned practices. In the context of national shipping centres, similar norms industry practices allow network members to work with each other more efficiently to perform logistics and transport operations that facilitate trading activities.

To examine social capital, it is essential to understand its conceptualisation and examine its features. Adler and Kwon (2002[76]) used the "validity challenge" to conceptualise a framework that integrated various streams of social capital research. This stimulated dialogue with various perspectives and led to the view that social capital is the resources available in a particular location. In the context of national shipping centres, the availability of resources may be one of the justifications for users to select the countries to situate to perform their business operations.

Social capital can also be viewed as resources available to groups or individuals (Paldam 2000[77]). For instance, firms performing trading and shipping activities know about the availability of work force and other services in national shipping centres to conduct their business operations. The availability of these valuable resources attracts new comers to locate in these shipping centres. Shipping centres with excellent resources attract business

operators to conduct their business activities in the countries. This agglomeration effect may create external economies of scale to facilitate the business operations of the countries. From this perspective, features of social capital include: (1) stems from the social structure where actors are located, and (2) available to them by virtue of ties that have been already established (Putnam 1993[78], Fukuyama 1995[79], Adler and Kwon 2002[80]).

Figure 2.1: Conceptualization of Social Capital



The conceptualization of social capital is summarised in Figure 2.1. Theoretically, the development of social capital is associated with external economies of scales. Social structures exist in the national shipping centre. Actors located in the national shipping centres can take of advantages of the social structure to run their business.

Social capital of country shipping centres consists of both TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) activities. The social capital generated by both public sectors (to perform tasks to facilitate trade in macro-level) and private sectors (to perform tasks to facilitate trade in micro-level). Social capital stems from

the social structure where actors are located. When users select the national shipping centres to conduct their business and establish the ties with other actors, the social capital is available to them. These features of social capital indicate that resources are external to firms and located where firms are located. These resources are tied with other firms in the location where agglomerations are established. In the context of national shipping centres, actors tend to locate in countries with high levels of social capital, which would allow them to carry out their business more efficiently.

2.3.2 Social Capital and Trade

The operations of international businesses have become very much linked among the different business partners. These linkages are related to international trade activities due to goods are produced in one country and consumed in another country. In international business operations, production and consumption activities span across national borders. Therefore, establishing a reliable transport network is important for actors in national shipping centres (Bell 2000[81]). This is because goods move along a network of shipping nodes and links (Lun and Browne 2009[82]).

The structure of networks have been extensively studied from various perspectives (e.g., Cohen et al. 2000[83], Holmgren 2006[84], and Jenelius 2009[85]). The components of transport system networks consist of nodes and links. In the context of national shipping centres, the nodes are the physical locations (e.g., container terminals and distribution centres) where goods are handled and transferred from one transport mode to another (Lun and Cariou 2009[86]). The links (e.g., road transport and sea transport) between the nodes are connected by infrastructure components (e.g., highway and channel for ocean-going ship) in which various transport modes operate.

In addition to shipping network that connect nodes via links, firms performing downstream and upstream activities in social network located in national shipping centres. Downstream

activities are the business processes, which occur after the company's business activities, typically the processes dedicated to getting goods to the end customers. On the other hand, upstream activities are the business processes that occur before the company's business activities, typically the processes dedicated to getting raw materials from suppliers.

Actors involved in upstream and downstream activities mutually work together (Lun et al. 2013[87]) along the supply chain. In national shipping centres, the actors (e.g., traders, logistics service providers, terminal operators, and shipping liners) in a network conduct business activities (Lun et al. 2013[88]) together. Social capital is the resource that facilitates the development of national shipping centres, which then support upstream and downstream activities. Efficient national shipping centres therefore provide better services to serve the actors in a network.

Industry ties are another important factor when examining social capital. When examining trade facilitation, industry ties are essential for improvements to services. Users with ties to the industry can obtain industry related information in a timely manner to better meet their customer needs. The availability of timely information is useful for firms when delivering their services so to meet customer expectations. Ties to the shipping industry can be valuable opportunities for traders to obtain valuable information rapidly on trading and shipping operations.

The three key contexts for shipping centres to operate smoothly are: (1) cost of service, (2) quality of service, and (3) ability of service provider. In national shipping centres, the ability of shipping service providers to provide high quality and cost-effective shipping services is important for traders when conducting their trading activities in a specific location. This is because the actors in shipping centres tie themselves closely to performance trading related activities for the provision of better services and improvement of overall performance (Porter 2000[89]). Hence, social capital (in term of provision of

macro-level and micro-level trade facilitation) of shipping centres facilitate the operation of trading and related activities.

2.3.3 Opportunity-motivation-ability Framework

The social networks in national shipping centres create opportunities for actors in the networks to social capital transactions. The actors in national shipping centres come together and social ties develop due to their motivation to provide better services and improve their overall performance. The actors who perform upstream and downstream activities also have the ability to efficiently perform trading related activities and join social networks to collectively create social capital.

To examine social capital, it is desirable to understand the drivers to create social capital. This is particular important for policy makers. To enhance national competitiveness, policy makers put efforts to formulate strategies to develop social capital (in terms of trade facilitation measures). It is essential for policy makers to fully understand the drivers to create social capital so that resources can be allocated. Generally speaking, drivers for both public sectors and private sectors to create social capital for the formation of national shipping centres. Adler and Kwon (2002[90]) conducted a study that explored a new concept of social capital, in which they proposed an opportunity-motivation-ability (OMA) framework to explain the drivers that create social capital. The key components of this framework involve "opportunity", "motivation", and "ability".

Opportunity: The first driver of social capital is opportunity. External ties to others give actors in a particular country the opportunity to gain access to new markets, reduce operating costs, and generate greater profits. The opportunity to join the networks in the national shipping centres spur actors operate their business efficiently to compete with competitors. Coleman (1998[91]) argued that the extent to which actors are connected or interact affect the strength of their social capital.

Motivation: Motivation is the second driver of social capital. Actors are motivated to come together and develop social capital because they want to develop trust and associability. This is because social capital transforms actors from taking individual to collective actions to achieve common benefits. Therefore, trust is essential for working closely together when collective actions are taken. Leana and Van Buren (1999[92]) indicated that associability is "the motivation and the ability to act collectively to define and enact goals". Associability also has an important role in ability.

Ability: The basis of trust is on "the willingness and ability of individuals to define collective goals that are then enacted collectively" (Leana and Van Buren 1999[93]). This then leads to the third driver of social capital, which is ability. Ability refers to the competencies of the nodes of the network. The abilities of actors who are the nodes of the network are complements to social capital (Portes 1998[94]).

These three components (i.e., opportunity, motivation, and ability) can also be applied to the development of national shipping centres:

- Opportunity: External industry ties provide opportunities for actors in national shipping centres to enjoy external economies of scale. For instance, liner-shipping companies can enjoy the services provided by container terminal operators to load/unload their containers.
- Motivation: Motivated by the benefits of economic agglomeration, newcomers will choose a national shipping centre as the business location to conduct business activities. In the context of national shipping centres, traders select location where logistics and shipping services are available.
- Ability: The abilities of actors of a national shipping centre are then greater as they can now access a well-established pool of resources.

The abilities of network members to provide high quality and low cost services are important to traders when conducting their trade activities in a specific location. The actors line themselves closely to performance trading related activities for the provision of better services and improvement of their overall performance (Porter 2000[95]). Hence, national shipping centres constitute a type of social capital that facilitates the operation of trading and related activities.

2.3.4 Defining Social Capital

The concept of social capital can be applied to different scopes. Hence, there are a number of definitions for social capital in the existing literature. For instance, Nahapiet and Ghoshal (1998[96]) defined social capital as "assets that may be mobilized through a network". According to Robbins and Pettinicchio (2012[97]), social capital is "the objective association with particular types of people or organizations that then foster collective action". Baker (1990[98]) viewed social capital as "a resource that actors derive from a specific social structure and then use to pursue their interests". Pennar (1997[99]) defined social capital as "a web of social relationships that influence individual behaviour and thereby affect economic growth". Porte (1998[100]) saw social capital as "the ability of actors to secure benefits by virtue of their membership in a social network or other types of social structures". Hence, there are no single and universally agreed definition of social capital.

In general, social capital is resource derive from the social network. In the context of national shipping centre, the important outcomes social capital are reduction in trade cost and improvement in economic performance. Grounded on existing literature, social capital in this study is defined in the context of national shipping centre as "resources that actors in the shipping industry derive from shipping related networks to reduce trade costs and enhance the economic performance of a country". In a national shipping centre, social capital (1) fosters collective actions, (2) is an important resource derived from a specific

social structure, (3) is a social relationship that influence individual behaviour, and (4) involves the ability of actors.

The definition of social capital (i.e., resources that actors in the shipping industry derive from shipping related networks to reduce trade costs and enhance the economic performance of a country) is important as it govern the development of hypotheses and the building of the research model of the shipping research centres. Based on this definition, the key resources of national shipping centres, i.e. macro-level trade facilitation (TF-MA) and micro-level trade facilitation (TF-MI) activities are identified. According to the definition, other core elements of social capital are "reduce trade cost" and "enhance economic performance". Therefore, the key variables of this study are macro-level trade facilitation (TF-MA), micro-level trade facilitation (TF-MI), trade costs and economic performance.

Defining social capital is critical in this study. Based on the definition, key variables of this study are identified. To build a national shipping centre model, various hypotheses are formulated. The building of a research model of national shipping centres is ground on these hypotheses. Based on the definition of the social capital, the measurements of the study variables (i.e., trade facilitation activities, trade cost, and economic performance) are also identified. Then, empirical data can be collected from various sources (e.g., World Bank).

With the empirical data, relevant analytical tools are selected to conduct data analysis. To validate the research model of national shipping centre, a series of reliability and validity tests are conducted. The model of national shipping centres can be established after a series of rigorous processes. The building of the model national shipping centre contributes to the academic community and the shipping industry significantly. Hence, the first and the most important step of the model building is to define social capital.

2.4 National Shipping Centres (NSCs) and Economic Development

Chapter 2.4 aims to examine from the development of national shipping centres to economic development. To begin, shipping centres (SCs) is discussed as grounded on the concept of social capital. First, the merits of examining the national shipping centres (NSCs) and the transport complex economies (TCEs) is presented. Next, the concept of the national shipping centres is discussed and defined. Moreover, the development of the national shipping centres is also examined. The key features of the national shipping centres are then examined are the importance national shipping centres are looked into. The discussion also extends to the contributions of national shipping centres to national competitiveness.

2.4.1 Defining National Shipping Centres (NSCs)

Grounded on previous scholarly research outputs (e.g. Lun et al. 2010[101]), national shipping centres of this study is defined as "an economy that emerges from the joint location of shipping-related activities that have substantial trading links with one another". In the context of national shipping centres, users are core elements to conduct business activities. They also generate micro-level trade facilitation activities. Examples of these micro-level trade facilitation activities include the availability of efficient shipping service. To attract business operators to locate in the countries, policy makers develop macro-level trade facilitation measures. Examples of these measures include the improvement of transport infrastructure and the enhancement of customs clearance procedures.

According to the definition of national shipping centres, links or connectivity is a key factor that affects the development of national shipping centres. Connectivity is crucial to the continuance of economic growth. Connectivity refers to the state of physically being connected from one area to another area. Connectivity is important to examine in the context of shipping and trading operations (Wilmsmerier and Hoffmann 2008[102], Lam and Yap 2011[103]). Connectivity can also be measured to determine the extent to which the

components of a network are connected to one another. Development of national shipping centres affects by the level of connectivity. The ability of a country to obtain required social capital to enhance its connectivity and develop as a national shipping centre is essential for its economic growth.

National shipping centres require access to ports in order to provide shipping transport services that connect cargo sources and goods destination. Connectivity refers to the ability of being connected. Shipping connectivity is associated with the competiveness of a country in performing shipping and trading activities (Djankov et al., 2010[104]; Evans and Harrigan, 2005[105]; Hausman et al., 2013[106]; Hummels and Schaur, 2013[107]; Nordas et al., 2006[108], Hausman 2004[109]; Carruthers et al., 2004;[110] Nordas et al., 2006[111]). The level of the shipping connectivity have a critical role in affecting trading related activities (Yu et al. 2015[112]; Wilmsmeier et al 2006[113]; Wilmsmeier and Hoffmann 2008[114]; Arvis et al. 2013[115], Fugazza 2015[116]).

The United Nations Conference of Trade and Development (UNCTAD 2015[117]) conduct a study on liner shipping connectivity to examine the level of connectivity among countries across the globe. According to the UNCTAD, the five key components to affect the level shipping connectivity include:

- number of ships calling the ports,
- level of throughput,
- number of shipping companies that provide shipping services,
- range of liner shipping services, and
- infrastructure that is capable of handling mega ships.

Connectivity measures the extent to which the nodes of a network are connected to one another. In the context of liner shipping, connectivity measure the extent to which seaports of a shipping network are connected to another network. The seaports can be connected directly or via transhipment (through hub and spoke approach). Take the ten countries of

the Association of Southeast Asian Nations (ASEAN) as an example. The country with the highest level of shipping connectivity as captured by the UNCTAD's liner shipping connectivity index (LSCI) is Singapore, followed by Malaysia. In both countries, the shipping connectivity is not only influenced by derived demand from the trade of the respective countries, but also by demand for transhipment service.

In the context of international trade, connectivity involves the "hinterland" (cargo source) and the "foreland" (goods destination). According to Rodrigue and Notteboom, 2010[118], hinterland is "the area where the demand for cargo movement is generated" and the foreland is "the cargo destinations that are connected by shipping services from the cargo sources". Connectivity is essential for nurturing the development of national shipping centres. Since the hinterland and foreland reconcile ports and markets, connectivity is important because it links the hinterland and foreland together. Any inefficiencies in shipping and transport would negatively affect the competitiveness of businesses because they lead to longer delivery times and higher costs in the handling and distribution of goods. Instead, the trading hub that emerges from connectivity, that is, the joint location of transport-related activities with substantial links to each other, would allow the involved actors to conduct efficient transport-related activities.

2.4.2 Key Features of Shipping Centres (SCs)

When upstream and downstream firms in a shipping chain conduct shipping and trade-related activities, their economic activities collectively lead to the emergence of a national shipping centre. For instance, upstream trading activities involve searches for products and procurements in accordance with customer requirements. Downstream shipping activities may include inventory management and distribution.

However, the development of global supply chains means that there is now increased pressure on transport complex economies (TCEs) to improve their shipping operations and

strengthen their inland transport links. This has led to the drive towards agglomeration, which is derived from interactions between the upstream and downstream industries (Ethier 1982[119], Rivera-Batiz 1988[120] and Markusen 1989[121]). That is because the linkages between industries will drive agglomeration.

Venables (1996[122]) examined the equilibrium locations of vertically linked industries, and created a framework to examine the effects of economic integration on the geographical concentration of production. He found that the extent to which a country accounts for a certain amount of an economic activity depends on the strength of the vertical linkages among related industries. If the vertical linkages are strong, then economic integration may lead to clustering in a single location. By transforming, the concept from transport complex economies (TCEs) to national shipping centres (NSCs), one of the features of national shipping centres is the "clusters of linked industries" (Porter 1990[123]).

There are a number of factors affecting business location decision. For instance, PEST (i.e., political, economic, social, and technological) factors may affect business location (Bartik 2012[124]). Among other studies, Venables (1996[125]) examined the influence of the industrial base of a location. Firms may prefer to be located close to other firms, where there is an industrial base of suppliers and customers. By locating close with each other, firms establish business relationships among actors who are engaged in the social network making a location more attractive to other potential firms.

Social networks evolve over time. According to Kossinets and Watts (2006[126]), network evolution is affected by a combination factors. The stability of the network influenced by the rate of information diffusion, the ability of firms to acquire and use information, and the speed and accuracy of decision-making (Carley 1999[127]). Socio-cognitive mechanism is useful to explain the change of social network. Burns and Gomolinska (2001[128]) used the socio-cognitive mechanism to identify four key factors affecting the change of social network: (1) degree of trust among network members; (2) the social status of network

members; (3) the strength of commitment; and (4) the strength of collective support. These four factors affect the stability of the social network.

The key features of shipping centres (SCs) and the implications of economic growth. These features include the existence of (1) clusters of linked industries, and (2) identified and stable business relations among actors who are engaged in shipping and trading activities. In a national shipping centre, clusters of linked industries exist. Examples of these clusters include trades (i.e., shippers and consignees), shipping firms and government agency. These clusters look for develop stable business with each other. For instance, shippers rely on liner-shipping companies to provide shipping services to transport their goods to their consignees. On the other hand, liner-shipping companies maintain good relationship with shippers to secure shipping orders from them.

Key business actors of the national shipping centre are traders and shipping firms. As these actors are located in the same country and engaged in shipping and trading activities, they are able to identify their business partner and establish business relationships. From the perspective of the policy makers of the national shipping centre, the ideal scenario is that these business actors can establish stable business relationship and locate in the country to perform their trading and shipping activities.

A typical national shipping centre is an agglomeration entity comprises of clusters on linked industries. These clusters include traders, logistics service providers, shipping firms, terminal operators, truckers, feeder operators, and other related commercial agents. These clusters conduct their business activities in the national shipping centre. The engagement of these clusters in related activities form stable business relations to create the agglomeration effect. According to Krugman (1991[129]), there is a relationship between the mobility of firms and agglomeration of economic activity. This is also supported by Venables (1996[130]), who states “agglomeration can be generated by interplay between the location decisions of firms in industrial that are linked through an input-output structure”.

According to Porter (1990[131]), clusters have the potential to influence competition by: (1) increasing productivity, (2) driving innovation, and (3) stimulating new business. In the context of national shipping centres, linked clusters (e.g., traders and liner shipping companies) are located in the same country. The productivity of traders can be increasing with easy connect to liner shipping companies to transport their goods efficiently. Within national shipping centres, several liner shipping companies and their business partners are located in the same country.

These linked clusters are able to share market information and business operating tactics with each other. Under such circumstance, innovative business model and business operating procedures can be enhanced. With traders and their business partners are located in the same country, additional business can be generated and it stimulates new business. Formation of clusters is one of the key features of national shipping centres. Clusters play an important role in the development of national shipping centres. In addition to clusters, the development of national shipping centres is also affected by socio-economic-political factors.

Social factor: Social forces involve attitudes and opinions. These forces shape the users of national shipping centres to behave and ultimately conduct their business activities. For instance, the attitudes shipping firms are changing towards cost-effectiveness and bigger ship deployment. To response, the container terminals operators upgrade their equipment and facilities to cope with bigger ships. Another example is the increasing requirements from shippers for ability of service providers on the provision of track and trace service. As a result, most of logistics service providers in the national shipping centres are capable of providing tracking services to shippers to trace their containers. If users of national shipping centres do not respond to changes in society, they will lose their customers and their market share will be reduced.

Economic factor: All business operators are affected by national and global economic factors. The economic climate influences the decisions of users of national shipping centres. For instance, an economy undergoing recession will low spending power and low stakeholder confidence. Hence, the business operators will not have huge investment and expand their business operations in national shipping centres. On the other hand, an economy undergoing booming will have high spending power and high stakeholder confidence. Firms operating in national shipping centres will respond to economic conditions and stakeholder behaviour. Hence, users in the national shipping centres need to review the impact economic conditions. They also need to response to the behaviour of their stakeholders and their competitors.

Political factor: Political factors influence users in national shipping centres in many ways. On one hand, favourable policies formulated by policy makers can create opportunities and benefit them. Conversely, additional regulatory requirements can place obligations on firms and increase their operating costs. Examples of political factors include minimum wage and compliance with legislative obligations.

2.4.3 Importance of Shipping Centres (SCs)

National shipping centres are important at different levels. At firm level, users (e.g., traders, logistics service providers, truckers, liner shipping companies, and terminal operators) conduct their business operation in the national shipping centres. Efficient national shipping centres are ideal locations for users to situate. At industry level, national shipping centres provide good business operating environment for users to perform their tasks. It also facilitates the growth of the linked industry clusters. At government level, national shipping centres attract international business operators and contribute to the economic development of the countries. Hence, it is essential to identify the factors affecting the importance of national centres.

The strategic importance of national sipping centres is affected by location, accessibility, and infrastructure (Lun et al., 2010[132] and Rodrigue et al. (2006[133]):

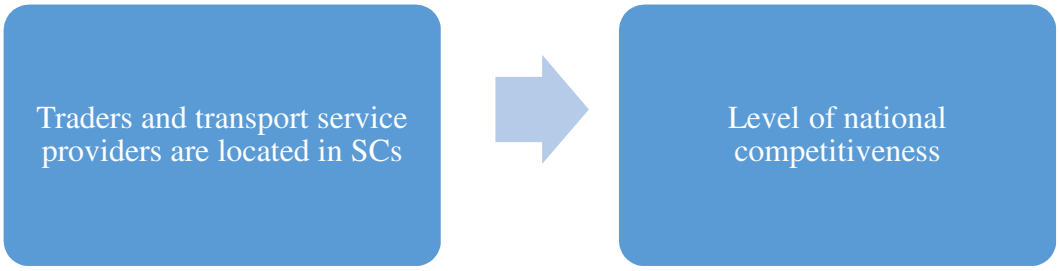
- Infrastructure: National shipping centres possess excellent transport infrastructures that take advantage of their corresponding geographical location for connecting with trading partners.
- Accessibility: Accessibility (i.e. the extent to which users/actors can obtain the required resources at the time that they are needed) is the foundation of the competitiveness of national shipping centres.
- Location: Locations are relative to one another and not constant. As developments in transport infrastructures change the levels of accessibility, the relations between locations are therefore not constant.

As locations are relative to one another, it is essential is look into the shape of spatial structures. Rodrigue et al. (2006[134]) identified the three factors (i.e., cost, accessibility, and agglomeration) that they considered important for shaping spatial structures:

- Cost is important because firms make locational decisions to minimize trade and transport costs;
- Accessibility is essential because locations that are highly accessible are perceived as more attractive; and
- Agglomeration is a key feature because related economic activities tend to agglomerate together to take advantage of the value of specific locations.

With increased attractiveness of a location, there is greater likelihood that agglomeration will take place (Venables 1996[135]). In terms of trading activities, the users are likely to agglomerate in a location with lower operating costs and higher levels of trade facilitation. The inter-organizational relations among the users of national shipping centres are primarily developed in terms of trading links. The patterns of trading transactions govern the decisions of business enterprises as to where they would like to be located and perform their business activities.

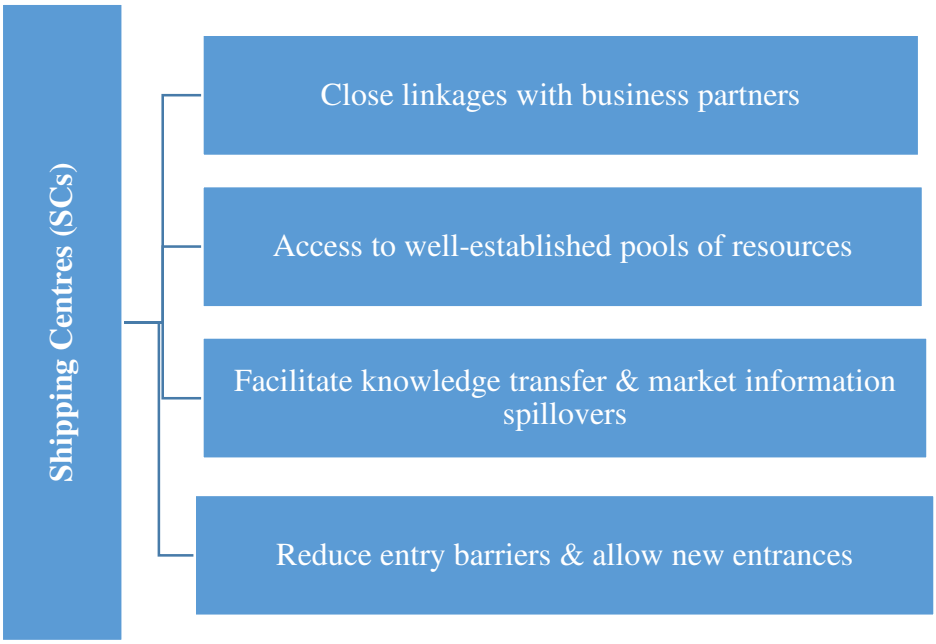
Figure 2.2: Linkage of Shipping Centres to National Competitiveness



The importance of national shipping centres can be extended to national competitiveness. Figure 2.2 illustrates the linkage between national shipping centres and national competitiveness. In global trade, the gateways of the global economy handle the trade flows. Gateways have a significant role in shaping the flow of freight, people and information (Rodrigue et al. 2006[136]). When traders and transport service providers are in the same location, this increases national competitiveness and explains for the phenomenon of national shipping centres. Since national shipping centres constitute a gateway for trading related activities, they are therefore linked to the competitiveness of the country.

The success of national shipping centres is closely related to the level of competitiveness of the involved rivals. The level of competitiveness in a successful national shipping centre is therefore higher. That is because countries must be more "competitive" if they are to maintain their economic position and respond to challenges. According to the OCED[137], competitive country is one that can attract and retain successful firms, and maintain or increase standards of living. Skilled labour and investment move away from uncompetitive countries towards more competitive ones.

Figure 2.3: Contribution of SCs to National Competitiveness



The concept of competitiveness can be extended to the national level to create a new page for policy formulation. In the past, national policy attempted to make countries more competitive by attracting firms operating globally to conduct their business operations in the countries. The modern approach to national development focuses on facilitating the competitiveness of domestic firms in both hard (e.g., physical infrastructure) and soft (e.g., knowledge transfer) capacities. The development of national shipping centres is closely linked with national competitiveness. Based on the work by Porter (2000[138]), Figure 2.3 illustrates how national shipping centres contribute to the national competitiveness in several important ways:

- First, the geographical concentration of national shipping centres mean that users have close linkages with business partners.
- Users located in the same country are able to access related specialized resources.

- As users can access well-established pools of resources, new entrances into the industry are feasible and barriers to conducting shipping and trade related activities are reduced. Knowledge can be transferred among firms in national shipping centres. Market information can also be spilled over to users quickly.
- National shipping centres therefore provide a close to perfect competition business operating environment for business enterprises to freely enter and exit the industry.

Furthermore, the concentration of an industry facilitates knowledge transfer and market information spill among users, which may lead to industrial growth in the country. With vibrant inter-firm activities, ideas are then quickly spread among the neighbouring firms. Hence, the development of national shipping centres enhances the competitiveness of a country.

According to Rodrigue et al. (2006[139]), countries are "commonly organized along an interdependent set of cities forming what is often referred to as an urban system". The spatial structure of a country thus comprises three basic components:

- The first component is a set of locations where specialized industries tend to group into agglomerations.
- The second component is a set of service industries where there is availability of support services (e.g., finance and other commercial services) which tend to agglomerate due to optimal accessibility to potential customers and market information, and the supply of human resources.
- The third component is transportation infrastructure that provides the transport nodes and links (e.g., seaports and airports) that are able to service the major centres of economic activity.

These three components define the spatial order of a country, which also involve the flow of freight, people and information. Firms tend to select countries or locations where these three types of flows (flow of freight, people and information) are effectively operating. In

line with the central place theory (Mulligan 1984[140] and Openshaw and Veneris 2003[141]), economic agents (i.e., firms) tend to "cluster at points of differential centrality on the economic landscape". This clustering process can provide further savings to users of national shipping centres due to the effective flow of freight, people and information.

Firms that perform trade and transport related activities therefore select locations with effective flow of freight, people and information. In doing so, they tend to cluster to perform specialized business activities which means the uneven distribution of economic activity globally. This clustering process then results in national concentration (Padmore and Gibson 1998[142] and Braunerhjelm and Borgman 2010[143]) which means national imbalances and spatial inequalities yet the specialization and centralization of economic activities.

The development of national shipping centres is important. Firms perform trade and transport related activities select national shipping centres as the locations to conduct their business activities. Firms operate in the national shipping centres with effective flow of freight, people and information. The effective operations of national shipping centres leading to specialized business activities resulting in the uneven distribution of economic activity globally. It further lead to the formation of national concentration. The concentration of resouces may positively influence economic development. Hence, the development of national shipping centres in terms of building social capital for trading and shipping activities is closely associated with economic development.

Economic development can generally be classified into the short-term growth and the long-term growth (Weil, 2005[144]). Short term economic growth is mainly caused by an increase in demand for goods and services in the economy. On the other hand, long term economic growth requires an increase in the productive capacity. Increase in public expenditure by development transport infrastructure may also lead to economic development (Berechamn

et al 2006[145]). To develop a national shipping centre, one of the key determinants is the development of transport and trading related infrastructure.

According to Lean et al (2014[146]), improvement transport infrastructure leads to economic growth through the four perspectives:

- First, investment in infrastructure boosts demand for goods and services in the economy. The expansion in government expenditures create short-term economic growth in the country (Aschauer 1989[147]).
- Second, infrastructure improvement reduces overall transit time. With the improvement in transport infrastructure, actors (e.g., traders and logistics service providers) of the national shipping centre benefit directly from time and cost savings (Gunasekera et al 2008[148]). These time and cost savings are essential factor lead to firm performance. Hence, actors conducting their business activities in the national shipping centre with more investment in infrastructure possess better economic performance.
- Third, a better infrastructure attracts foreign direct investment (Hong, 2007[149]). The increase in foreign direct investment creates employment opportunity which can further boosting demand for goods and services.
- Last, lower operating cost (due to cast savings) that can accelerate the development industrial cluster (Baldwin and Forslid 2000[150]).

The development of clusters lead to the geographical concentration of national shipping centres. As a result, users are closely linked with their business partners. Users located closely are able to access related specialized resources. In the context of shipping centre, examples of these specialized resources include the quality of logistics services and the sailing frequency. When well-established pools of resources can be access easily, it is easier for new comers (e.g., traders) to join the industry. Hence, barriers to conducting related activities are reduced due to the existence of related clusters. Moreover, knowledge can be transferred freely among firms in national shipping centres. Market

information can also be spilled over easily. The business environment provides an excellent market structure for firms to operate.

Chapter 3: Conceptualization and Hypothesis Development

3.1 Hypotheses Development

- 3.1.1 Trade Facilitation
- 3.1.2 Trade Costs
- 3.1.3 Economic Performance

3.2 Research Model

3.1 Hypothesis Development

In this study, social capital is defined in the context of national shipping centre as "resources that actors in the shipping industry derive from shipping related networks to reduce trade costs and enhance the economic performance of a country". With defining the definition of social capital of this study, the key variables can be identified. The key variables in this study, i.e., trade facilitation at the macro- and micro-levels, trade costs and economic performance, are examined in Sections 3.1.1, 3.1.2 and 3.1.3 respectively. Some existing studies related to these variables (i.e. trade facilitation, trade cost, and economic performance) are also examined.

Based on the discussion on trade facilitation, Hypothesis 1 is provided in Section 3.1.1 which associates the various activities that facilitate trade. Hypotheses 2.1 and 2.2 are then formulated in Section 2.2, which investigate whether there is a negative relationship between trade facilitation (at both macro- and micro-levels) and trade costs. The role of economic performance in national shipping centres is examined with the proposal of Hypotheses 3, 4, 5.1 and 5.2 in Section 2.3. The proposed research model of national shipping centres can be set up with the development of these hypotheses.

3.1.1 Trade Facilitation

Social capital is useful for explaining how location strategies are applied. When selecting a location to conduct trade related activities, business firms tend to select a country with resources that allow them to reduce their trade costs. Policy makers often develop measures to attract the investment of business operators in a certain location by improving their shipping networks so that trade costs are reduced to enhance economic performance. The usefulness of social capital can be used at either the national or the national level.

Two important aspects of location are place and space. According to Beugelsdijk and Mudambi (2013[151]), place is a "geographical unit of analysis" and space is spatial variation which is "any characteristic that generates variation among places". Both place and space are associated with accessibility, which is important to examine at both the macro and micro levels of economic activities. To be attractive national shipping centres, both social capital and accessibility are important. Social capital can be built from macro- and micro levels. However, accessibility is concerned about geographical location. Accessibility of places varies. Some places are land-locked with limited accessibility. National shipping centres normally locate in highly accessible places. For instance, Hong Kong is located at the mouth of the Pearl River. The location of the port of Hong Kong is excellent with hinterland of Pearl River Delta. In addition, the port of Hong Kong can be access be sea transport to handle transhipment cargos to serve a one of the transhipment hubs in the Asian country. All the geographical factors make Hong Kong highly accessible for shipping and trading activities.

Policy makers play an important role in developing trade facilitation measures to boost economic activities (Ioannou and Serafeim 2012[152]) in shipping centres. These measures are developed from a marco-level perspective. For instance, the quickness of customs clearance and border management are measures that traders use to evaluate the efficiency of the transport of goods for international trade. In addition, it is desirable to have high quality trade and transport infrastructures in place to enhance the operations of trading related activities. TF-MA (macro-level trade facilitation) in terms of customs efficiency and transport infrastructure is therefore important to actors when they are making the decision to select a location to conduct their business activities.

The World Bank provided a tool to gauge performance called the Logistics Performance Index (LPI), which consists of six items (source: http://lpi.worldbank.org). These six items are: (1) customs, (2) infrastructure, (3) ease of arranging shipment, (4) quality of logistics services, (5) tracking and tracing, and (6) timeliness. The first of the two items can be

categorized as related to TF-MA (macro-level trade facilitation). The other four items are adapted from firms that conduct business operations in a specific country. These four items can therefore be classified as TF-MI (micro-level trade facilitation) factors.

In addition to TF-MA (macro-level trade facilitation), the availability of TF-MI (micro-level trade facilitation) resources has an essential role for actors to make location decision to select countries to conduct their business activities. Actors (i.e., users in shipping centres) need required resources to perform trade related activities drive. Examples of these resources are the availability of high quality shipping services and logistics services. Actors to collaborate beyond their organisational boundaries to acquire required resources in order to attain cost and service advantages with TF-MI (micro-level trade facilitation).

Grounded on the existing literatures, justifications to support the positive association between macro-level and micro-level trade facilitation activities are established:

- From the perspective of institutional isomorphism, one of the major factors that affecting firm decision must take into account are operations of other organisations (Lun et al., 2009[153]). National shipping centres with better performance possess TF-MI (micro-level trade facilitation) activities. These TF-MI (micro-level trade facilitation) activities create social capital, which attract global firms to locate at the national shipping centres. National shipping centres with better performance in macro-level trade facilitation operations further attract other actors to select their location for conducting their business operations.
- National shipping centres are locations with high accessibility. According to Beugelsdijk and Mudambi (2013[154]), place and space are important elements of location. Place and space are associated with accessibility. National shipping centres generally locate in countries where is highly accessible and both the macro- and micro levels of economic activities are existed.
- Actors of national shipping centres perform their business activities and develop micro-level trade facilitation. At the same time, policy makers develop appropriate

macro-level trade facilitation measures to boost economic activities (Ioannou and Serafeim 2012[155]).

Hence, both TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) are essential components of national shipping centres. These two variables are therefore positively associated with each other. Hence, the following hypothesis is proposed:

Hypothesis 1 (H1): TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) are positively correlated.

A number of trade facilitation activities exist in national shipping centres. Some of the trade facilitation activities are performed at the macro-level. These macro-level trade activities include customs and infrastructure. Public sectors play the most important role in developing the macro level social capital. On the other hand, the micro-level trade facilitation social capital is built by private sectors. In efficient national shipping centres, macro level and micro-level trade facilitation activities are essential for firms to perform their business operations. Both public sectors and private sectors are significant for the development of social capital in national shipping centres. It is desirable to establish public-private partnership to develop social capital to facilitate trade from both macro- and micro-levels. The first hypothesis (H1) aims to propose the positive association between the macro-level trade facilitation activities and the micro-level trade facilitation activities.

3.1.2 Trade Costs

According to the opportunity-motivation-ability framework (Adler and Kwon, 2002[156]), social capital in national shipping centres provides opportunities for actors to enhance trade and related business transactions. These opportunities can mean that actors are motivated to create social ties in national shipping centres for such benefits as lower operating cost

(Coleman 1998[157]). Hence, actors in national shipping centres are willing to take collective actions to achieve common benefits (Leana and Van Buren 1999[158]). As a result, the actors in national shipping centres are competent in conducting their business operations. These actors also have the ability to provide relevant services that facilitate trading and shipping related activities (Portes 1998[159]).

Social capital facilitates the access of timely information on the latest operations in the field to improve the efficiency of business operations (Coleman 1998[160]). The availability of timely information is important for actors. Information transfer among actors in a specific industry who are located in the same country assists firms to know about industry requirements in order to provide better services for their customers (Uzzi 1997[161]). Social capital links actors in national shipping centres to allow them to connect with others (Burt 1997[162]) with updated information.

With updated information on shipping service, traders can easily coordinate with shipping liners and logistics service providers to arrange shipments at competitive prices. With updated market information, traders can promote their business effectively and boost their sales volume. As a result, the trade volume is higher. When traders support the operations of national shipping centres with sufficient cargo volume, service providers can then provide high sailing frequencies to enhance national connectivity. Hence, shipments can reach destinations within the expected delivery times.

Effective information flow among actors in the trade and shipping industry assist to enhance their ability to adopt technology to provide tracking and tracing services for their customers. According to Sandefur and Laumann 1998[163], the benefits that social capital can provide include the applicability, appropriateness and dependability of information. From macro-level, effective information improves efficiency during customs and border clearance. From micro-level, effective information improves the cargo visibility through

various track and trace tools. Trade facilitation measures are essential for firms to conduct their business activities in national shipping centres.

TF-MA (macro-level trade facilitation)

Social capital is an important resource that leads to positive outcomes in trade facilitation. Trade facilitation improvement as defined by Portugal-Perez and Wilson (2012[164]) is "the set of policies aiming at reducing export and import costs". Hence, trade cost is an important variable that needs to be taken into account in national shipping centres. Trade cost in general consist of the costs to export and import. Transaction costs, which refer to costs incurred in the performing of trading activities, can be used to examine performance outcomes.

Brouthers (2002[165]) examined performance outcomes by integrating transaction cost. Trade cost is important in affecting firm performance. Transaction costs can be reduced if business managers locate their business operations in an efficient national shipping centre. Therefore, in selecting a location to conduct trade related activities, it is desirable that a strategy-performance relationship be used to make sound inferences (Martin 2013[166]). To enhance firm performance, firms tend to strategically select locations where operating costs are lower to conduct their trading related activities.

National shipping centres possess social capital, i.e., TF-MA (macro-level trade facilitation), developed by public sectors are ideal locations for actors to perform trading and shipping activities. The trade cost in national shipping centres with social capital (e.g., efficient customs and excellent infrastructure) are expected to be lower. Hence, the following hypothesis is developed:

Hypothesis 2.1 (H2.1): TF-MA (macro-level trade facilitation) and trade costs are negatively correlated.

H2.1 proposes the negative association between TF-MA (macro-level trade facilitation) and trade cost. To develop the national shipping centres, support from public sectors as trade facilitators to conduct TF-MA (macro-level trade facilitation) activities is essential. Shipping activities involve inbound and outbound movements. In the context of national shipping centres, trade cost involves both cost to import and cost to import. National shipping centres possess excellent social capital established by public sectors is expected to be more cost efficient in conduct trading and shipping related business activities. Hence, TF-MA (macro-level trade facilitation) is negatively associated with trade cost. The higher the level of TF-MA (macro-level trade facilitation), the lower the level of trade cost.

TF-MI (micro-level trade facilitation)

In addition to TF-MA (macro-level trade facilitation) activities, national shipping centres perform TF-MI (micro-level trade facilitation) activities. From the perspective of TF-MI (micro-level trade facilitation), the benefits that social capital originate from four approaches, namely, communitarian, network, institution and synergy (Woolcock and Narayan 2000[167]).

Communitarian: The number and density of local groups measure the communitarian view. In the context of national shipping centres, with high number of the sailing frequency and high density of shipping connectivity, shipments that can reach consignees within expected delivery times because of high sailing frequencies.

Network: The network refers to the relations within and among the actors. In the context of TF-MI (micro-level trade facilitation), a shipping network with actors who work closely with others to exchange real-time shipping data will better perform cargo tracking related activities. Under such circumstance, service providers can provide accurate and timely information to their customers.

Institution: According to the institutional view, the capacity of actors to act in their collective interest depends on the quality of the formal institutions under which they reside (Adger 2003[168]). From the institutional perspective, national shipping centres possess skilful work force and other relevant resources for shipping firms to provide high quality of shipping services to their users.

Synergy: The overall service level of national shipping centres when all of the actors in the network provide high quality services. This is the synergy view, which refers to mutually supportive relations and promotion of complementarities. For instance, shippers in national shipping centres are able to source high quality and price-competitive service from shipping firms to transport their goods when all shipping firms of the network are able to perform high quality shipping services cost-effectively.

Service providers can provide cost-effective and high quality services to serve their customers. Traders can easily arrange for competitively priced shipments in a national shipping centre when shipping and logistics service providers are supportive in their performing of shipping related activities. Under such circumstance, the overall operating cost can be reduced. Therefore, the trade costs tend to be lower when a country possesses social capital, i.e., TF-MI (micro-level trade facilitation), for traders to obtain cost-effective supporting service. Hence, the following hypothesis is developed:

Hypothesis 2.2 (H2.2): TF-MI (micro-level trade facilitation) and trade costs are negatively correlated.

H2.2 proposes the relationship between TF-MI (micro-level trade facilitation) and trade cost. To develop the national shipping centres, efforts from private sectors as trade facilitators to conduct various TF-MI (micro-level trade facilitation) activities is essential. Similar to previous discussion, trade cost includes both cost to import and cost to import.

National shipping centres possess excellent social capital established by private sectors is expected to be more cost efficient with lower cost to import and cost to export. TF-MI (micro-level trade facilitation) is therefore negatively associated with trade cost. The higher the level of TF-MI (micro-level trade facilitation), the lower the level of trade cost.

3.1.3 Economic Performance

The international integration of trading and shipping related activities has substantially increased in the past decades (Garrett 2009[169]). From a global perspective, the increased integration of goods and services has contributed to the economic development of many countries. Trade liberalization and trade facilitation have also contributed to their economic growth (Winters 2004[170]). In examining the potential contribution of national shipping centres for national competitiveness, it is important to examine performance outcomes.

Although a number of indictors are available, economic performance in terms of the gross domestic product (GDP) are important outcome from both the academia and industry experts. The GDP is adopted in this study because the GDP of a country reflects its actual economic performance (Rawski 2001[171]). GDP is commonly used at the national or national level to examine economic performance and national growth (Robbins and Pettinicchio 2012[172]).

Development of national shipping centres is closely linked to national competitiveness. Successful national shipping centres are highly competitiveness in national development. There are two main reasons for the positive association the development of national shipping centres and the enhancement of national competitiveness (European Commission 1996[173]):

- First, the increased ability of a country to provide integrated trading and related services that meet the needs of traders.

- Second, a country that is able to generate relatively high income and high employment levels, while at the same time, address increasingly competitive pressure from their competitors.

A successful national shipping centre is one that can attract and maintain successful firms for their business operations national shipping centres possess such social capital as excellent infrastructure for further economic development. The development of national shipping centres from macro level involves the investment from public sectors in social capital. One of the important reasons for the public sectors to resources in conducting macro-level trade facilitation activities is that the development of TF-MA (macro-level trade facilitation) is essential to the development of national shipping centres and the improvements in economic performance. Accordingly, the following hypothesis is proposed:

Hypothesis 3 (H3): TF-MA (macro-level trade facilitation) positively affects the economic performance of a country.

The relationship between social capital and economic performance are important topic to explore. Majority of previous studies found that social capital affects economic performance (Westund and Adam 2010[174]). H3 deals with marco-level trade facilitation activities performed by government or public sectors. It proposes the positive relationship between social capital (in terms of TF-MA (macro-level trade facilitation) and economic performance.

As the focus of national shipping centres is on trading and related services, the share of the GDP also plays an important role when examining the performance outcomes of a country. GDP is the sum of the gross value added to an economy. As an individual firm may not be able to conduct all tasks, increases in the exchange of services through various activities improves its productivity. Services are a primary means that firms use to differentiate

themselves in today's competitive market. Homburg et al. (2002[175]) examined service-oriented business strategies, and the linkages between service-oriented business strategies and performance outcomes. They found that service-orientation and performance outcomes are positive associated. Hence, service-orientation is important to examine.

To investigate national shipping centres, it is essential examine service-oriented economies. For instance, Hong Kong has undergone a transformation from a manufacturing centre in the 1980s to a service-oriented economy today. Hong Kong has also enjoyed high growth rates between the 1980s and 1990s with a high per capita income. Therefore, a service-oriented economy appears to be associated with economic development (Sin et al.[176]). Therefore, when operating in a service-oriented economy, the competitiveness of firms depends on the availability of services to support their cost-effective operations (Eschenbach and Hoekman 2006[177]). Service-oriented firm select locations with low trade cost to performance their business activities. If trade costs in a national shipping centre are lower, the level of service orientation (i.e., value added from services) will be higher. Accordingly, the following hypothesis is suggested:

Hypothesis 4 (H4): Trade cost negatively influences the service orientation of a country.

The relationship between service-oriented economy and its trade cost is an important factor to examine. Trade cost is negatively associated with trade boom (Jacks et at. 2008[178]). In the context of national shipping centres, shipping and logistics service providers provide value-added service facilitate trading related activities. Traders select service-oriented economies with lower operating costs to perform their business activities. The volume of trading activities is higher when the trade cost is lower. Therefore, H4 proposes the negative relationship between trade cost and service orientation.

A national shipping centre with a lower operating cost and high levels of TF-MI (micro-level trade facilitation) is an attractive place to conduct business operations. The existence

social capital in terms of TF-MI (micro-level trade facilitation) activities reflects the increasing importance of an orientation towards services. Francois (1990[179]) developed a model to illustrate the importance of services for economic growth. There is a trend on service orientation, which also reflects modern business operations. Hence, service orientation is important for future economic development across countries.

From the perspective of micro-level, firms devote effort and resources to perform their core business in order to be competitive. The growth in the outsourcing of activities to work with external service providers indicates the importance of services. The outsourced activities range from sourcing the manufacturers to performing shipping and logistics operations. A national shipping centre with a high level of TF-MI (micro-level trade facilitation) is capable of providing better services to serve actors and facilitate them to perform trading and related activities. Therefore, the following hypothesis is put forth:

Hypothesis 5.1 (H5.1): TF-MI (micro-level trade facilitation) positively affects the service orientation of a country.

Social capital in the forms micro-level trade facilitation activities is viewed as an important source for delivering better service (Andrews 2011[180]). In service-oriented economies, firms located in national shipping centres possess social capital are capable to provide better services. H5.1 proposes the relationship between social capital (in terms of micro-level trade facilitation activities provided by business operators or private sectors) and service orientation. National shipping centres perform higher level of TF-MI (micro-level trade facilitation) are service-oriented economies.

To understand the contribution of national shipping centres, it is essential to examine the relationship between economic performance and economic activities (Banerjee and Marcellino 2006[181]). In general, service-oriented countries have more efficiency and better economic performance (Hogan et al., 1984[182]). According to Ang (2006[183]), the economic

performance of a country will be better when their operating efficiency is higher. Operating efficiency and economic performance are positively associated. For instance, the logistics performance of Germany is one of the highest in the world according to the Logistics Performance Index of the World Bank. The economic performance of Germany is also higher compare with other countries. Hence, the following hypothesis is put forth:

Hypothesis 5.2 (H5.2): The service orientation of a country positively affects its economic performance.

To perform trading related activities, national shipping centres generally require the support of service users. Service users (i.e., traders) in national shipping centres may therefore exert an important influence on service delivery decisions. The engagement of service users is also determined by the quality of the services they receive (Andrews 2011[184]). This suggests the connection between social capital for the development of service-oriented economies and economic performance. H5.2 proposes the relationship between service orientation and economic performance in service-oriented economies.

Accordingly, the following hypotheses are developed to examine economic performance of national shipping centres:

- TF-MA (macro-level trade facilitation) positively affects the economic performance of a country (i.e., H3)
- Trade cost negatively influences the service orientation of a country (i.e., H4).
- TF-MI (micro-level trade facilitation) positively affects the service orientation of a country (i.e., H5.1).
- The service orientation of a country positively affects its economic performance (i.e., H5.2).

Performance outcomes are important to explore when examining the national shipping centres. Overall, the proposed model of national shipping centres consists of three major parts:

- To start the research model, social capital (in terms macro- and micro levels trade facilitation activities) is investigated.
- Then, the impact of social capital on trade cost is inquired.
- The consequence of economic performance is also examined.

3.2 Research Model

Hypotheses are statements that are used to speculate on the outcomes of research. They are generated by citing the existing literature and making observations. Hypotheses are proposed explanations for a set of phenomena. They associate concepts by specifying the anticipated relationships. When a set of hypotheses are grouped together, they become a conceptual framework. Hypotheses, with possible causal association among multiple phenomena, can be tested with relevant empirical evidence. A research model can be formulated by developing a set of hypotheses. A research model aims to develop theory that emphasises the "nature of causal relationships, identifying what comes first as well as the timing of such events" (Sutton and Staw 1995[185]).

Research hypotheses put down problems into testable statements to build research models (Bassellier et al 2001[186]). They must be tested by using the appropriate tool(s) and verifiable with empirical data. When the data support the hypotheses, research models are then built based on the evidence. A research model can also be a set of equations that indirectly represent a system. The development of these equations are based on a set of hypotheses to explain how the system works.

Based on literature review and observation, a set of testable hypotheses have been generated to build the model of national shipping centres. In this study, Hypothesis 1 (H1), Hypothesis 2.1 (H2.1), Hypothesis 2.2 (H2.2), Hypothesis 3 (H3), Hypothesis 4 (H4), Hypothesis 5.1 (H5.1) and Hypothesis 5.2 (H5.2) provide the foundation to formulate the national shipping centre model. The model consists of three major components, namely trade facilitation, trade cost, and economic performance.

The first part of the model of national shipping centres involves trade facilitation as source of social capital. The first hypothesis aims to establish the positively association between TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation). Hence,

H1 proposes that TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation).

The second part of the model of national shipping centres deals with trade cost. The second hypothesis aims to establish the negative relationship between trade facilitation and trade cost. Hence, H2.1 that proposes TF-MA (macro-level trade facilitation) and trade costs are negatively correlated, and H2.2 proposes that TF-MI (micro-level trade facilitation) and trade costs are negatively correlated.

The second part of the model of national shipping centres examines economic performance. H3, H4, H5.1 and H5.2 aim to examine the economic performance. H3 proposes that TF-MA (macro-level trade facilitation) positively affects the economic performance of a country. H4 proposes that trade cost negatively influences the service orientation of a country. H5.1 proposes that the TF-MI (micro-level trade facilitation) positively affects the service orientation of a country. H5.2 proposes that the service orientation of a country positively affects its economic performance.

Hence, the formulation of the research model of national shipping centres (NSCs) is based on a series of hypotheses:

- H1: TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) are positively correlated.
- H2.1: TF-MA (macro-level trade facilitation) and trade costs are negatively correlated.
- H2.2: TF-MI (micro-level trade facilitation) and trade costs are negatively correlated.
- H3: TF-MA (macro-level trade facilitation) positively affects the economic performance of a country.
- H4: Trade cost negatively influences the service orientation of a country.

- H5.1: TF-MI (micro-level trade facilitation) positively affects the service orientation of a country.
- H5.2: The service orientation of a country positively affects its economic performance.

Chapter 4: Methodology

4.1 Data Collection

With the development of the proposed research model, the next step is to examine the measurements to measure the variables: trade facilitation at both macro-level and micro-level, trade costs and economic performance. Sections 4.1.1, 4.1.2 and 4.1.3 discusses these variables, and their descriptive statistics are presented.

An empirical approach is adopted in this study to collect secondary data from the World Bank[‡] to build the model of NSCs. The secondary data analysis involved the analysis of an existing dataset from the World Bank. This database provides a large volume of high-quality information as secondary data to build the research model of national shipping centre. In addition, the use of secondary data is essential since it may be difficult to conduct a new survey to obtain data such as GDP per capita. The key advantage of using secondary data is the breadth of the information available.

In this study, a four-step analysis method of the secondary data proposed by Miller and Brewer (2003[187]) is adopted. The step-by-step approach for the use of secondary data in this study is outlined in the following:

- Step 1: The first step is model development. The research model is developed by establishing the hypotheses. After a comprehensive search in existing literature, social capital is defined in this study. The first step is development of research model by establishing a series of hypotheses.
- Step 2: The second step is the specification of population. To investigate the national shipping centres, it is essential to collect relevant data to validate the proposed research model. In this study, the population is specified with data

[‡] The author had conducted a comprehensive search on the existing secondary data that may be useful for this study. However, it is not possible to identify any other set of data with the components consist of both marco-level and micro-level trade facilitation activities. Hence, the six indicators of the Logistics Performance Index (LPI) are collected as secondary data for this study.

obtained across countries provided by the World Bank (as shown in Appendices 1, 2 and 3).

- Step 3: The third step is identification of variables. With the clearly defined definition of social capital, the key variables of this are identified. The variables of TF-MA (marco-level trade facilitation), TF-MI (micro-level trade facilitation), trade costs and economic performance (i.e., GDP and VAS) are specified.
- Step 4: The fourth step is data reliability and validity. The quantitative data that are appropriate for validating the proposed research model. Reliability and validity of the data are examined. After the process of data reliability and validity, the tool of structural equation modelling (SEM) is employed for data analysis.

4.1.1 Data on Trade Facilitation

The data collection process consisted of three stages:

- In the first stage, the secondary data for measuring TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) based on the logistics performance index (LPI) of the World Bank (source: http://lpi.worldbank.org) were identified.
- The second stage is the collection of data on trade cost.
- The third stage is the collection of data on economic performance.

The compilation of LPI is based on a worldwide survey that provided feedback on the logistics friendliness of the countries where the respondents operate. The six items [§] to measure the trade facilitation activities (from both marco-level and micro-level) of national shipping centres are:

[§] According to the World Bank, these six measures "reflect perceptions of a country's shipping and logistics operations based on efficiency of customs clearance process, quality of trade-related and transport-related infrastructure, ease of arranging competitively priced shipments, quality of logistics services, ability to track and trace consignments, and frequency with which shipments reach the consignee within the scheduled time".

- Efficiency of customs and border
- Quality of trade and transport infrastructures
- Ease of arranging competitively priced shipments
- Competence and quality of the logistics services
- Ability to track and trace
- Frequency that shipments reach consignees within the expected delivery times

These six items are the measures put together by the World Bank to make up the logistics performance index (LPI). Data are from Logistics Performance Index surveys conducted by the World Bank in partnership with academic and international institutions and private companies and individuals engaged in international logistics. According to the World Bank (source: http://lpi.worldbank.org/), the LPI is "an interactive benchmarking tool for countries in the world to identify the challenges and opportunities they face in the performance on trade logistics". It allows countries to compare themselves across countries. The scale[**] ranges from 1.00 to 5.00, with a higher score representing better performance.

These six items can be classified into two categories, i.e., TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation). The items related to TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) are labelled accordingly as follows:

- TF- MA01: efficiency of customs and border staff
- TF-MA02: quality of trade and transport infrastructures
- TF-MI01: ease of arranging competitively priced shipments
- TF-MI02: competence and quality of the logistics services
- TF-MI03: ability to track and trace
- TF-MI04: frequency that shipments reach consignees within the expected delivery

[**] According to the World Bank, the six core components captured by the survey are rated by respondents on a scale between 1 and 5, where 1 is very low or very difficult and 5 is very high or very easy.

These six items to measure TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) are the weighted average[††] of the raw data collected from the respondents:

- TF-MA01: Efficiency of the clearance process (i.e., speed, simplicity and predictability of formalities) by border control agencies, including customs
- TF-MA02: Quality of trade and transport related infrastructure (i.e., ports, railroads, roads, information technology)
- TF-MI01: Ease of arranging competitively priced shipments
- TF-MI02: Competence and quality of logistics services (i.e., transport operators, customs brokers)
- TF-MI03: Ability to track and trace consignments
- TF-MI04: Timeliness of shipments in reaching destination within the scheduled or expected delivery time

The first two items of the LPI are adopted as the measurement items of TF-MA (macro-level trade facilitation). The scores of TF-MA (macro-level trade facilitation) of the countries are shown in Appendix 1. The remaining four items of the LPI are adopted as the measurement items of TF-MI (micro-level trade facilitation). The scores of TF-MI (micro-level trade facilitation) of the countries are shown in Appendix 2.

The descriptive statistics of the TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) items are shown in Table 4.1. The scores of the items for trade facilitation (TF) measures for both TF-MA (macro-level trade facilitation) and TF-MI are between 1.00 and 5.00 (with 5.00 as the highest and 1.00 the lowest). The mean values of TF-MA01 and TF-MA02 are 2.5935 and 2.6372, whereas the mean values of TF-MI01, TF-MI02, TF-MI03 and TF-M04 are 2.8452, 2.7583, 2.9178 and 3.4092 respectively.

[††] Weight average is similar to an arithmetic mean with except that some data points contribute more than others in the data set. According to the World Bank, the weights are chosen "to maximize the percentage of variation in the original six indicators that is accounted for by the summary indicator".

Table 4.1: Descriptive Statistics of TF-MA and TF-MI

	Minimum	Maximum	Mean
TF-MA01	1.33	4.04	2.5935
TF-MA02	1.35	4.34	2.6372
TF-MI01	1.33	3.86	2.8452
TF-MI02	1.33	4.32	2.7583
TF-MI03	1.17	4.27	2.9178
TF-MI04	1.38	4.58	3.4092

The TF-MI (micro-level trade facilitation) involves trade facilitation activities of TF-MI01 (i.e., ease of arranging competitively priced shipments, TF-MI02 (i.e., competence and quality of the logistics services), TF-MI03 (i.e., ability to track and trace), and TF-MI04 (i.e., frequency that shipments reach consignees within the expected delivery time). Hence, these TF-MI trade facilitation activities are social capita generated by private sectors. On the other hand, the TF-MA (macro-level trade facilitation) involves TF-MA01 (i.e., efficiency of customs and border), and TF-MA02 (i.e., quality of trade and transport infrastructure). Thus, these TF-MA trade facilitation activities are social capital generated by public sector.

Overall, the mean values of the TF-MI (micro-level trade facilitation) items are higher when comparing with the mean values of the TF-MA (macro-level trade facilitation) items. The results suggest that the performance of the private sector in performing trade facilitation activities (i.e., TF-MI01, TF-MI02, TF-MI03 and TF-MI04) is better than that of the public sector (i.e., TF-MA01 and TF-MA02). The results therefore indicate that the social capital from the private sector is better in facilitating trade in an economy, and contributed more in developing national shipping centres. From a micro-level, business firms contribute to develop national shipping centres through performing tasks related to

trade facilitation. They are better perform to build up the social capital of TF-MI (micro-level trade facilitation).

There are two significations drawn from the data:

- First, there is the need to examine the gap between the private and public sectors in performing trade facilitation activities. What are the factors that limit the efficiency of the public sector? This can be an issue for further explore from the perspective of policy makers.
- Second, it may be necessary for the government or related agencies to investigate the possible tricks that lead to higher efficiency of customs and border staff and higher quality of trade and transport infrastructures. The ways that trade facilitation activities performed by the public sector may also be different from those by the private sector. Decision making in the former is complex and involves parties with different views. On the other hand, the latter is primarily commercially driven. That is, firms tend to perform tasks efficiently to maximize their profit.

4.1.2 Data on Trade Cost

The second stage involved the collection of secondary data from the World Bank to determine trade costs. Generally speaking, trading activities involve both inbound and outbound operation. Hence, cost to import (CI) and cost to export (CE) are the two key items to measure trade costs[‡‡].

[‡‡] According to the data from the World Bank, the measure of trade costs (cost to import and cost to export) is the fees levied on a twenty-foot equivalent unit (TEU) in US dollars measure trade costs. All of the fees associated with completing the procedures to export or import goods were included. These include costs for documentation, administrative fees for customs clearance and technical control, customs broker fees, and charges for terminal handling and inland transportation. This measure did not include tariffs or trade taxes. Only official costs were recorded.

The data of cost to export (CE) and cost to import (CI) collected from the World Bank are shown in appendix 3.

The data on trade costs (i.e. cost to export and cost to import) are collected from the World Bank. The descriptive statistics of trade costs are shown in Table 4.2. The mean value of costs to export is US$ 1,387 and the costs to import is US$1,642. The cost for export is 18.4% lower than the cost for import.

Table 4.2: Descriptive Statistics of Trade Costs

	Minimum	Maximum	Mean
Cost to Export	450*	5,902*	1,387
Cost to Import	439*	8,525*	1,642

*in US$ per TEU

The cost to export is generally lower the cost to import. The findings indicate that countries put more effort on facilitate export. From the perspective of policy makers, exports play an important role. Exports influence the level of economic growth, employment and balance of payments. As a results, more efforts are expected to spent to lower cost to export in order to facilitation more exports. Another significant point to note from the descriptive statistics is that there are substantial differences in the trade costs among the different countries. The range for the cost to export is between US$ 450 and US$ 5,902 per twenty-foot equivalent unit (TEU), while the range for cost to import is between US$ 439 and US$ 8,525. Overall, the maximum cost to export (i.e., US$ 8525 per TEU) is higher than the maximum cost to import (i.e., US$ 5902 per TEU).

4.1.3 Data on Economic Performance

The final stage was to collect the information on GDP per capita[§§] and value added from services (VAS) [***] which were also obtained from the World Bank to evaluate the performance outcomes. The GDP per capital is presented in current USD and the value added from service is presented in percentage. The details of the data are shown in Appendix 3.

The descriptive statistics of economic performance are shown in Table 4.3. The results indicate that there are substantial differences in the economic performance among the different countries. The range of the GDP per capita is between US$ 199 and US$ 103,574, with a mean value of US$ 12,671. The results indicate an uneven distribution of income and resources across countries worldwide. Higher levels of TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) are positively correlated with better economic performance in terms of GDP per capita. These countries therefore have more resources to develop a national shipping centre. However, the high level of GDP per capital may lead to higher operating costs, which may negatively affect the cost-effectiveness to perform trading and shipping related activities in national shipping centre.

[§§] The GDP per capita is gross domestic product divided by midyear population. According to the World Bank: The GDP is the sum of the gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It was calculated without making deductions for the depreciation of fabricated assets or the depletion and degradation of natural resources.

[***] According to the World Bank, value added from services include that from wholesale and retail trade, transport, and government, financial, professional, and personal services. Also included are imputed bank service charges, import duties, and any statistical discrepancies noted by national compilers as well as discrepancies that arise from rescaling. Value added is the net output of a sector after adding up all of the outputs and subtracting the intermediate inputs.

Table 4.3: Descriptive Statistics of Economic Performance

	Minimum	Maximum	Mean
Gross value added (GDP per Capita)	199*	103,574*	12,671
Value added from services (VAS)	19.45**	92.57*	55.56

*in US$
** in percentage

The findings indicate that difference between developed countries and developing countries is substantial. The mean value of GDP per capita is US$ 12,671. However, the range GDP per capita is between US$ 199 and US$ 103,574. The gap is extremely huge. The uneven distribution of income between developed and under-developed countries is important to explore further. In examining the development of social capital, the impact on the economic performance (in terms of GDP capita) is essential to include. Focus may also extend to the improvement of economic performance of less-developed countries.

Nevertheless, economic performance and orientation towards services are in general positively related. The range of the value added from services is between 19.45% and 92.57%, with a mean value of 55.56%. The findings indicate that a substantial gap exists among countries. Economic activities of some countries are higher than 90%. On the other hand, the contributions from VAS to GDP is relatively low.

4.2 Research Approach

This section aims to formulate the theoretical model of national shipping centres (NSCs) based on the hypotheses developed in previous sections. Section 4.2.1 focuses on the development of a series of regression equation to illustrate the relationship between the study variables. Section 4.2.2 discusses the use of the structural equation modelling (SEM) as a tool to test the hypotheses. The results of SEM is presented in Chapter 5.

4.2.1 Regression Analysis

The formulation of the research model of NSCs is based on the Hypothesis 1 (H1), Hypothesis 2.1 (H2.1), Hypothesis 2.2 (H2.2), Hypothesis 3 (H3), Hypothesis 4, (H4), Hypothesis 5.1 (H.5.1) and Hypothesis 5.1 (H5.2) developed in previous sections. To begin, regression analysis is employed as a tool to examine the relationship among the variables of this study.

Regression analysis involves identifying the relationship between a dependent variable and one or more independent variables. The relationship between dependent and independent variables is hypothesized. The goal of regression analysis is to model the expected value of a dependent variable y in terms of the value of an independent variable x. In a simple linear regression model, the equation is:

$$y = \text{intercept} + r\,(x) + \varepsilon$$

where r is a regression coefficient, and ε is an unobserved random error with mean zero conditioned on a scalar variable x. In this equation, for each unit increase in the value of x, the conditional expectation of y increases by r units.

Equation 1.1, Equation 1.2, Equation 2.1.1., Equation 2.1.2, Equation 2.2.1, Equation 2.2.2, Equation 3, Equation 4, Equation 5.1, and Equation 5.2 illustrate the first order linear regression model (i.e., 1st degree polynomial[†††]) to examine the relationship between dependent and independent variables.

Grounded on the hypotheses developed in previous sections, the model of NSCs is formulated based on a series of regression equations with the following notations:

I = Intercept (constant) of regression equation

β = Regression coefficient

vas = Gross value added / gross domestic product per capita

tc = Trade cost

ma = Macro level trade facilitation (TF-MA)

mi = Micro level trade facilitation (TF-MI)

vas = Value added from service (VAS)

Regression analysis is a tool for building a statistical predictor of a response. It enables researchers to place a bound (i.e., an approximate upper limit) on the error of prediction (Medenhall and Sincich 2003[188]). The upper limit refers to the significance level to a pre-chosen probability. The term *p* value (set as 0.05 level in this study) indicates a chosen probability (Hair et al 2006[189]). If the *p* value is less than the chosen significance level, reject the null hypothesis (i.e., a type of hypothesis used in statistics proposes that no statistical significant exists in a set of given observations) and accept the sample provides reasonable evidence to support the alternative hypothesis (which is the hypothesis that is accepted if the

[†††] Polynomial regression is a form of linear regression in which the relationship between the independent variable *x* and the dependent variable *y* is modelled as n^{th} degree polynomial. Polynomial regression also fits nonlinear relationship between the value of *x* and the corresponding value of *y*. Model order aims to show a trend in the data. The model order is an important factor in telling how accurately the model describes the data and predicts a trend. A linear model (i.e., first order model) shows a steady rate of increase or decrease in the data. A quadratic model (i.e., second order model) explains curvature in the data. A cubic model (i.e., third order model) describes a peak-and-valley pattern in the data. In general, it is possible to model the expected value of *y* as n^{th} degree polynomial to formulate the general polynomial regression model.

null hypothesis is rejected). To initially examine the proposed hypotheses, the SPSS (Software Package for Social Science), which is a predictive analytics software, is employed to conduct the regression analysis.

Hypothesis 1 (H1): The first hypothesis aims to establish the positive relationship between TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation). Hence, Equations 1.1 and 1.2 incorporate in the research model.

As shown in Table 4.4, the *p* value of the regression model is 0.000 (i.e., less than 0.05). Hence, the first part of the H1 (TF-MA ← TF-MI) is supported.

Equation 1.1: TF-MA (macro-level trade facilitation) ← TF-MI (micro-level trade facilitation)

$$\text{i.e., } ma = \mathrm{I} + \beta\, mi + \varepsilon$$

According to the results from the collected data (as shown in Table 4.4), the regression equation is:

$$ma = -0.078 + 0.956\, mi + \varepsilon$$

Table 4.4: Regression Model 1.1 (Dependent Variable: *ma*)

	Unstandardized Coefficient Beta	**Standardized Coefficient Beta (*β*)**	***p* value**
Constant	-0.078		
mi	0.924	0.956	0.000

As shown in Table 4.5, the *p* value of the regression model is 0.000 (i.e., less than 0.005). Hence, the second part of the H1 (TF-MI ← TF-MA) is supported.

Equation 1.2: TF-MA (micro-level trade facilitation) → TF-MI (micro-level trade facilitation)

i.e., $mi = I + \beta\, ma + \varepsilon$

According to the results from the collected data (as shown in Table 4.5), the regression equation is:

$mi = 0.318 + 0.956\, ma + \varepsilon$

Table 4.5: Regression Model 1.2 (Dependent Variable: *mi)*

	Unstandardized Coefficient Beta	**Standardized Coefficient Beta (*β*)**	***p* value**
Constant	0.318		
ma	0.989	0.956	0.000

Hypothesis 2.1 (H2.1): The second hypothesis aims to establish the negative relationship between trade facilitation and trade cost. H2.1 that proposes TF-MA (macro-level trade facilitation) and trade costs are negatively correlated. Accordingly, Equation 2.1.1 and Equation 2.1.2 incorporate in the model to deal with TF-MA (macro-level trade facilitation) in the research model.

As shown in Table 4.6, the *p* value of the regression model is 0.000 (i.e., less than 0.05). Hence, the first part of the H2.1 (TF-MA← TC) is supported.

Equation 2.1.1: TF-MA (macro-level trade facilitation) ←TC (trade cost)

i.e., $ma = I - \beta\, tc + \varepsilon$

According to the results from the collected data (as shown in Table 4.6), the regression equation is:

$ma = 2.718 - 0.308\, tc + \varepsilon$

Table 4.6: Regression Model 2.1.1 (Dependent Variable: *ma)*

	Unstandardized Coefficient Beta	**Standardized Coefficient Beta (*β*)**	***p* value**
Constant	2.718		
tc	0.000	- 0.308	0.000

As shown in Table 4.7, the *p* value of the regression model is 0.000 (i.e., less than 0.05). Hence, the second part of the H2.1 (TF-MA→ TC) is supported.

Equation 2.1.2: TF-MA (macro-level trade facilitation) → TC (trade cost)

$$\text{i.e., } tc = I - \beta\, ma + \varepsilon$$

According to the results from the collected data (as shown in Table 4.7), the regression equation is:

$$tc = 3926.738 - 0.328\, ma + \varepsilon$$

Table 4.7: Regression Model 2.1.2 (Dependent Variable: *tc)*

	Unstandardized Coefficient Beta	**Standardized Coefficient Beta (*β*)**	***p* value**
Constant	3926.738		
ma	-902.844	- 0.328	0.000

Hypothesis 2.2 (H2.2): H2.2 proposes that TF-MI (micro-level trade facilitation) and trade costs are negatively correlated. To deal with TF-MI (micro-level trade facilitation), another two regression equations (Equation 2.2.1 and Equation 2.2.2) incorporate in the research model.

As shown in Table 4.8, the *p* value of the regression model is 0.000 (i.e., less than 0.05). Hence, the first part part of the H2.2 (TF-MI← TC) is supported.

Equation 2.2.1: TF-MI (micro-level trade facilitation) ←TC (trade cost)

i.e., $mi = I - \beta\, tc + \varepsilon$

According to the results from the collected data (as shown in Table 4.8), the regression equation is:

$mi = 3.001 - 0.307\, tc + \varepsilon$

Table 4.8: Regression Model 2.2.1 (Dependent Variable: *mi)*

	Unstandardized Coefficient Beta	**Standardized Coefficient Beta (*β*)**	***p* value**
Constant	3.001		
tc	0.000	-0.307	0.000

As shown in Table 4.9, the *p* value of the regression model is 0.001 (i.e. less than 0.05). Hence, the second part of the H2.2 (TF-MI → TC) is supported.

Equation 2.2.2: TF-MI (micro-level trade facilitation) → TC (trade cost)

i.e., $tc = I - \beta\, mi + \varepsilon$

According to the results from the collected data (as shown in Table 4.9), the regression equation is:

$tc = 3987.181 - 0.307\, mi + \varepsilon$

Table 4.9: Regression Model 2.2.2 (Dependent Variable: *tc)*

	Unstandardized Coefficient Beta	**Standardized Coefficient Beta (*β*)**	***p* value**
Constant	3987.181		
mi	-830.243	-0.307	0.001

Hypothesis 3 (H3): H3 proposes that TF-MA (macro-level trade facilitation) positively affects the economic performance of a country. Hence, Equation 3 incorporates in the research model.

As shown in Table 4.10, the *p* value of the regression model is 0.000 (i.e., less than 0.05). Hence, H3 (VAS ← TF-MA) is supported.

Equation 3: GAV (gross value added) ← TF-MA (macro-level trade facilitation)

$$\text{i.e., } gav = I + \beta\, ma + \varepsilon$$

According to the results from the collected data (as shown in Table 4.10), the regression equation is:

$$gav = -33682.07 + 0.562\, ma + \varepsilon$$

Table 4.10: Regression Model 3 (Dependent Variable: *gav)*

	Unstandardized Coefficient Beta	**Standardized Coefficient Beta (*β*)**	***p* value**
Constant	-33682.077		
ma	15648.973	0.562	0.000

Hypothesis 4 (H4): H4 proposes that trade cost negatively influences the service orientation of a country. Therefore, Equation 4 incorporates in the research model.

As shown in Table 4.11, the *p* value of the regression model is 0.035 (i.e., <0.05). Hence, H4 (VAS ← TC) is supported.

Equation 4: VAS (value added to service) ← TC (trade cost)

$$\text{i.e., } vas = I - \beta\, tc + \varepsilon$$

According to the results from the collected data (as shown in Table 4.11), the regression equation is:

$$vas = \quad 59.632 - 0.197\, tc + \varepsilon$$

Table 4.11: Regression Model 4 (Dependent Variable: *vas)*

	Unstandardized Coefficient Beta	**Standardized Coefficient Beta (*β*)**	***p* value**
Constant	59.632		
tc	-0.004	-0.197	0.035

Hypothesis 5 (H5.1): H5.1 proposes that the TF-MI (micro-level trade facilitation) positively affects the service orientation of a country. Thus, Equation incorporates in the research model.

As shown in Table 4.12, the *p* value of the regression model is 0.008 (i.e., <0.05). Hence, H5.1 (VAS ← TF-MI) is supported.

Equation 5.1: VAS ← TF-MI (micro-level trade facilitation),

$$\text{i.e., } vas = I + \beta\, mi + \varepsilon$$

According to the results from the collected data (as shown in Table 4.12), the regression equation is:

$$vas = 21.533 + 0.178\ mi + \varepsilon$$

Table 4.12: Regression Model 5.1 (Dependent Variable: *vas)*

	Unstandardized Coefficient Beta	**Standardized Coefficient Beta (*β*)**	***p* value**
Constant	21.533		
mi	10.564	0.178	0.008

Hypothesis 5.2 (H5.2): On the other hand, H5.2 proposes that the service orientation of a country positively affects its economic performance. Thus, 5.2 incorporates in the research model.

As shown in Table 4.13, the *p* value of the regression model is 0.001 (i.e., <0.05). Hence, H5.2 (GAV ← VAS) is supported.

Equation 5.2: GAV (value added to service) ← VAS (value added to service)

$$\text{i.e., } gav = I + \beta\ vas + \varepsilon$$

According to the results from the collected data (as shown in Table 4.13), the regression equation is:

$$gav = -1697.506 + 0.297\ vas + \varepsilon$$

Table 4.13: Regression Model 5.2 (Dependent Variable: *gav)*

	Unstandardized Coefficient Beta	**Standardized Coefficient Beta (*β*)**	***p* value**
Constant	-1697.506		
vas	151.705	0.297	0.001

With the development hypotheses (i.e., H1, H2.1, H2.2, H3, H4, H.5.1 and H5.2), the research model of NSCs is formulated via a number of regression equations (i.e., Equation 1.1, Equation 1.2, Equation 2.1.1., Equation 2.1.2, Equation 2.2.1, Equation 2.2.2, Equation 3, Equation 4, Equation 5.1, and Equation 5.2).

4.2.2 Structural Equation Model

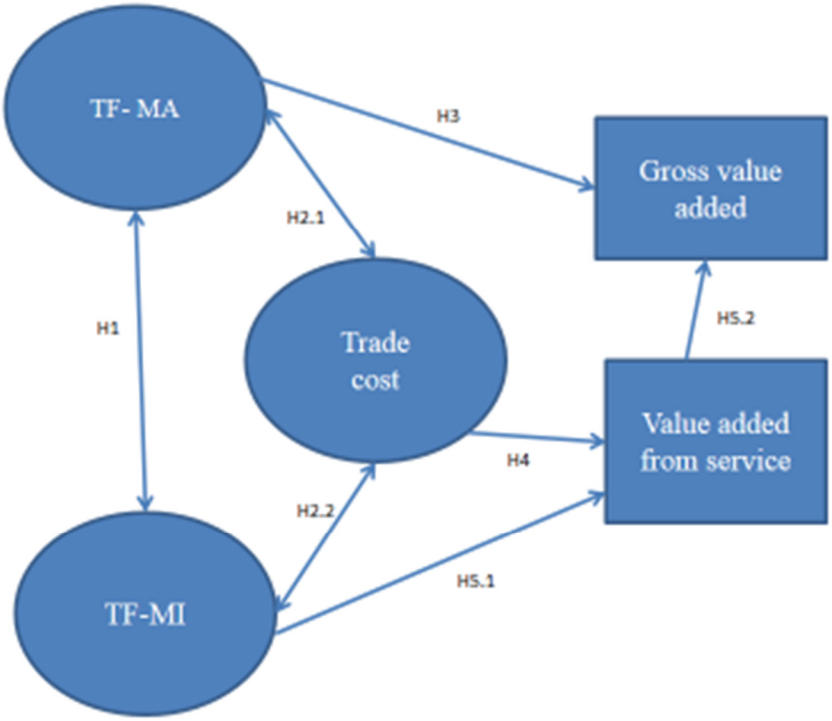
In this study, structural equation modelling (SEM) is used as a tool to examine the proposed research model. SEM belongs to the family of statistical models that seek to explain the relationships among multiple variables. SEM evolved in three different streams: (1) regression equations; (2) algorithms for path analysis; and (3) correlation fit algorithms for path analysis. Most of these developments occurred when computer science was substantially enhanced over the traditional calculator and analogue computing methods (Westland 2015[190]).

SEM is a statistical modelling technique and provides a very convenient framework for statistical analysis that includes several traditional multivariate procedures (Hox and Bechger, 1998[191]). According to Hair et al. (2006[192]), SEM is used to examine a series of dependence relationships simultaneously. It is particularly useful to examine subsequent dependence relationships. It is necessary to have a sound theoretical foundation when

designing a SEM analysis.

SEM is a powerful analytical means for studying complex relationships and a statistical method designed to test either a conceptual or theoretical model (Kaplan 2007[193]). SEM is a combination of two components: (1) a measurement model that defines latent variables by using one or more observed variables, and (2) a structural regression model that links latent variables together (Kline, 2011[194]). SEM is widely used in empirical research for model specification. In structural equation model diagrams, latent variables commonly illustrate as ovals and observed variables as rectangles.

Figure 4.1: Proposed Research Model



SEM is useful to examine the structure of interrelationships expressed in a series of equations. These equations specify the relationships defined in previous sections among the variables, i.e., TF-MA (macro-level trade facilitation), TF-MI (micro-level trade facilitation), trade costs and economic performance (in terms of gross value added and value added from service), that are involved in the analysis. SEM evolves from systems of regression methods. Based on the Hypothesis 1 (H1), Hypothesis 2.1 (H2.1), Hypothesis 2.2 (H2.2), Hypothesis 3 (H3), Hypothesis 4, (H4), Hypothesis 5.1 (H.5.1) and Hypothesis 5.1 (H5.2) developed in previous sections. Hence, the proposed model of Building of National Shipping Centres (NSCs) is constructed based on the hypotheses developed in previous sections. The proposed research model is shown in Figure 4.1.

Chapter 5: Data Analysis and Results

5.1 Test of Hypotheses

- 5.1.1 Reliability Tests
- 5.1.2 Validity Tests
- 5.1.3 Structural Equation Model

5.2 Model Fit

- 5.2.1 Absolute Fit
- 5.2.2 Fit Index

5.1 Testing of Hypotheses

The reliability and validity of the study variables need to be examined before testing the hypotheses. Reliability is the consistency of the measures whereas validity refers to the extent to which a measure or set of measures correctly represents the conceptualization. Validity is also the degree to which a measure accurately represents what it is supposed to represent (Hair et al. 2006[195]).

Sections 5.1.1 and 5.1.2 present the results of the various tests that illustrate the reliability and validity of the study variables respectively. Section 5.1.3 uses SEM to conduct the testing. The key findings are presented and the national shipping centre model is then formulated.

5.1.1 Reliability Testing

The aim of reliability testing is to examine the overall consistency of a measure. Reliability does not imply validity. Instead, reliability testing establishes the consistency of the measures whereas validity measures the extent to which a measure or set of measures correctly represent the conceptualization. According to Hair et al. (2006[196]), reliability is the assessment of the degree of consistency between multiple measurements of a variable. In general, there are two ways of determining reliability. One is to examine the degree to which a set of items are able to measure a single construct. The second is to look at the extent to which individual items measure the same construct.

Cronbach's alpha is one of the most popular tools to examine reliability. In this study, Cronbach's alpha is employed to measure reliability. Cronbach's alpha is "the expected correlation of two tests that measure the same construct" (Cronbach, 1951[197]). It is useful

to estimate the reliability of the items that measure the construct. Cronbach's alpha is widely used in the social sciences, business, and other disciplines.

To test the reliability of the variables in this study, Cronbach's alpha (Cronbach, 1951[198]) which is one of the most common tools for evaluating internal consistency, is used to indicate the degree to which a set of items measure a single construct. According to the SPSS program, Cronbach's alpha can be written as "a function of the number of test items and the average inter-correlation among the items" (Hair et al. (2006[199]).

Table 5.1: Reliability Test

Construct	**Cronbach's alpha (α)**	**Measured item**	**Loading (p<0.001)**
TF-MA	0.969	TF-MA01: Efficiency of customs and border clearance	0.974
		TF-MA02: Quality of trade and transport infrastructure	0.989
TF-MI	0.944	TF-MI01: Ease of arranging competitively priced shipments	0.909
		TF-MI02: Competency and quality of logistics services	0.983
		TF-MI03: Ability to track and trace	0.963
		TF0MI04: Frequency that shipments reach consignees within expected delivery time	0.912
Trade costs	0.963	CE: Cost to export per container	0.962
		CI: Cost to import per container	0.971

According to Hair et al. (2006[200]), Cronbach's alpha (α) is a coefficient of reliability (or consistency). The acceptable level is $0.6 < \alpha < 0.7$. The internal consistency of the items used to measure a construct is excellent when $\alpha > 0.9$. As shown in Table 5.1, the value for TF-MA (macro-level trade facilitation) is 0.969, TF-MI (micro-level trade facilitation) 0.944, and trade costs 0.963. Hence, the reliability of these items for measuring the variables in this study is excellent.

On the other hand, another commonly used measure of reliability is internal consistency. Internal consistency applies to "the consistency among the variables in a summated scale" (Nandakumar 2010 [201]). The rationale for the need to have internal consistency is that the individual items should all be measuring the same construct. Thus, these items should be highly correlated. In addition to using Cronbach's alpha to examine the reliability, a correlation analysis is used to examine the internal consistency in this study.

Reliability is also examined through internal consistency, which applies to the consistency among the variables in a summated scale. The rationale for the need to have internal consistency is that the individual items should all be measuring the same construct. Thus, items should be highly correlated. Hence, the TF-MA01 and TF-MA02 should be measuring the same construct, i.e., TF-MA (macro-level trade facilitation). On the other hand, the TF-MI01, TF-MI02, TF-MI03, and TF-MI04 should be measuring the same construct, i.e., TF-MI (micro-level trade facilitation).

Table 5.2 shows the correlation matrix of the study variables (i.e., macro-level trade facilitation in terms of TF-MA01-02, micro-level trade facilitation in terms of TF-MI01-04, and trade costs in terms of CE and CI). Correlation analysis is the process of studying the strength of that relationship with available statistical data. The correlation coefficient is a measure that determines the degree to which the items involved are associated. The range of values for the correlation coefficient is -1.0 to 1.0. A correlation of -1.0 indicates

a perfect negative correlation, while a correlation of 1.0 indicates a perfect positive correlation. The correlation matrix illustrates the correlations among the study variables (i.e., TF-MA, TF-MA, and trade). All these items are significantly correlated with each other at the 0.01 level (i.e., $p<0.01$). The p value, or calculated probability, is the probability of finding the observed results.

Table 5.2: Correlation Matrix of Study Variables

	MA01	MA02	MI01	MI02	MI03	MI04	CE	CI
MA01	1							
MA02	.888**	1						
MI01	.681**	.704**	1					
MI02	.889**	.924**	.670**	1				
MI03	.834**	.822**	.672**	.861**	1			
MI04	.750**	.745**	.600**	.788**	.773**	1		
CE	-.299**	-.353**	-.241*	-.303**	-.286**	-.248**	1	
CI	-.318**	-.372**	-.259**	-.314**	-.277**	-.204*	.932**	1

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

TF-MA (macro-level trade facilitation):

TF-MA01 (i.e., efficiency of customs and border clearance) and TF-MA02 (i.e., quality of trade and transport infrastructure) are correlated. The results of the correlation analysis indicate that these two items are good measures of TF-MA (macro-level trade facilitation). The results also indicate that both TF-MA01 and TF-MA02 are important social capital to develop national shipping centres.

TF-MI (micro-level trade facilitation):

TF-MI01 (i.e., ease of arranging competitively priced shipment), TF-MI02 (i.e., competency and quality of logistics services), TF-MI03 (i.e., ability to track and trace), and TF-MI04 (i.e., frequency tat shipment reach consignees within expected delivery time) are correlated. The results of the correlation analysis indicate that these four items are good measures of TF-MI (micro-level trade facilitation). The results also indicate that these four items of TF-MI (micro-level trade facilitation) are important social capital to develop national shipping centres.

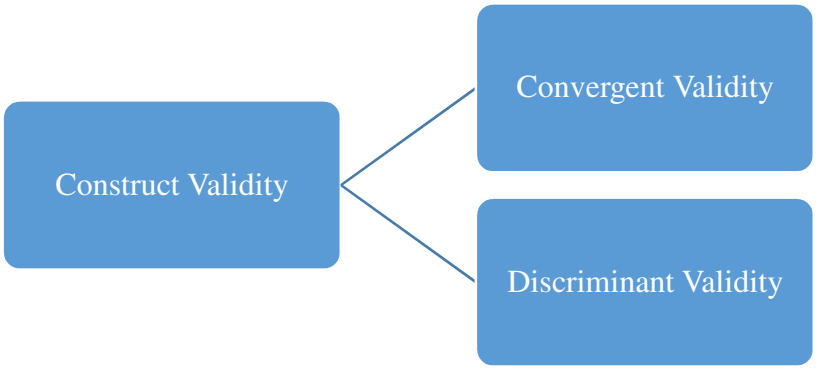
Trade cost:

According to the results, cost to export (CE) and cost to import (CI) are correlated. The results of the correlation analysis indicate that these two items are good measures of trade costs. The results also indicate that both outbound and inbound shipments are important to develop national shipping centres.

5.1.2 Validity Testing

In addition to reliability, it is important to examine validity. Validity is the extent to which a measurement is well founded, based on good reasoning, and accurately corresponds to the real world. Construct validity is "the degree to which a test measures what it claims, or purports, to be measuring" (Brown 1996[202]). Convergent and discriminant validities are the subtypes that make up construct validity (as shown in Figure 5.1). Convergent validity assesses "the degree to which two measures of the same concept are correlated" and discriminant validity examines "the degree to which two conceptually similar concepts are distinct" (Hair et al. 2006[203]).

Figure 5.1 Construct Validity



In this study, a correlation analysis is conducted to examine convergent validity. The data from 160 countries were categorized into two groups. The first group are the developed countries with a GDP per capita greater than the mean value (i.e. > US$ 12,671), and the second group are the developing countries (with a GDP per capita < US$ 12,671).

Table 5.3 illustrates the results of developed countries. According to the findings, the measurement items of TF-MA (macro-level trade facilitation), TF-MI (micro-level trade facilitation), and trade costs (i.e. CE and CI) for the developed countries are correlated. TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) are positively correlated with each other. The correlation between TF-MA and TF-MI is significant at the level of $p<0.01$. Trade cost is negatively correlated with both TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation). The correlation among these variables is significant at the level of $p<0.01$.

Table 5.3: Correlation Matrix - Developed Countries

	MA01	MA02	MI01	MI02	MI03	MI04	CE	CI
MA01	1							
MA02	.924**	1						
MI01	.711**	.719**	1					
MI02	.872**	.933**	.789**	1				
MI03	.761**	.864**	.804**	.931**	1			
MI04	.898**	876**	656**	844**	767**	1		
CE	-.302	-.223	-.081	-.199	-.111	-.195	1	
CI	-.356*	-.260	-.132	-.219	-.121	-.236	.970**	1

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Table 5.4: Correlation Matrix - Developing Countries

	MA01	MA02	MI01	MI02	MI03	MI04	CE	CI
MA01	1							
MA02	.888**	1						
MI01	.681**	.704**	1					
MI02	.889**	.924**	.670**	1				
MI03	.834**	.822**	.672**	.861**	1			
MI04	.750**	.745**	.600**	.788**	.773**	1		
CE	-.299**	-.353**	.214**	-.303**	-.286**	-.248**	1	
CI	-.318**	-.372**	-.259**	-.314**	-.277**	-.204**	.932**	1

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

As shown in Table 5.4, the measurement items of TF-MA (macro-level trade facilitation), TF-MI (micro-level trade facilitation), and trade costs (i.e. CE and CI) for the developing countries are correlated. TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) are positively correlated with each other. The correlation between TF-MA and TF-MI is significant at the level of $p<0.01$. On the other hand, trade cost is negatively correlated with both TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation). The correlation among these variables is significant at the level of $p<0.01$.

The findings illustrate the results of the correlation analysis of two groups of countries. The first group is developing countries (with lower GDP per capita) and the second group is development countries (with higher GDP per capita. The results of the correlation analysis of both the developing (i.e., first group) and developed countries (i.e., second group) indicate that convergent validity is established.

Discriminant validity examines "whether concepts or measurements that are supposed to be unrelated are unrelated" (Campbell, 1959[204]). The expected cross validation index (ECVI), which is "the average discrepancy in the fitted covariance matrices between two samples of equal sample size across all possible combinations of two samples from the same population" (West et al. 2012[205]), is used to gauge the discriminant validity. A lower ECVI value implies a better model (Browne and Cudeck 1993[206]). The ECVI value of the structural equation model is 0.299 (which is lower than 0.3). It therefore indicates that the discriminant validity is established.

5.1.3 Structural Equation Modelling

Structural equation modelling (SEM) is a statistical method designed to test a conceptual or theoretical model. Example of common SEM approaches include confirmatory factor

analysis and path analysis. In general, a structural equation model is a combination of measurement and structural regression models. The measurement model involves latent variables that use one or more of the observed variables while the structural regression model links the latent variables together. SEM allows multiple measures to be associated with a single latent construct. In this study, the two key latent constructs are TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation).

Table 5.5: Test Results

Path	**Estimate**	**Hypothesis**
Gross value added (GDP) ← TF-MA (macro-level trade facilitation)	0.774***	H 3
Gross value added (GDP) ← Value added from services	0.107***	H 5.2
Value added from services ← Trade cost	-0.193***	H 4
Value added from services ← TF-MI (micro-level trade facilitation)	0.349***	H 5.1
TF-MA (macro-level trade facilitation) ←→ TF-MI (micro-level trade facilitation)	0.979***	H 1
TF-MA (macro-level trade facilitation) ←→ Trade cost	-0.429***	H 2.1
Trade cost ←→ TF-MI (micro-level trade facilitation)	-0.404***	H 2.2

***p<0.001

The software of SPSS Analysis of a Moment Structures (AMOS), which is a statistical data analysis software, is employed to conduct the SEM analysis. The results of the SEM is shown on Table 5.5. The paths of Hypotheses 1, 2.1, 2.2, 3, 4, 5.1 and 5.2 are tested. The results show that all the paths are supported with p value below the level of 0.001. The p value (or calculated probability) is less than 0.001 suggest rejecting the null hypothesis (i.e., the hypothesis used in statistics proposes that no statistical significant exists in a set

of given observations) and accepting the sample provides reasonable evidence to support the alternative hypothesis.

Specifically, the SEM results suggest the followings:

- Hypothesis 1 is supported: TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) are positively correlated with a coefficient of 0.979.
- Hypothesis 2.1 is supported: Trade costs are negatively correlated with TF-MA (macro-level trade facilitation) with coefficients of -0.429.
- Hypothesis 2.2 is supported: Trade costs are negatively correlated with TF-MI (micro-level trade facilitation) with coefficients of -0.404.
- Hypothesis 3 is supported: TF-MA (macro-level trade facilitation) positively affects the gross value added from services with a coefficient of 0.774.
- Hypothesis 4 is supported: Trade costs negatively affect the value added from services with a coefficient of -0.193.
- Hypothesis 5.1 is supported: TF-MI (micro-level trade facilitation) positively affects value added from services with a coefficient of 0.349.
- Hypothesis 5.2 is supported: Value added from services positively affects the gross value added with a coefficient of 0.107.

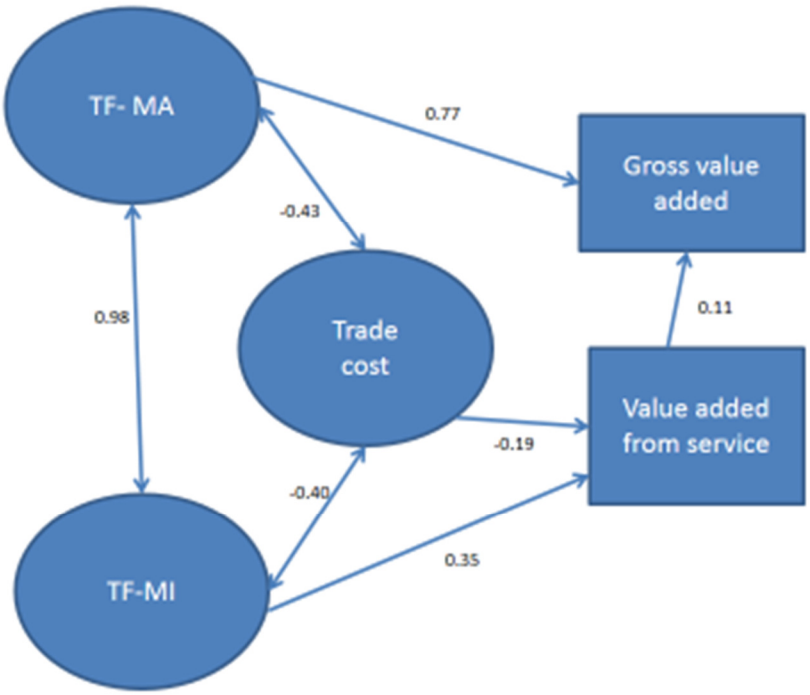
According to the results, all of the above causal relationships are significant with $p < 0.001$. The model of national shipping centres can then be built based on the estimated paths from the SEM. The results is shown in Figure 5.2. The research model consists of three components:

- The first component of the model involves H1 aims to illustrate the positive relationship between TF-MA (marco-level trade facilitation) and TF-MI (micro-level trade facilitation). The results indicate that social capital of national shipping

centres involve both TF-MA (marco-level trade facilitation) and TF-MI (micro-level trade facilitation).

- The second component of the model involves H2.1 and H2.2. This part aims to establish the negative relationship between trade costs and trade facilitation including both TF-MA (marco-level trade facilitation) and TF-MI (micro-level trade facilitation).
- The third component of the model involves H3, H4, H5.1, and H 5.2. These hypotheses aim to establish the positive economic outcomes of the national shipping centres.

Figure 5.2: Research Model



SEM is designed to test conceptual or theoretical models (Kaplan 2007[207]). It is used to simultaneously examine a series of dependence relationships (Hair et al. 2006[208]) and the structure of the interrelationships expressed in a series of equations. These equations specify all of the relationships among the variables (i.e., TF-MA (macro-level trade facilitation), TF-MI (micro-level trade facilitation), trade costs and economic performance) involved in an analysis. A sound theoretical framework is required in this study to design the national shipping centre model. Therefore, SEM has an important role in examining the complex relationships involved. The results indicate that the hypotheses are supported; that is, Hypotheses 1, 2.1, 2.2., 3, 4, 5.1 and 5.2 will be used to build the national shipping centre model. SEM provides the numerical estimates for each of the parameters (arrows) in the model to indicate the strength of the relationships.

5.2 Model Fit

SEM is one of the most important techniques for empirical research. By using the tool of SEM, the model of national shipping centres can be established. To ensure the overall acceptance of the model, it is essential to examine how the model can best represent the data. Hence, model fit must be discussed.

To examine model fit, it is necessary to first look into absolute fit and then check the relevant fit indices. Section 5.2.1 deals with the absolute fit to determine how well the model fits the sample data. Section 5.2.2 presents various indices to illustrate whether the national shipping centre model is a "good fitting" model.

5.2.1 Absolute Fit

Absolute fit indices provide a fundamental indication of how well the proposed model fits the data (McDonal and Ho 2002[209]). Hooper et al. (2008[210]) indicated that absolute fit indices include the chi-square test and the root mean square error of approximation (RMSEA).

Chi-square test:

The chi-square test is the most commonly used method to measure model fit. The chi-square value represents the difference between the observed covariance matrix and the predicted or model covariance matrix. The relative chi-square equals the chi-square (x^2) divided by the degree of freedom (*df*). The criterion for acceptance of this index varies across researchers, which ranges from less than 2 to less than 5 (Schumacker & Lomax, 2004[211]). In general, the value should be less than 3 (Kline, 1998[212], Tabachnick and Fidell, 2001[213]). In this model, the results of the chi-square test is 2.6 (i.e. 78.596/30), which is considered to be an acceptable level.

Root Mean Square Error of Approximation (RMSEA):

The RMSEA analyses the discrepancy between the hypothesized model with optimally chosen parameter estimates and a population covariance matrix (Hooper et al. 2008[214]).The RMSEA ranges from 0 to 1, with smaller values indicating a better model fit. A value of 0.1 or less is indicative of an acceptable model fit (Hu and Bentler, 1999[215]). The RMSEA of the structural equation model in this study is 0.061, thus indicating that the model is acceptable.

5.2.2 Fit Indexes

Prior to interpreting the causal paths of the national shipping centre model, it is necessary to ensure that it is a good-fitting measurement model. Fit refers to the ability of a model to reproduce the data (i.e., usually the variance-covariance matrix). A good-fitting model is one that is reasonably consistent with the data. According to Cheung and Rensvold (2002[216]), important indexes used to compare a target model with a null model are the relative fit index (RFI), comparative fit index (CFI), normal fit index (NFI), and incremental fit index (IFI).

Relative fit index (RFI):

The RFI is one of the most informative indices in SEM (Bollen, 1986[217]). The RFI is usually between 0 and 1, with 0 representing a poor fit and close to 1 representing a very good fit. In the RFI, a value of zero indicates the worst possible model and a value of one indicates the best possible model (Kenny and McCoach, 2003[218]). The RFI value for the structural equation model in this study is 0.966, which means that it is a very good fitting model.

Comparative fit index (CFI):

The CFI is also known as the Bentler CFI (Bentler and Bonett 1980[219] and Bentler 1990[220]). The CFI compares the fit of a target model to the fit of an independent model in which the variables are assumed to be uncorrelated. A value of CFI that approaches 1 indicates an acceptable fit. The CFI value for the structural equation model is 0.988, which means an acceptable fit.

Normal fit index (NFI):

The NFI is also known as the Bentler-Bonett [221] normed fit index. The NFI varies from 0 to 1 where 1 is ideal. The NFI equals the difference between the chi-square of the null model and the chi-square of the target model, divided by the chi-square of the null model. An NFI value that exceeds 0.90 (Byrne, 1994[222]) or 0.95 (Schumacker & Lomax, 2004[223]) is acceptable. The NFI value of the structural equation model is 0.981, which indicates that the model of interest improves the fit by 98.1% relative to the null model. The Tucker-Lewis index (TLI) is similar to the NFI. The value of the TFI is usually lower than that of the NFI, but values over 0.90 or 0.95 are considered acceptable (e.g., Hu & Bentler, 1999[224]). The TLI value for the structural equation model is 0.978, thus indicating that the model is acceptable.

Incremental fit index (IFI):

The IFI is also known as Bollen's incremental fit index (1989[225] and 1990[226]). The IFI is based on a comparison of the fit of a substantive model to that of a null model (Widaman and Thompson, 2003[227]). Although this index can exceed 1, values that exceed 0.90 are regarded as acceptable. The IFI value for the structural equation model is 0.988, thus indicating that the model is acceptable.

In general, fit refers to the ability of a model to reproduce the data. The model of national shipping centres in this study can be seen as a good-fitting model because it is reasonably

consistent with the data. The fundamental indication of how well the proposed model fits the data is absolute fit. Typical tool to examine absolute fit is the chi-square test. The root mean square error of approximation (RMSEA) is also a common method to examine absolute fit.

A good-fitting model is important because of its reasonably consistent with the data. The causal paths of a good-fit model is used to establish the model of the national shipping centres in this study. Important indices used to evaluate mode fit include the following four indices: the relative fit index (RFI), the comparative fit index (CFI), the normal fit index (NFI), and the incremental fit index (IFI). The SEM of this study is examined by using all these four indices. The acceptable results indicate that the model of national shipping centres of this study is a good-fit model.

Chapter 6: Discussion

6.1 Development of National Shipping Centres Model

This section aims to discuss the development of the national shipping centre model through the validation of the hypotheses in this study. The research model has been developed by specifying the pathways with the SEM. Reliability and validity tests have been carried out, and a series of model fit tests has been conducted. The SEM illustrates the potential dependencies between variables, and the relationships between variables and their indicators. The results from the data analysis are then used for the establishment of a national shipping centre model.

Development of national shipping centres involve the building of social capital (in terms of macro-level trade facilitation and micro-level trade facilitation), the reduction of trade cost, and the enhancement of economic performance. To develop national shipping centres, a number of issues need to examine in more details. The issues of trade facilitation, public-private partnerships, building of social capital, trade costs, and economic performance are addressed in Sections 5.1.1, 5.1.2, 5.1.3, 5.1.4 and 5.1.5 respectively.

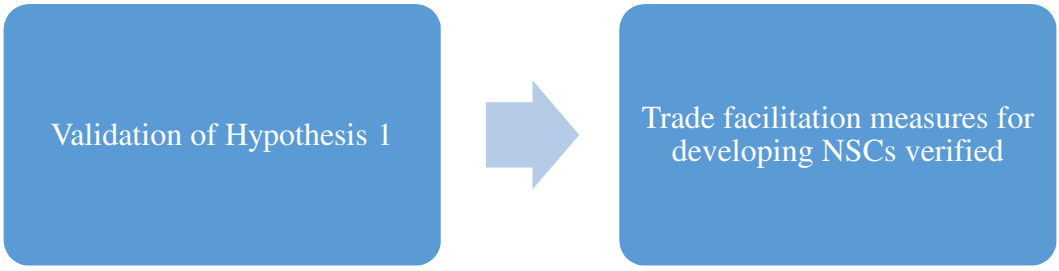
6.1.1 Trade Facilitation

In this study, the model of national shipping centres consists of three components. The first hypothesis (i.e., H1) deals with the positive relationship between TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation). The second set of hypotheses (i.e., H2.1 and H2.2) focuses on establishing the negative relationship between trade costs and trade facilitation including both TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation). The third set of hypotheses (i.e. H3, H4, H5.1, and H 5.2) looks into the consequences of performance through the establishment of the positive economic outcomes of the national shipping centres.

With the validation of Hypothesis 1, the trade facilitation measures, in terms of TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation), are found to be positively associated. Both TF-MA (macro-level trade facilitations) and TF-MI (micro-level trade facilitation) activities contribute to the development of national shipping centres. These trade facilitation measures are important social capital for the development of national shipping centres.

The measures from the logistics performance index (LPI) from the World Bank are adopted as trade facilitation activities. The LPI of the World Bank aims to serve as a benchmark amongst the different countries. Hence, existing studies deal with the first part of the model of national shipping centres in this study. The existing work is extended here by also examining the performance outcome at the firm (i.e., trade costs) and national (i.e., value added from services and gross value added) levels and not just at the country level. Hence, the model of national shipping centres provides a comprehensive model to illustrate the impact of social capital (in terms of trade facilitation activities) on trade cost and economic performance.

Figure 6.1: Validation of Hypothesis 1



The first part of the research model focuses on establishing the positive association between macro-level and micro-level trade facilitation. The findings support the first hypothesis of this study, and indicate that trade facilitation at both macro-level and micro-level is important for the development of national shipping centres. Public sectors perform macro-level trade facilitation activities, while private sectors perform micro-level trade facilitation activities. As shown in Figure 6.1, the findings have verified the importance of trade facilitation measures for both public and private sectors.

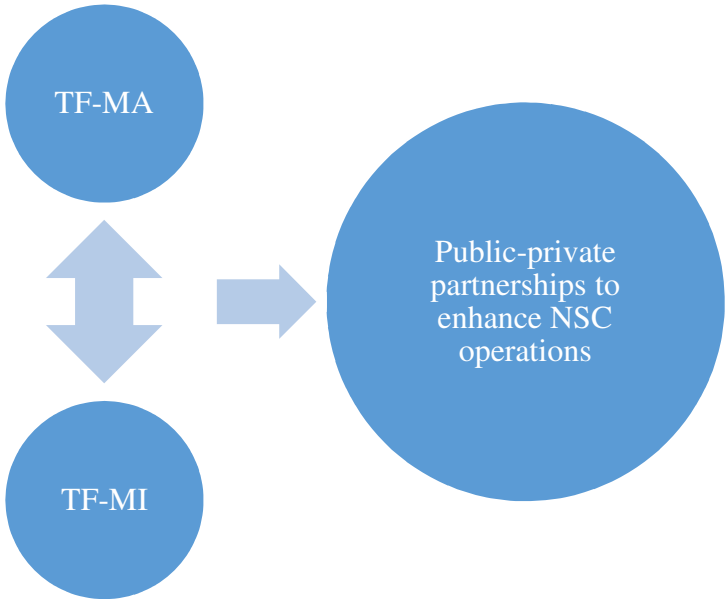
The findings provide insights for firms when they are making decisions to select appropriate location to conduct their business activities. These firms perform their business activities more efficiently in the national shipping centres. At the same time, they contribute to build the social capital of TF-MI (micro-level trade facilitation). These micro-level trade facilitation activities include TF-MI01 (ease of arranging competitively priced shipments), TF-MI02 (competency and quality of the logistics services), TF-MI03 (ability to track and trace), and TF-MI04 (frequency that shipments reach consignees within the expected delivery time). The findings are also a reference for policy makers for establishing effective trade facilitation measures to build social capital for the development of national shipping centres.

For policy makers, the trade facilitation measures that they need to take into consideration include efficiency of customs and border staff (TF-MA01) and quality of trade and transport infrastructures (TF-MA02). Business operators need to allow ease in arranging competitively priced shipments (TF-MI01), ensure competence and quality of the logistics services (TF-MI02), provide ability to track and trace (TF-MI03), and maintain frequency that shipments reach consignees within the expected delivery (TF-MI04).

6.1.2 Public and Private Partnerships

A correlation is verified between TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation). Trade facilitation activities from both macro-level and micro-level are associated with each other. TF-MA (macro-level trade facilitation) activities are generated by public sectors on the one hand and TF-MI (micro-level trade facilitation) activities are generated by private sectors on the other hand. In national shipping centres, public sectors should cooperate with private sectors to develop required social capital. The results suggest that public-private partnerships (PPP) are important for developing social capital that would enhance the operations of national shipping centres as illustrated in Figure 6.2. That is, the correlation between TF-MA and TF-MI indicates that these two sectors need to work together to develop social capital.

Figure 6.2: Correlation between TF-MA and TF-MI



In examining how the private and public sectors would work together, it is important to look into the economic system in which they are situated. In the context of national shipping centres, economic system consists of resource allocation and the distribution of goods. There are two different types of economic systems, i.e., market and planned economies. In the former, private sectors perform TF-MI (micro-level trade facilitation) activities efficiently and public sectors develop TF-MA (macro-level trade facilitation) measures to support the development of national shipping centres. In the latter, the public sectors establish TF-MA (macro-level trade facilitation), and arrange the private sectors to build on TF-MI (micro-level trade facilitation).

Figure 6.3: Validation of Hypotheses 3 & 5.1

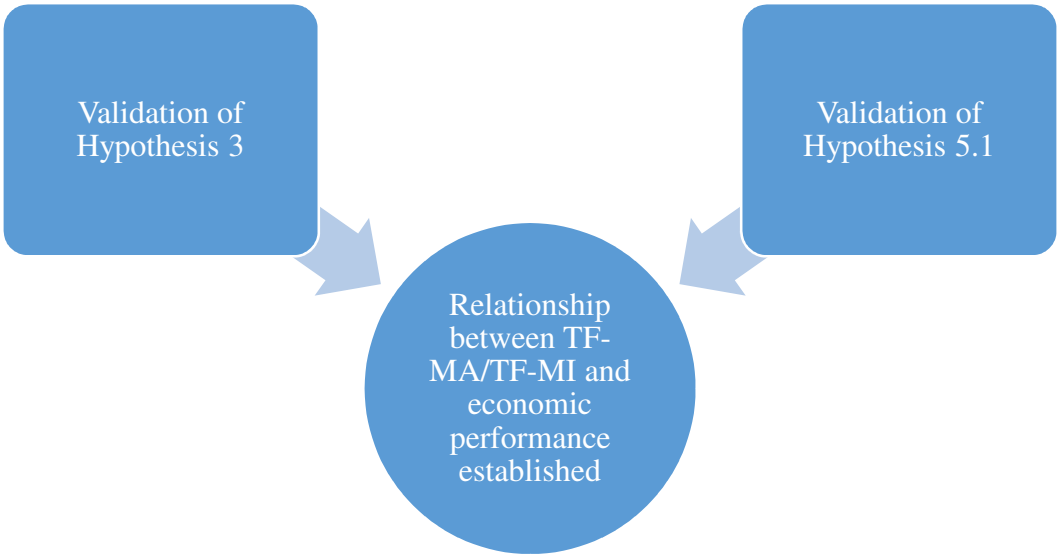


Figure 6.3 illustrates the important implications of the validation of hypothesis 3 and hypothesis 5.1 on public-private partnership. With the validation of Hypothesis 3, i.e., TF-

MA (macro-level trade facilitation) positively affects the economic performance of a country, and hypothesis 5.1, i.e., TF-MI (micro-level trade facilitation) positively affects the service orientation of a country, the relationship between trade facilitation and economic performance is empirically established in this study.

At the macro-level, trade facilitation refers to functions that are performed or managed by public sectors to facilitate trade related activities. On other hand, trade facilitation at the micro-level refers to functions that are performed or managed by private sectors to facilitate trade related activities. The validation of these two hypothesis established the relationship between trade facilitation (in terms of both macro-level and micro-level) and economic performance. The findings indicate the importance of the public and private partnership on the improvements in economic performance (in terms GDP per capita and VAS to economies).

By developing the public private partnership (PPP), the social capital can be built from both the macro-level and micro-level. Economic performance (in terms of GDP per capital and VAS to economies) can be enhanced in the national shipping centres with better social capital (in terms of TF-MA and TF-MI). Hence, the validation of Hypotheses 3 and 5.1 is important in providing implications on public private partnership to build social capital for the enhancement of economic performance.

6.1.3 Building of Social Capital

Building of social capital is important in national shipping centres. Table 6.1 provides the mean values of both of the TF-MA and TF-MI trade facilitation measures. The mean values of all the items are above 2.5 (which is the mid-point of the 5-point Likert scale). Among all the items, the mean values of TF-MA01 and TF-MA02 are the lowest (i.e., 2.5935 and 2.6372 respectively), which suggest that the public sector has less efficiency in

building the social capital of TF-MA. On the other hand, the mean values of TF-MI01, TF-MI02, TF-MI03, and TF-MI04 are 2.8452, 2.7583, 2.9178, and 3.4092.

Table 6.1: Mean Values of TF-MA and TF-MI

Measure	Mean	Rank
TF-MA01	2.5935	6
TF-MA02	2.6372	5
TF-MI02	2.7583	4
TF-MI01	2.8452	3
TF-MI03	2.9178	2
TF-MI04	3.4092	1

The findings indicate that the private sector is more efficient than the public sector in building social capital. This is an important implication for policy makers to look into the generation of social capital from the public sectors to develop national shipping centres. The public sectors may need to devote more resources or improve the efficiency at the time of social capital for the development of national shipping centres.

Among the four items of TF-MI (i.e., TF-MI01, TF-MI02, TF-MI03 and TF-MI04), the mean value of TF-MI04 is the highest with the mean value of 3.4092. Therefore, the results indicate the importance of connectivity to provide high sailing frequencies so that shipments reach consignees within the expected delivery as social capital for the development of national shipping centres. Building connectivity means it is essential for a national shipping centre serves as a gateway port. A gateway port is a network port that acts as an entrance to another network. It is a port on shipping routes that can connect to other parts of the world. Features of gateway port include: (1) possesses excellent

accessibility to connect to a number of other locations, (2) possesses excellent hard and soft infrastructure to handle largest ships, and (3) possesses the ability to handle huge volume of transhipment cargo (i.e., off-loading of cargo from one ship and loading onto another ship). The issue of connectivity is important from the perspectives of many economies. The studies on connectivity go beyond national levels. Examples of recent studies include "ASEAN Maritime Connectivity" and APEC Gateway Port Connectivity". Hence, connectivity is an important social capital of national shipping centres.

On the other hand, the mean values of the scores the other three items of TF-MI (i.e., TF-MI01, TF-MI02 and TF-MI03) are less than 3.0. Although the mean values of these three items (i.e., TF-MI01, TF-MI02 and TF-MI02) are higher than TF-MA01 and TF-MA02, their mean values are less than 3.0. The findings indicate the need to enhance the social capital development in the following areas:

- Improve the easiness to arrange shipments with competitive price
- Enhance the quality of logistics service
- Strength the ability of tracking and tracing

The importance of social capital (in terms of macro-level and micro-level trade facilitation) can be illustrated through the validation of H1, H3, and H5.1 of the model of national shipping centres. According to the finding, TF-MA02 (i.e., quality of trade and transport infrastructure) obtains the highest score in the macro-level, and TF-MI04 (i.e., frequency of shipment reach consignees within the expected delivery times) in the micro-level. Based on these findings, two important points can be found for the development of national shipping centres.

The first point is high quality infrastructure and shipping services. From the macro-level, quality of trade and transport infrastructure provided by public sectors significantly influence the development of national shipping centres. From the micro-level, the most

influential element is shipping services provided by private sectors with high sailing frequency to meet users' requirement to deliver goods on times. Hence, it is essential for public sectors to provide high quality infrastructure and encourage shipping firms to provide high quality shipping service to meet users' need.

The second implication is the importance of connecting. The high value of TF-MI04 indicates the importance of high sailing frequency. It is essential for a national shipping centre to be a network port that acts as an entrance to another network. A national shipping centre is a port on shipping routes that can connect to other parts of the world with high sailing frequency. A prerequisite for high sailing frequency is high quality trade and transport infrastructure (i.e., TF-MA02).

6.1.4 Trade Costs

Trade cost is one of the components of the research model of national shipping centres. In this study, Hypothesis 2.1 aims to establish the negative relationship between TF-MA (macro-level trade facilitation) and trade costs, and Hypothesis 2.2 aims to establish the negatively relationship between TF-MI (micro-level trade facilitation) and trade costs. Through the validation of Hypotheses 2.1 and 2.2, this study empirically validates the relationships between trade facilitation activities and their correlation with trade costs.

Figure 6.4 illustrate the validation of hypotheses 2.1 and 2.2, showing a negative association between trade facilitation (both at the micro- and macro-levels) and trade costs is established. The findings illustrate the impacts of social capital of national shipping centres on trade cost reduction. The next step is to identify the elements of social capital in affecting the reduction of trade costs.

Figure 6.4: Validation of Hypotheses 2.1 & 2.2

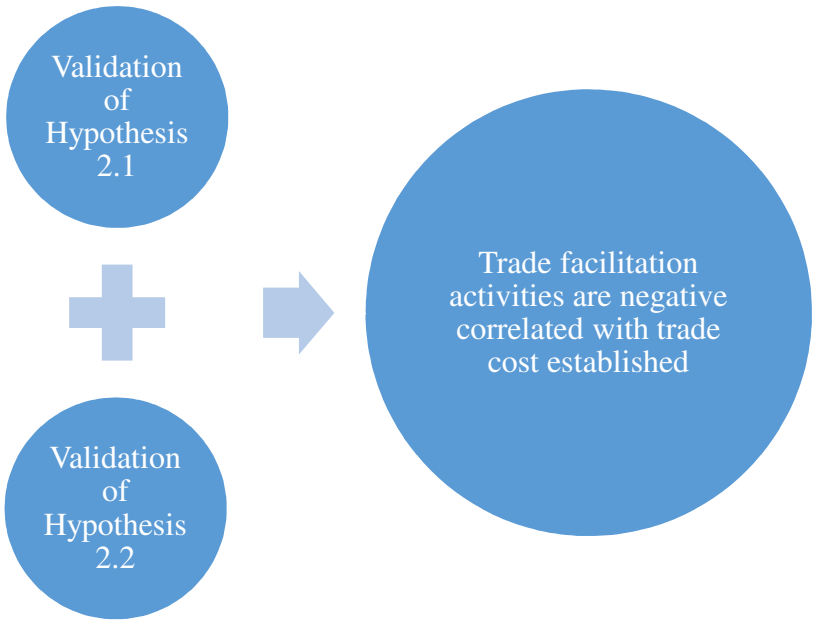


Table 6.2 presents the correlation matrix to illustrate the association between TF-MA (macro-level trade facilitation) and trade costs (in which CE refers to the cost to export and CI refers to the cost to import). The results indicate that both TF-MA01 and TF-MA02 negatively correlate with trade costs. When comparing these two items, the correlation co-efficiency of TF-MA02 is higher (with a correlation coefficient of -0.353 for CE and -0.372 for CI). This indicates that TF-MA02 is more powerful in influencing trade costs of national shipping centre. Therefore, to build social capital that would reduce trade costs, the public sector will require more resources to improve the quality of their trade and transport infrastructures.

Table 6.2: Correlation Matrix of TF-MA and Trade Cost

	MA01	MA02	CE	CI
MA01	1			
MA02	.888**	1		
CE	-.299**	-.353**	1	
CI	-.318**	-.372**	.932**	1

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Table 6.3: Correlation Matrix of TF-MI and Trade Cost

	MI01	MI02	MI03	MI04	CE	CI
MI01	1					
MI02	.670**	1				
MI03	.672**	.861**	1			
MI04	.600**	.788**	.773**	1		
CE	-.241*	-.303**	-.286**	-.248**	1	
CI	-.259**	-.314**	-.277**	-.204*	.932**	1

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

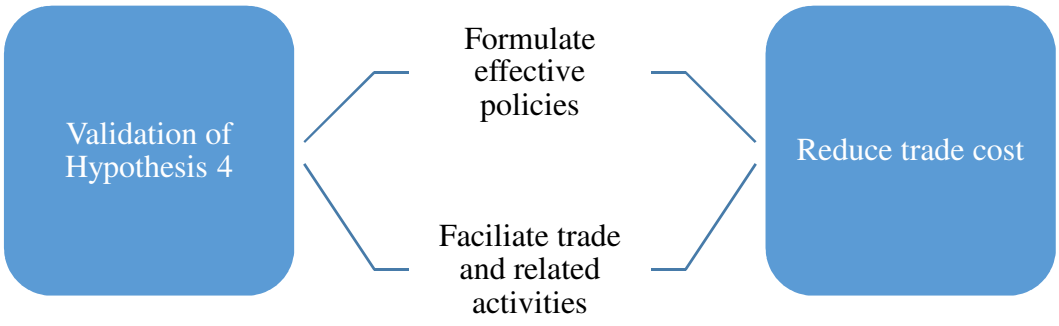
Table 6.3 presents the correlation matrix to illustrate the association between TF-MI (micro-level trade facilitation) and trade costs. The results indicate that all four measures of TF-MI (micro-level trade facilitation) are negatively correlated with trade costs. When comparing these four items, the correlation coefficient of TF-MI02 is the highest (with a correlation coefficient of -0.303 for CE and -0.301 for CI). This indicates that TF-MI02

has the most powerful in influencing trade costs in national shipping centres. Therefore, to build social capital that would reduce trade costs, the private sector will need to identify effective tools that would enhance the competence and the quality of their logistics services. They may also need to put forth more resources that would enhance competence and the quality of their logistics services.

6.1.5 Economic Performance

The confirmation of Hypothesis 4 (trade cost negatively influences the service orientation of a country) indicates a negative relationship between trade costs and service orientation in national shipping centres. Therefore, the public sector would need to formulate effective policies to build the required social capital and the private sector would need to perform trade and related activities efficiently to develop a national shipping centre, see Figure 6.5.

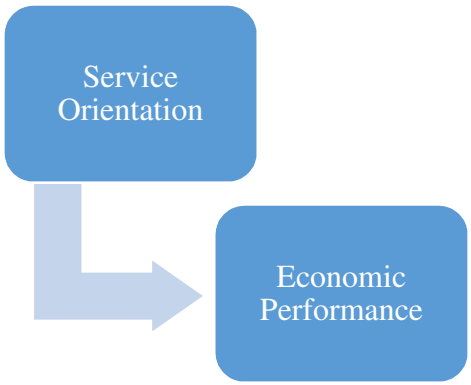
Figure 6.5: Validation of Hypothesis 4



Firms tends to select national shipping centres with lower trade costs as a location to provide their trading and related services. The negative relationship between trade costs and service orientation indicates that a location with lower operating costs attracts business firms to choose this location to conduct their business and provide services to other users

of the national shipping centre. This ultimately leads to increasing the competitiveness of the country.

Figure 6.6: Validation of Hypothesis 5.2



Hypothesis 5.2 (the service orientation of a country positively affects its economic performance) aims to verify the economic outcomes of developing a national shipping centre It is found that the service orientation of a national shipping centre positively affects its economic performance, see Figure 6.6. Service-oriented countries are generally more efficient in providing trading related activities.

The increasing importance of the orientation towards services reflects modern business operations. National shipping centres with lower operating costs and strong TF-MI (micro-level trade facilitation) will attract business operations. The prevalence of TF-MI (micro-level trade facilitation) reflects the increasing importance of the orientation towards services. Table 6.4 illustrates that there is a positive relationship between service orientation (in terms of value-added from services) and GDP per capita. The results further

support that there is a positive correlation between service orientation and economic performance in national shipping centres with a correlation coefficient of 0.297.

Table 6.4: Service Orientation and Economic Performance

	GDP per Capita	**Service Orientation**
GDP per Capita	1	
Service Orientation	0.297**	1

** Correlation is significant at the 0.01 level (2-tailed).

6.2 Shipping Centres across Countries

There are two major indications of the research model of national shipping centres in this study:

- Trade facilitation activities, i.e., TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) are negatively correlated with trade costs (CE and CI) on the one hand.
- Trade facilitation activities, i.e., TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) are positively correlated with economic performance on the other hand.

The results indicate the importance of trade facilitation in the development of national shipping centres, and particularly relevant for developing countries. The differences between the developed and developing countries are important enough to require further examination. For instance, developed countries have advanced transport infrastructures, but these also have high operating costs.

Additional insight is provided for policy makers which is outlined in Table 6.5. For example, trade facilitation activities (TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation)) in developed countries are positively correlated with economic performance, but not with trade costs (CE and CI). This result therefore serves as a useful reference for policy makers so that they can better understand their "trade costs". That is, for developed countries, factors such as advanced infrastructure and availability of expertise (rather than operating costs) are important for economic development.

Table 6.5: Correlation Matrix of Developed Countries

	MA01	MA02	MI01	MI02	MI03	MI04	CE	CI	GDP/C
MA01	1								
MA02	.924**	1							
MI01	.711**	.719**	1						
MI02	.872**	.933**	.789**	1					
MI03	.761**	.864**	.804**	.931**	1				
MI04	.898**	876**	656**	844**	767**	1			
CE	-.302	-.223	-.081	-.199	-.111	-.195	1		
CI	-.356*	-.260	-.132	-.219	-.121	-.236	.970**	1	
GDP/C	.654**	.673**	545**	.560**	.584**	632**	039	-.010	1

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Table 6.6: Correlation Matrix of Developing Countries

	MA01	MA02	MI01	MI02	MI03	MI04	CE	CI
MA01	1							
MA02	.888**	1						
MI01	.681**	.704**	1					
MI02	.889**	.924**	.670**	1				
MI03	.834**	.822**	.672**	.861**	1			
MI04	.750**	.745**	.600**	.788**	.773**	1		
CE	-.299**	-.353**	-.214**	-.303**	-.286**	-.248**	1	
CI	-.318**	-.372**	-.259**	-.314**	-.277**	-.204**	.932**	1

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

As for developing countries, the operating costs are more important in affecting location decisions. As can be observed in Table 6.6, both TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) are negatively correlated with trade costs (CE and CI). That is, trade facilitation is increased with reductions in trade costs. This is important for policy makers, who need to put forth efforts to develop effective measures for the reduction of trade costs in order to attract businesses.

The results indicate that there are differences between the developed and developing countries, which is a useful reference for policy makers in developing effective measures and decision makers should take note of the differences. Although trade facilitation activities (TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation)) are negatively correlated with trade costs (CE and CI) in general, there are still differences between developed countries and developing countries. Trade facilitation is important for the development of national shipping centres, particularly for developing countries. However, trade facilitation activities are positively correlated with economic performance for both developed and developing countries.

Chapter 7: Case study

7.1 The Cases of China, Japan and Korea

In this study, hypotheses have been developed and then tested with SEM. A national shipping centre model is then formulated based on the verification of the hypotheses. This is useful to use some real-life cases to illustrate the application of the of the development of national shipping centres. In Section 6.1, three cases are presented to illustrate the national shipping centre model with application in China, Japan and Korea. Section 7.1.1 examines the TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) in these three countries. Section 7.1.2 examines their trade costs and economic performance. Section 7.1.3 discusses the development of shipping centres.

7.1.1 TF-MA and TF-MI: China, Korea and Japan

Due the rapid globalization of production activities and markets, and the continuing increase in global trade volume, trading and shipping related activities are now growing at a fast pace. Shipping, logistics, and trade related activities continue to bring about many commercial opportunities to business firms.

Table 7.1 shows the top ten third-party logistics providers (3PL) worldwide. Seven out of the ten are American or European based firms. Three are Asian based firms, with a Japanese firm (Nippon) that ranks third in revenue generated, a Korean firm (Hyundai) that ranks sixth, and a Chinese firm (Sinotrans) that ranks tenth. A comparison of the transport logistics industries in Japan, Korea and China is useful for showing the state of their national shipping centre. Hence, these three countries are selected as the case studies to illustrate national shipping centres.

Table 7.1: Major Logistics Players Listed by Revenue Generated

Rank	Third-party Logistics Provider	Country	Revenue*
1	DHL	Germany	31,639
2	Kuehne & Nagel	Switzerland	22,141
3	Nippon Express	Japan	20,321
4	DB Schenker	Germany	19,789
5	C.H. Robinson	United States	11,359
6	Hyundai GLOVIS	Korea	9,832
7	CEVA Logistics	Netherlands	9,290
8	UPS	United States	9,147
9	DSV	Demark	7,759
10	Sinotrans	China	7,523

*Gross Logistics Revenue in US$ Million

Source: Global and National Infrastructure, Logistics, and Third-Party Logistics Market Trends and Analysis by Armstrong Associate, (http://www.3plogistics.com/Global_3PL_Market_Analysis_EIS-2014.pdf)

Table: 7.2 TF-MA and TF-MI of the Case Countries

TF-MA & TF-MI	China	Japan	Korea
TF-MA01 (Customs)	3.21	3.78	3.47
TF-MA02 (Infrastructure)	3.67	4.16	3.79
TF-MI01 (International shipment)	3.50	3.52	3.44
TF-MI02 (Logistics competence)	3.46	3.93	3.66
TF-MI03 (Tracking and tracing)	3.50	3.95	3.69
TF-MI04 (Timeliness)	3.87	4.24	4.00
Average Score	3.54	3.93	3.68
Overall Ranking	28	10	21

The logistics performance index (LPI) of the World Bank focuses on benchmarking among various countries. The benchmarks for the TF-MA (macro-level trade facilitation), i.e., TF-MA01 and TF-MA02, and TF-MI (micro-level trade facilitation), i.e., TF-M101, TF-MI02, TF-MI03 and TF-MI04, for China, Japan and Korea are shown in Table 7.2. The average score for China, Japan and Korea is 3.54, 3.93, and 3.68 respectively.

Among the three case countries, Japan has the highest overall ranking, Korea second and China third. According to the national shipping centre model, countries with higher levels of TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) have lower trade costs. In addition, countries with higher levels of TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) have better economic performance. Therefore, Japan has lower trade costs and better economic performance than Korea and China, while Korea has lower trade costs and better economic performance than China.

7.1.2 Trade Costs and Economic Performance: China, Japan and Korea

This study extends the LPI, which provides benchmarks at the country level, by examining performance outcomes at the firm (i.e., logistics and trade costs) and national (i.e., economic performance) levels. Table 7.3 therefore presents the logistics cost (GDP %) and GDP per capita of the three case countries.

The data sources are listed as follows:

- Logistics Cost (in GDP percentage): Global and National Infrastructure, Logistics, and Third-Party Logistics Market Trends and Analysis by Armstrong Associate, (http://www.3plogistics.com/Global_3PL_Market_Analysis_EIS-2014.pdf)
- Trade Cost (cost to import in USD per container): The World Bank, (http://data.worldbank.org/indicator/IC.IMP.COST.CD)

- Trade Cost (cost to export in USD per container): The World Bank, (http://data.worldbank.org/indicator/IC.EXP.COST.CD)
- GDP per Capita (in USD per individual): The World Bank (http://data.worldbank.org/indicator/NY.GDP.PCAP.CD)

Table 7.3: Data of the Case Countries

Country	Logistics Cost	Trade Cost (Import)	Trade Cost (Export)	GDP per Capita
China	18%	800	823	7594
Japan	8.5%	1021	829	36194
Korea	9%	695	670	27970

At the firm level, the logistics cost (in terms of percentage of GDP) in Japan is the lowest whereas that in China is the highest amongst the three case countries. Recall that the average score of Japan for TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) is the highest whereas that of China is the lowest amongst the three case countries. Therefore, the results indicate that logistics cost is negatively correlated with trade facilitation measures. However, the results cannot determine the relationship between trade costs (for import and export) and the trade facilitation measures as the case countries are a developed country (i.e., Japan) and two developing countries (i.e., Korea and China).

At the national level, the GDP per capita in Japan is the highest whereas the GDP per capita in China is the lowest among the three case countries. Recall that the average score of Japan for TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) is the highest whereas that of China is the lowest amongst the three case countries. Therefore,

the findings indicate that economic performance is positively correlated with trade facilitation measures.

7.1.3 Status of National Shipping Centres

A comparison on the status of national shipping centre development in the case countries is provided on Table 7.4. The results show both TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) are negatively correlated with logistics cost but positively correlated with economic performance:

- In the case of China, the TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) are the lowest among the three countries. The logistics cost of the country is the highest and the economic performance is the lowest.
- In the case of Japan, the TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) are the highest among the three countries. The logistics cost of the country is the lowest and the economic performance is the highest.

The use of these three counties (i.e., China, Japan and Korea) is an excellent application of the national shipping centre model to illustrate: (1) the negative associated between social capital and trade cost, and (2) the positive association between social capital and economic performance.

Table 7.4: Status of National Shipping Centres

Country	TF-MA	TF-MI	Logistics Cost	Economic Performance
China	Low	Low	High	Low
Japan	High	High	Low	High
Korea	Medium	Medium	Medium	Medium

Due to China's expanding economy, the logistics and transport sector has experienced a significant growth. As shown in Table 7.5, the revenue growth of multimodal logistics and maritime transport companies is 53.8% and 13.6% respectively. On the other hand, the rate of the growth of companies that are operating in Japan and Korea is relatively lower in comparison. Although the rate of growth of Japanese and Korean multimodal logistics and maritime transport companies is less than that of the Chinese companies, their logistics and transport companies are operating more efficiently

Table 7.5: Performance of Logistics and Transport Companies

Multimodal logistic companies	
Country	**Revenue growth (2004-2009; %)**
Korea	5.9%
China	53.8%
Japan	1.2%
Maritime transport companies	
Country	**Revenue growth (2004-2009; %)**
Korea	9.2%
China	13.6%
Japan	5.9%

Source: Lee and Lee 2011[228]

Table 7.6 Average Efficiency Score of Logistics and Transport Companies

Multimodal logistic companies			
Country	**Score* (2005)**	**Score* (2007)**	**Score* (2009)**
Korea	0.449	0.511	0.546
China	0.335	0.358	0.287
Japan	0.571	0.604	0.575
Maritime transport companies			
Country	**Score* (2005)**	**Score* (2007)**	**Score* (2009)**
Korea	0.791	0.775	0.855
China	0.620	0.345	0.305
Japan	0.876	0.87	0.895

*The score is ranged from 0 to 1 (with 0 as the lowest and 1 as the highest)

Source: Lee and Lee 2011[229]

As shown in Table 7.6, the average efficiency scores of both the Chinese multimodal logistics and maritime transport companies are the lowest among the three case countries. The results suggest that companies that are operating in China with lower levels of TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) are less efficient, while companies that are operating in Japan with higher levels of TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) are more efficient.

Understanding the economic performance and logistics cost at the country level is important not only in the transport sector but across all sectors. Lower logistics costs reduce the cost of delivering goods both nationally and internationally and encourage trade

activities, open new markets and generate more business. Therefore, performance evaluation is a useful tool to improve the efficiency and functioning of national shipping centres from both macro- and micro-perspectives. TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) are critical for policy formulation and implementation at the higher levels.

7.2 The Cases of Hong Kong and Singapore

The data provided by the World Bank are from national level. Hence, three countries (i.e., China, Japan and Korea) are selected as cases to illustrate the application of the model of national shipping centres. Similar to most of the countries, these countries possess more than one ports (e.g., Port of Shanghai, Port of Shenzhen and other ports in China). However, there are some economies possess a single port. To illustrate the use of the model of shipping centre in areas with single port, Section 7.2 uses two examples (namely Port of Hong Kong and Port of Singapore) to provide the real-life application of the research model.

7.2.1 TF-MA and TF-MI: Hong Kong and Singapore

Both Hong Kong and Singapore are important shipping centres as these ports are the world's top busiest ports in terms of container throughput. Hong Kong ranked the first among the world's busiest container ports between 2000 and 2004. Then, Singapore took the position as number one among the world's busiest container ports between 2005 and 2009. Table 7.7 shows the latest ranking of container ports of the world.

Both Hong Kong and Singapore are listed as one of the top five container ports in the world. Both Hong Kong and Singapore are shipping centres with high connectivity. Table 7.8 shows that the Liner Shipping Connectivity Index (LSCI) of both Hong Kong and Singapore. Their scores are consistently over the baseline of 100.00. According to the United Nations Conference of Trade and Development (UNCTAD), the LSCI is an indicator for the provision of liner shipping services based on five components (i.e., ships, capacity, shipping companies, services, and ship sizes). The high scores on LSCI indicate that both Hong Kong and Singapore are world class shipping centres.

Table 7.7: Top Five Container Ports in the World

Rank	2014		2015	
	Port	Throughput*	Port	Throughput
1	Shanghai	35.285	Shanghai	36.537
2	Singapore	33.869	Singapore	30.922
3	Shenzhen	24.037	Shenzhen	24.205
4	Hong Kong	22.226	Ningbo	20.627
5	Ningbo	19.450	Hong Kong	20.073

*in million TEUs
Source: Marine Department, The Hong Kong SAR Government

Table 7.8: Liner Shipping Connectivity Index of Hong Kong and Singapore

Year	Hong Kong	Singapore
2010	113.60	103.76
2011	115.28	105.02
2012	117.18	113.16
2013	116.63	106.91
2014	115.99	113.16
2015	116.76	117.13

The logistics performance index (LPI) of the World Bank focuses on benchmarking among various countries. The benchmarks for the TF-MA (macro-level trade facilitation), i.e., TF-MA01 and TF-MA02, and TF-MI (micro-level trade facilitation), i.e., TF-M101, TF-MI02, TF-MI03 and TF-MI04, for China, Japan and Korea are shown in Table 7.9. The average score for Hong Kong and Singapore is 3.83 and 4.00 respectively.

Table: 7.9 TF-MA and TF-MI: Hong Kong and Singapore

TF-MA & TF-MI	Hong Kong	Singapore
TF-MA01 (Customs)	3.72	4.01
TF-MA02 (Infrastructure)	3.97	4.28
TF-MI01 (International shipment)	3.58	3.70
TF-MI02 (Logistics competence)	3.81	3.97
TF-MI03 (Tracking and tracing)	3.87	3.90
TF-MI04 (Timeliness)	4.06	4.25
Average Score	3.83	4.00
Overall Ranking	15	5

Between the two shipping centres, Singapore has a higher overall ranking. According to the national shipping centre model, countries with higher levels of TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) have lower trade costs. In addition, countries with higher levels of TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) have better economic performance. Therefore, Singapore has lower trade costs and better economic performance.

7.2.2 Trade Costs and Economic Performance: Hong Kong and Singapore

This study extends the LPI (in terms of TF-MA and TF-MI) to provide benchmarks at the country level, by examining performance outcomes at the firm (i.e., handling costs). To illustrate the handling and trade costs, Table 7.10 shows the terminal handling charges of Hong Kong and Singapore. The handling costs of Hong Kong is higher than Singapore.

The results support the theoretical model that ports with higher levels of TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) have better lower trade cost. As the overall TF-MA and TF-MI scores of Hong Kong is lower, the terminal handling cost is higher.

Table 7.10 Terminal Handling Charges per TEU

	Hong Kong	Singapore
Trans-Pacific	HK$2,140	HK$1,148
Asia/Europe	HK$2,065	HK$1,148
Intra-Asia	HK$1,250	HK$1,148

Table 7.11 illustrate the cost to export and cost of import of both Hong Kong and Singapore. At the firm level, the trade costs of Singapore is lower than Hong Kong. Recall that the average score of Singapore for TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) is the higher than Hong Kong. Therefore, the results indicate that trade cost is negatively correlated with trade facilitation measures.

Table 7.11: Trade Cost of Hong Kong and Singapore

		Cost to Export	Cost to Import
Hong Kong	2005	USD425	USD425
	2014	USD590	USD565
Singapore	2005	USD416	USD267
	2014	USD460	USD440

Table 7.12: Economic Performance of Hong Kong and Singapore

Port	GDP per Capita
Hong Kong	USD42,442
Singapore	USD52,888

At the national level, the GDP per capita in Singapore is the higher (as shown in Table 7.12). Recall that the average score of Singapore for TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) is the higher. Therefore, the findings indicate that economic performance is positively correlated with trade facilitation measures.

7.2.3 Status of Shipping Centres

A comparison on the status of shipping centre development in the case countries is provided on Table 7.13. The results show both TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) are (1) negatively correlated with trade cost, and (2) positively correlated with economic performance:

- In the case of Hong Kong, the TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) are the lower. The trade cost of the shipping centre is higher and the economic performance is lower.
- In the case of Singapore, the TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) are higher. The trade cost of the shipping centre is the lower and the economic performance is higher.

Table 7.13: Status of Shipping Centres

Port	TF-MA	TF-MI	Trade Cost	Economic Performance
Hong Kong	Low	Low	High	Low
Singapore	High	High	Low	High

The use of these two ports (i.e., Hong Kong and Singapore) is an excellent application of the theoretical e model to illustrate: (1) the negative associated between social capital and trade cost, and (2) the positive association between social capital and economic performance. Understanding the economic performance and trade cost at the port level is important across all sectors. Lower trade costs reduce the transport cost nationally and internationally to encourage trade activities and generate new business. The theoretical model is a useful tool to examine the social capital of national shipping centres from both macro- and micro-perspectives, and their impacts on trade costs and economic performance.

Chapter 8: Conclusion

8.1 Model of National Shipping Centre

8.2 Consequences of National Shipping Centre

8.3 Contributions

8.4 Research Limitations and Future Research Agenda

8.1 Model of National Shipping Centres

The objective of this study is to build model of national shipping centres. Specifically, the model consists of three components:

- The first component (i.e., H1) focuses on establishing the positive relationship between TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation).
- The second components (i.e., H2.1 and H2.2) investigate the negative relationship between trade costs and trade facilitation including both TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation).
- The third component (i.e. H3, H4, H5.1, and H 5.2) examines the consequences of performance through the establishment of the positive economic outcomes of the national shipping centres.

This study uses SEM as a tool to validate the hypotheses, which constitute the three components of the model of national shipping centres. The research methodology is empirical approach by collecting secondary data to validate the proposed research model. A number of reliability and validity tests have also been carried out. This study builds the research model of national shipping centres by specifying the pathways with the SEM. The model of national shipping centres involves the elements of building of social capital (in terms of macro-level trade facilitation and micro-level trade facilitation), reduction of trade cost, and enhancement of economic performance.

After the establishment of the model of national shipping centres, it is desirable to examine key issues related to the development of national shipping centres. Discussion on previous sections identify important issues for the development of national shipping centres. This section looks issues to boost the development of national shipping centres. Issues related

to trade facilitation, public-private partnerships, trade costs, and economic performance are examined.

H1: Trade Facilitation

Hypothesis 1 verifies the association between TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation. According to the findings of this study, both TF-MA (macro-level trade facilitations) and TF-MI (micro-level trade facilitation) activities contribute to the development of national shipping centres. Both TF-MA (macro-level trade facilitations) and TF-MI (micro-level trade facilitation) are elements of the social capital significantly contribute to the development of national shipping centres.

The building of social capital in national shipping centres involves both public sectors (government or other related agency) and private sectors (users of national shipping centres, e.g., traders, shipping companies, and logistics service providers). Public sectors conduct tasks related to macro-level trade facilitation activities on the one hand, while private sectors conduct tasks related to micro-level trade facilitation activities on the other hand. From the perspective of public sectors particularly policy makers, TF-MA (macro-level trade facilitation) measures are essential to build social capital for the development of national shipping centres.

From the perspective of private sectors, business firms make decisions to select location to perform their business operations. These business firms can carry out their business activities more efficiently in the national shipping centres, which possess required social capital. Simultaneously, these business firms devote construct to the social capital of TF-MI (micro-level trade facilitation). Examples include: (1) the operations of liner shipping companies contribute to the provision of competitively priced shipping services, and the improvement of sailing frequency (2), the operations of logistics service providers

contribute to the supply of competency and quality of the logistics services, and provision track and trace.

H3 and H5.1: Public and Private Partnerships

The findings of this study validates that trade facilitation activities from both macro-level and micro-level are associated with each other. In the context of national shipping centres. Public sectors deal with TF-MA (macro-level trade facilitation) activities, and private sectors deal with TF-MI (micro-level trade facilitation) activities. Ideally, public sectors cooperate with private sectors to ensure the availability of required social capital for the development of national shipping centres. The findings indicate the importance of public-private partnerships (PPP) for the development of social capital to enhance economic performance.

The validation of Hypotheses 3 & 5.1 illustrate the importance of TF-MA (generated by public sectors) and TF-MI (generated by private sectors on economic performance. Hypothesis 3 aims to illustrate that TF-MA (macro-level trade facilitation) positively affects the economic performance of a country. Hypothesis 5.1 aims to illustrate that TF-MI (micro-level trade facilitation) positively affects the service orientation of a country. The validation of these two hypotheses established the positive relationship between trade facilitation (in terms of both macro-level and micro-level) and economic performance. The findings also indicate the existence of the public and private partnership on the provision of TF-MA and TF-MI on the enhancement of economic performance (in terms GDP per capita and VAS to economies).

To examine public private partnership, it is essential to look into the economic system. In the context of national shipping centres, users can select different types of economic systems (i.e., market and planned economies), where to conduct their business operations.

To enhance economic performance of national shipping centre, it is essential to establish the public private partnership. The public private partnership (PPP) is useful for both market economies and planned economies:

- In the cases of market economies, private sectors perform TF-MI (micro-level trade facilitation) activities on one hand and public sectors perform TF-MA (macro-level trade facilitation) activities on the other hand. Public sectors also need to implement appropriate measures to support the development of national shipping centres.
- In the cases planned economies, public sectors formulate measures to develop national shipping centres. At the same time, the public sectors perform TF-MA (macro-level trade facilitation) activities. Public sectors implement measures to arrange the private sectors to build on TF-MI (micro-level trade facilitation).

H2.1 and H2.2: Trade Costs

In the model of national shipping centres, Hypothesis 2.1 aims to establish the negative relationship between TF-MA (macro-level trade facilitation) and trade costs, while Hypothesis 2.2 aims to establish the negatively relationship between TF-MI (micro-level trade facilitation) and trade costs. With the collection of empirical data, a series of test has been conduct for the formulation of the research model. The findings support hypotheses 2.1 and 2.2, illustrating a negative association between trade facilitation (both at the micro- and macro-levels) and trade costs is established.

The model of national shipping centres is important because it is not only identify the social capital (i.e., macro- and micro-level trade facilitation activities), the model also illustrate the negative association between the availability of social capital and trade costs. The better the social capital of national shipping centres, the lower the trade costs. Existing studies

focus on the development of trade facilitation measures for social capital building. This study goes beyond by investigating the effect on trade costs.

The findings contribute to provide an excellent justification for building social capital for the development of national shipping centres. National shipping centres with appropriate macro- and micro-level trade facilitation activities attract business firms to conduct their business operations. This study provides empirical evidence to support the argument that trade cost reduction is a critical factor for location decision.

H4 and H5.2: Economic Performance

In the model of national shipping centres, the confirmation of Hypothesis 4 (i.e. trade cost negatively influences the service orientation of a country) suggests the existence of a negative relationship between trade costs and service orientation. Furthermore, the confirmation of Hypothesis 5.2 (the service orientation of a country positively affects its economic performance) emphasises the contribution of service sectors to the economic outcomes for the development national shipping centre. Overall, H4 and H5.2 deals with economic outcomes of the model of national shipping centres.

The first component of the model of national shipping centres aims to identify the social capital (i.e., macro-level and micro-level trade facilitation activities), while the second component of the model illustrates the negative association between social capital and trade costs. The third component of the modal shows the performance outcomes. Existing studies mainly focus on the promotion of trade facilitation measures. This study goes beyond not only by investigating the effect on trade costs, but also the performance outcomes.

The research model of this study contributes to provide justifications for building social capital for the development of national shipping centres. National shipping centres with

appropriate macro-level and micro-level trade facilitation activities not only provide the operating environment for business firms to conduct their business activities with lower trade cost, they also have better economic performance. This study provides empirical evidence to support the argument that better performance can be achieved by building social capital to develop national shipping centres.

8.2 Consequences of National Shipping Centres

The development of national shipping centres is important for economic performance. It is timely and important to study the ways to facilitate the development of national shipping centres for four reasons.

First, due to the rapid globalization of production activities and markets, as well as the continual increases in global trade volume, it is anticipated that shipping activities will continue to also grow at a fast pace. Shipping, logistics, and trade related activities will continue to bring about many commercial opportunities to business firms. However, there is insufficient knowledge on the requirements for the development of national shipping centres and their economic implications. This research is therefore valuable to policy makers, as it identifies trade at both the macro- and micro-levels (through the validation of Hypothesis 1) to facilitate activities that contribute to the development of national shipping centres. Existing tools (e.g., the LPI) focus on benchmarking among different countries. However, this study extends their work at the country level by examining performance outcomes at the firm (i.e., trade costs) and the national (i.e., value added from service and gross value added) levels. From the perspective of the private sector, the findings would provide insights for firms to make decisions to enhance their performance at the firm level (by reducing trade costs). From the perspective of the public sector, the findings are useful for policy makers to develop effective trade facilitation measures to build social capital for the development of national shipping centres.

Secondly, this study empirically validates the proposed model to establish relationships between trade facilitation activities, and their correlations with trade costs (through the validation of Hypotheses 2.1 and 2.2) and economic performance (through the validation of Hypotheses 3 and 5.1). At the macro-level, trade facilitation refers to functions that are performed or managed by a government to facilitate trade related activities, while trade

facilitation at the micro-level refers to functions that are performed or managed by organizations to facilitate trade related activities. The correlation between TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) illustrate the importance of public-private partnerships in developing social capital to enhance national shipping centre operations.

Thirdly, policy makers at all levels often put forth favourable policies that aim to increase economic performance. Good economic performance is indicated by high spending per household which leads to increases in demand for consumer goods and subsequently retail activities. The development of national shipping centres can be a good means to enhance national competitiveness. To boost the development of national shipping centres, policy makers will want to formulate effective policies that develop social capital through the facilitation of trade and related activities. The confirmation of Hypothesis 4 illustrates the importance of formulating effective policies to reduce trade costs that would then increase national competitiveness.

Fourthly, the results are useful for firms in making their location decision. It is important for national shipping centre users to understand the consequences of a competent national shipping centre (e.g., higher level national shipping centres lead to lower trade costs). national shipping centres affect the location decisions of international business operators. A successful national shipping centre that has effective social capital to conduct service related activities has higher levels of economic performance (as validated from Hypothesis 5.2).

Policy Implications

Policy makers of most of countries aims to formulate favourable measures to enhance economic performance. Economic performance can be indicated by spending per

household. Better economic performance leads to higher demand for consumer goods. As a result, the trading and retail activities are increased. The development of national shipping centres can therefore be a good means to enhance national competitiveness. The consequences of developing national shipping centre is shown in Figure 8.1.

Figure 8.1: Consequences of Developing National Shipping Centres (NSCs)

To boost the development of national shipping centres, policy makers will want to formulate effective policies that develop social capital through the facilitation of trade and related activities. The confirmation of the national shipping centre model illustrates the importance of formulating effective policies that would reduce trade costs which would then increase national competitiveness.

The existence of national shipping centres explains why traders and transport service providers are situated in particular locations with higher levels of TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation). The success of a national shipping centre is closely linked to the level of competition from rivals. Policy makers often stress that "competitiveness" is important to maintain a strong economic position and respond to challenges.

A competitive country retains successful firms. Global traders and investors therefore may move away from "uncompetitive" countries towards national shipping centres. The extension of the competitiveness factor to the national level thus creates a new component in national policies that would allow domestic firms to increase their competitiveness from the perspectives of both hard (e.g., physical infrastructure) and soft (e.g., knowledge transfer) capacities.

Managerial Implications

The results in this study are useful for firms in making their location decision. A successful national shipping centre with effective social capital to conduct service related activities has higher levels of economic performance. It is therefore important for users to understand the consequences of a competent national shipping centre. According to our findings, higher level national shipping centre (with higher level of social capital) leads to lower trade costs and higher level of economic performance (in terms of both gross value added and value added from services).

National shipping centres affect the location decisions of international business operators. Justifications of the importance of location decision include the followings:

- The localization of an industry provides support for specialized service providers to source inputs for their production activities.
- Technological spill over can be generated with the rapid diffusion of information where there is localized concentration of industry.
- The pooling of specialized workforces in a locality provides an adequate supply of human resources to facilitate the development of shipping and trade related activities.

Such geographical concentration is internal to the shipping and trade sectors, but external to users who are operating in a national shipping centre. A competitive national shipping centre attracts successful business firms. Global traders and investors therefore may use this study as reference guide to select competitive national shipping centres to conduct their business operations in order to enjoy lower trade cost.

8.3 Contributions

The contributions of this study can be viewed as those that are academic, managerial, and policy related. Contributions of this study:

- Academically, this study builds and empirically validates a national shipping centre model. Three case countries (i.e., China, Japan and Korea) are used as examples to illustrate the effectiveness of this model for national shipping centres. The cases of Hong Kong and Singapore are also useful to illustrate the importance of TF-MA and TF-MI in building shipping centres.
- The findings provide implications for business managers to make their location decision. They show the importance of the development of TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) to facilitate the growth of trading related activities.
- The findings also show the importance of the development of social capital for policy makers. To enhance the development of national shipping centres, policy makers need to formulate effective policies that facilitate trade and related activities.

Academic Contribution

This study has illustrated and validated a proposed theoretical model in seeking answers to the following questions: What are the roles of trade facilitation at the macro- and micro-levels in the development of national shipping centres? Does trade facilitation influence the economic development of a country? What is the link between the development of a national shipping centre and the economic performance of a country? In answering these questions, the study thus contributes both academically and practically.

Academically, the results of this research contribute knowledge towards national shipping centres and the use of trade facilitation activities to enhance economic performance. The

findings also provide a comprehensive picture on the development of national shipping centres and their correlation with economic performance. This study also explains why national shipping centres should be developed, examines the key attributes of trade facilitation measures, and investigates their performance outcomes. Consequently, a more systemic theory-driven model for the development of national shipping centres as opposed to those in the existing literature has been provided. Furthermore, a theory that predicts and explains the drivers of the development of national shipping centres and the performance outcomes of national shipping centres is established and empirically tested.

Managerial Contributions

The efficiency of national shipping centres affects the location decision of international business operators. The findings show the importance of the development of TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) as social capital for policy makers. To contribute to the formulation of measures to boost economic growth, this study has identified both trade facilitating activities at the macro-level (TF-MA) and trade facilitating activities at the micro-level (TF-MI), which contribute to the development of national shipping centres. The findings show that both TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) are related to business operations in terms of trade costs. That is, trade costs are lower if actors conduct their business activities in an efficient national shipping centre.

The findings also provide justification for firms to select particular locations to conduct their business operations. Based on the findings, managers can formulate effective and efficient strategies when selecting a location for their firm to conduct their business. The result supports that TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) positively affect the economic performance of an economy. The finding of a positive correlation between TF-MA (macro-level trade facilitation) and TF-MI (micro-

level trade facilitation) reveals that public-private partnerships are important. Firms in the private sector may wish to focus on the development of TF-MI (micro-level trade facilitation) measures to enhance their overall operational efficiency in the industry. On the other hand, the public sector may need to formulate effective TF-MA (macro-level trade facilitation) measures for social capital development.

Policy Contributions

The development of national shipping centres is crucial to continual economic development and sustainability. Efficient national shipping centres, which comprise both upstream and downstream firms in the transport chain for conducting shipping and trade-related activities, are a desirable arena for actors (e.g., traders, logistics service providers, shipping lines, and terminal operators) to perform their business activities. National shipping centres contribute to national competitiveness in three important ways. First, the geographical concentration of national shipping centre users allows access to upstream and downstream business partners and related specialized resources. Second, a national shipping centre facilitates new entrances into the industry and reduces barriers in conducting related activities as users can access a well-established pool of resources. Finally, the concentration of industry resources facilitates knowledge transfer and market information spills among users in a national shipping centre to enhance growth of the industry.

As part of the theory development in this study, both macro-and micro-level trade facilitating activities (TF-MA and TF-MI) that contribute to the development of national shipping centres have been identified. A theoretical model is subsequently formulated to illustrate the relationships between various trade facilitating activities and trade costs. The economic outcomes are also examined. The findings show that both TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) are related to business

operations in terms of trade costs. Trade costs are lower if business activities are conducted in an efficient national shipping centre. The findings provide justification for firms to select particular locations to conduct their business operations. Based on the findings, managers can formulate effective and efficiency strategies to select locations to conduct their business. The results indicate that TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) positively affect the performance of an economy and show the importance of developing TF-MA (macro-level trade facilitation) and TF-MI (micro-level trade facilitation) as social capital. These are important implications for policy makers. That is, to increase the development of a national shipping centre, policy makers should formulate policies to effectively promote trade and related activities.

8.4 Research Limitations and Future Research Agenda

Research Limitations

This study uses the empirical approach to build a model of national shipping centres. This research work is mainly limited by the method used. The testing of the hypotheses is based on a secondary source with the use of the Logistics Performance Index (LPI) from the World Bank. Although the reliability and validity of the data are tested, the process of data collection cannot be verified.

The key data source of this study comes from the Logistics Performance Index (LPI) of the World Bank. The release of the data is at country level. Hence, it is not possible to evaluate the development of individual ports (e.g., Shanghai or Shenzhen in China) of national shipping centres. In building the model of shipping centre, it is national based (e.g., China or Korea) instead of port based (e.g., Port of Shanghai or Port of Pusan). Due to the problem of data availability, only very limited data based on single port (e.g., Hong Kong and Singapore) are presented.

Another limitation is the scope of this study. The focus is on examining trade facilitation at both the macro and micro levels, but the research scope could be extended to include development of theoretical concepts on international trade management and policy measures to enhance national competitiveness.

Future Research Agenda

To address the research limitations and continue the research topic of development of shipping centres, it is desirable to conduct future studies on the following topics:

- Formulating a theoretical model on international trade management based on the variables of trade facilitation and business operations.
- Development of a location decision model.
- Examining roles of trade facilitation on shipping connectivity.
- Building a model of shipping centres for both national shipping centres and regional shipping centres.
- Further investigating consequences of social capital on national competitiveness.

Appendix 1: TF-MA (macro-level trade facilitation) Score

Country	Overall Rank*	TF-MA01	TF-MA02
Germany	1	4.10	4.32
Netherlands	2	3.96	4.23
Belgium	3	3.80	4.10
United Kingdom	4	3.94	4.16
Singapore	5	4.01	4.28
Sweden	6	3.75	4.09
Norway	7	4.21	4.19
Luxembourg	8	3.82	3.91
United States	9	3.73	4.18
Japan	10	3.78	4.16
Ireland	11	3.8	3.84
Canada	12	3.61	4.05
France	13	3.65	3.98
Switzerland	14	3.92	4.04
Hong Kong	15	3.72	3.97
Australia	16	3.85	4.00
Denmark	17	3.79	3.82
Spain	18	3.63	3.77
Taiwan	19	3.55	3.64
Italy	20	3.36	3.78
Korea, Rep.	21	3.47	3.79
Austria	22	3.53	3.64
New Zealand	23	3.92	3.67
Finland	24	3.89	3.52

Malaysia	25	3.37	3.56
Portugal	26	3.26	3.37
United Arab Emirates	27	3.42	3.70
China	28	3.21	3.67
Qatar	29	3.21	3.44
Turkey	30	3.23	3.53
Poland	31	3.26	3.08
Czech Republic	32	3.24	3.29
Hungary	33	2.97	3.18
South Africa	34	3.11	3.20
Thailand	35	3.21	3.40
Latvia	36	3.22	3.03
Iceland	37	3.54	3.34
Slovenia	38	3.11	3.35
Estonia	39	3.40	3.34
Romania	40	2.83	2.77
Israel	41	3.10	3.11
Chile	42	3.17	3.17
Slovak Republic	43	2.89	3.22
Greece	44	3.36	3.17
Panama	45	3.15	3.00
Lithuania	46	3.04	3.18
Bulgaria	47	2.75	2.94
Vietnam	48	2.81	3.11
Saudi Arabia	49	2.86	3.34
Mexico	50	2.69	3.04
Malta	51	3.00	3.08

Bahrain	52	3.29	3.04
Indonesia	53	2.87	2.92
India	54	2.72	2.88
Croatia	55	2.95	2.92
Kuwait	56	2.69	3.16
Philippines	57	3.00	2.60
Cyprus	58	2.88	2.87
Oman	59	2.63	2.88
Argentina	60	2.55	2.83
Ukraine	61	2.69	2.65
Egypt, Arab Rep.	62	2.85	2.86
Serbia	63	2.37	2.73
El Salvador	64	2.93	2.63
Brazil	65	2.48	2.93
Bahamas, The	66	3.00	2.74
Montenegro	67	2.83	2.84
Jordan	68	2.60	2.59
Dominican Republic	69	2.58	2.61
Jamaica	70	2.88	2.84
Peru	71	2.47	2.72
Pakistan	72	2.84	2.67
Malawi	73	2.79	3.04
Kenya	74	1.96	2.40
Nigeria	75	2.35	2.56
Venezuela, RB	76	2.39	2.61
Guatemala	77	2.75	2.54
Paraguay	78	2.49	2.46

Cote d'Ivoire	79	2.33	2.41
Rwanda	80	2.50	2.32
Bosnia and Herzegovina	81	2.41	2.55
Maldives	82	2.95	2.56
Cambodia	83	2.67	2.58
São Tomé and Príncipe	84	2.42	2.59
Lebanon	85	2.29	2.53
Ecuador	86	2.49	2.50
Costa Rica	87	2.39	2.43
Kazakhstan	88	2.33	2.38
Sri Lanka	89	2.56	2.23
Russian Federation	90	2.20	2.59
Uruguay	91	2.39	2.51
Armenia	92	2.62	2.38
Namibia	93	2.27	2.57
Moldova	94	2.46	2.55
Nicaragua	95	2.66	2.20
Algeria	96	2.71	2.54
Colombia	97	2.59	2.44
Burkina Faso	98	2.50	2.35
Belarus	99	2.50	2.55
Ghana	100	2.22	2.67
Senegal	101	2.61	2.30
Liberia	102	2.57	2.57
Honduras	103	2.70	2.24
Ethiopia	104	2.42	2.17
Nepal	105	2.31	2.26

Solomon Islands	106	2.49	2.46
Burundi	107	2.60	2.40
Bangladesh	108	2.09	2.11
Benin	109	2.64	2.35
Tunisia	110	2.02	2.30
Fiji	111	2.40	2.47
Angola	112	2.37	2.11
Chad	113	2.46	2.33
Tajikistan	114	2.35	2.36
Mauritius	115	2.25	2.50
Georgia	116	2.21	2.42
Macedonia, FYR	117	2.35	2.50
Libya	118	2.41	2.29
Mali	119	2.08	2.20
Botswana	120	2.38	2.23
Bolivia	121	2.40	2.17
Guinea	122	2.34	2.10
Zambia	123	2.54	2.31
Guyana	124	2.46	2.40
Azerbaijan	125	2.57	2.71
Papua New Guinea	126	2.40	2.23
Guinea-Bissau	127	2.43	2.29
Comoros	128	2.58	2.30
Uzbekistan	129	1.80	2.01
Niger	130	2.49	2.08
Lao PDR	131	2.45	2.21
Madagascar	132	2.06	2.15

Lesotho	133	2.22	2.35
Central African Rep.	134	2.47	2.50
Mongolia	135	2.20	2.29
Equatorial Guinea	136	2.35	2.11
Zimbabwe	137	1.89	2.25
Tanzania	138	2.19	2.32
Togo	139	2.09	2.07
Turkmenistan	140	2.31	2.06
Iraq	141	1.98	2.18
Cameroon	142	1.86	1.85
Bhutan	143	2.09	2.18
Haiti	144	2.25	2.00
Myanmar	145	1.97	2.14
Gambia, The	146	2.06	2.00
Mozambique	147	2.26	2.15
Mauritania	148	1.92	2.40
Kyrgyz Republic	149	2.03	2.05
Gabon	150	2.00	2.08
Yemen, Rep.	151	1.62	1.87
Cuba	152	2.17	1.84
Sudan	153	1.87	1.90
Djibouti	154	2.20	2.00
Syrian Arab Republic	155	2.07	2.08
Eritrea	156	1.90	1.68
Congo, Rep.	157	1.50	1.83
Afghanistan	158	2.16	1.82
Congo, Dem. Rep.	159	1.78	1.83

Somalia	160	2.00	1.50

*Ranking and score are provided by the World Bank

Dats source: World Bank

Notes: the scores are ranged from 1.0 to 5.0 with 1.0 as the lowest and 5.0 as the highest

Appendix 2: TF-MI (micro-level trade facilitation) Score

Country	Overall Rank*	TF-MI01	TF-MI02	TF-MI03	TF-MI04
Germany	1	3.74	4.12	4.17	4.36
Netherlands	2	3.64	4.13	4.07	4.34
Belgium	3	3.80	4.11	4.11	4.39
United Kingdom	4	3.63	4.03	4.08	4.33
Singapore	5	3.70	3.97	3.90	4.25
Sweden	6	3.76	3.98	3.97	4.26
Norway	7	3.42	4.19	3.5.0	4.36
Luxembourg	8	3.82	3.78	3.68	4.71
United States	9	3.45	3.97	4.14	4.14
Japan	10	3.52	3.93	3.95	4.24
Ireland	11	3.44	3.94	4.13	4.13
Canada	12	3.46	3.94	3.97	4.18
France	13	3.68	3.75	3.89	4.17
Switzerland	14	3.58	3.75	3.79	4.06
Hong Kong	15	3.58	3.81	3.87	4.06
Australia	16	3.52	3.75	3.81	4.00
Denmark	17	3.65	3.74	3.36	4.39
Spain	18	3.51	3.83	3.54	4.07
Taiwan	19	3.71	3.60	3.79	4.02
Italy	20	3.54	3.62	3.84	4.05
Korea, Rep.	21	3.44	3.66	3.69	4.00
Austria	22	3.26	3.56	3.93	4.04
New Zealand	23	3.67	3.56	3.33	3.72
Finland	24	3.52	3.72	3.31	3.80

Malaysia	25	3.64	3.47	3.58	3.92
Portugal	26	3.43	3.71	3.71	3.87
United Arab Emirates	27	3.20	3.50	3.57	3.92
China	28	3.50	3.46	3.50	3.87
Qatar	29	3.55	3.55	3.47	3.87
Turkey	30	3.18	3.64	3.77	3.68
Poland	31	3.46	3.47	3.54	4.13
Czech Republic	32	3.59	3.51	3.56	3.73
Hungary	33	3.40	3.33	3.82	4.06
South Africa	34	3.45	3.62	3.30	3.88
Thailand	35	3.30	3.29	3.45	3.96
Latvia	36	3.38	3.21	3.50	4.06
Iceland	37	3.15	3.46	3.38	3.51
Slovenia	38	3.05	3.51	3.51	3.82
Estonia	39	3.34	3.27	3.20	3.55
Romania	40	3.32	3.20	3.39	4.00
Israel	41	2.71	3.35	3.20	4.18
Chile	42	3.12	3.19	3.30	3.59
Slovak Republic	43	3.30	3.16	3.02	3.94
Greece	44	2.97	3.23	3.03	3.50
Panama	45	3.18	2.87	3.34	3.63
Lithuania	46	3.10	2.99	3.17	3.60
Bulgaria	47	3.31	3.00	2.88	4.04
Vietnam	48	3.22	3.09	3.19	3.49
Saudi Arabia	49	2.93	3.11	3.15	3.55
Mexico	50	3.19	3.12	3.14	3.57
Malta	51	3.23	3.00	3.15	3.15

Bahrain	52	3.04	3.04	3.29	2.80
Indonesia	53	2.87	3.21	3.11	3.53
India	54	3.20	3.03	3.11	3.51
Croatia	55	2.98	3.00	3.11	3.37
Kuwait	56	2.76	2.96	3.16	3.39
Philippines	57	3.33	2.93	3.00	3.07
Cyprus	58	3.01	2.92	3.00	3.31
Oman	59	3.41	2.84	2.84	3.29
Argentina	60	2.96	2.93	3.15	3.49
Ukraine	61	2.95	2.84	3.20	3.51
Egypt, Arab Rep.	62	2.87	2.99	3.23	2.99
Serbia	63	3.12	3.02	2.94	3.55
El Salvador	64	3.20	3.16	3.00	2.75
Brazil	65	2.80	3.05	3.03	3.39
Bahamas, The	66	2.96	2.92	2.64	3.19
Montenegro	67	3.15	2.45	2.76	3.19
Jordan	68	2.96	2.94	2.67	3.46
Dominican Republic	69	2.93	2.91	2.91	3.18
Jamaica	70	2.79	2.72	2.72	3.14
Peru	71	2.94	2.78	2.81	3.30
Pakistan	72	3.08	2.79	2.73	2.79
Malawi	73	2.63	2.86	2.63	2.99
Kenya	74	3.15	2.65	3.03	3.58
Nigeria	75	2.63	2.70	3.16	3.46
Venezuela, RB	76	2.94	2.76	2.92	3.18
Guatemala	77	2.87	2.68	2.68	3.24
Paraguay	78	2.83	2.76	2.89	3.22

Cote d'Ivoire	79	2.87	2.62	2.97	3.31
Rwanda	80	2.78	2.64	2.94	3.34
Bosnia / Herzegovina	81	2.78	2.73	2.55	3.44
Maldives	82	2.92	2.79	2.70	2.51
Cambodia	83	2.83	2.67	2.92	2.75
São Tomé / Príncipe	84	2.95	2.50	3.13	2.77
Lebanon	85	2.53	2.89	3.22	2.89
Ecuador	86	2.79	2.61	2.67	3.18
Costa Rica	87	2.63	2.86	2.83	3.04
Kazakhstan	88	2.68	2.72	2.83	3.24
Sri Lanka	89	2.56	2.91	2.76	3.12
Russian Federation	90	2.64	2.74	2.85	3.14
Uruguay	91	2.64	2.58	2.89	3.06
Armenia	92	2.75	2.75	2.50	3.00
Namibia	93	2.70	2.69	2.56	3.15
Moldova	94	3.14	2.44	2.35	2.89
Nicaragua	95	2.69	2.58	2.58	3.17
Algeria	96	2.54	2.54	2.54	3.04
Colombia	97	2.72	2.64	2.55	2.87
Burkina Faso	98	2.63	2.63	2.49	3.21
Belarus	99	2.74	2.46	2.51	3.05
Ghana	100	2.73	2.37	2.90	2.86
Senegal	101	3.03	2.53	2.65	2.53
Liberia	102	2.57	2.86	2.57	2.57
Honduras	103	2.79	2.47	2.61	2.79
Ethiopia	104	2.50	2.62	2.67	3.17
Nepal	105	2.64	2.50	2.72	3.06

Solomon Islands	106	2.22	2.72	2.72	2.96
Burundi	107	2.60	2.51	2.51	2.76
Bangladesh	108	2.82	2.64	2.45	3.18
Benin	109	2.69	2.35	2.45	2.85
Tunisia	110	2.91	2.42	2.42	3.16
Fiji	111	2.72	2.22	2.47	2.97
Angola	112	2.79	2.31	2.59	3.02
Chad	113	2.33	2.34	2.71	3.02
Tajikistan	114	2.73	2.47	2.47	2.74
Mauritius	115	2.62	2.48	2.34	2.88
Georgia	116	2.32	2.44	2.59	3.09
Macedonia, FYR	117	2.38	2.51	2.46	2.81
Libya	118	2.29	2.29	2.85	2.85
Mali	119	2.80	2.20	2.70	2.90
Botswana	120	2.42	2.58	2.40	2.94
Bolivia	121	2.35	2.68	2.68	2.60
Guinea	122	2.47	2.35	2.41	3.10
Zambia	123	2.13	2.47	2.47	2.91
Guyana	124	2.43	2.27	2.47	2.74
Azerbaijan	125	2.57	2.14	2.14	2.57
Papua New Guinea	126	2.47	2.47	2.27	2.73
Guinea-Bissau	127	2.29	2.57	2.29	2.71
Comoros	128	2.51	2.26	2.37	2.37
Uzbekistan	129	2.23	2.37	2.87	3.08
Niger	130	2.38	2.28	2.36	2.76
Lao PDR	131	2.50	2.31	2.20	2.65
Madagascar	132	2.38	2.33	2.29	3.07

Lesotho	133	2.48	2.23	2.35	2.60
Central African Rep.	134	2.16	2.31	2.31	2.47
Mongolia	135	2.62	2.33	2.13	2.51
Equatorial Guinea	136	2.11	2.20	2.53	2.86
Zimbabwe	137	2.25	2.50	2.22	2.93
Tanzania	138	2.32	2.18	2.11	2.89
Togo	139	2.47	2.14	2.49	2.60
Turkmenistan	140	2.56	2.07	2.32	2.45
Iraq	141	2.31	2.15	2.31	2.85
Cameroon	142	2.20	2.52	2.52	2.80
Bhutan	143	2.38	2.48	2.28	2.28
Haiti	144	2.27	2.14	2.32	2.63
Myanmar	145	2.14	2.07	2.36	2.83
Gambia, The	146	2.67	2.22	2.00	2.46
Mozambique	147	2.08	2.10	2.08	2.74
Mauritania	148	2.07	2.06	2.22	2.75
Kyrgyz Republic	149	2.43	2.13	2.20	2.36
Gabon	150	2.58	2.25	1.92	2.31
Yemen, Rep.	151	2.35	2.21	2.21	2.78
Cuba	152	2.47	2.08	1.99	2.45
Sudan	153	2.23	2.18	2.42	2.33
Djibouti	154	1.80	2.21	2.00	2.74
Syrian Arab Republic	155	2.15	1.82	1.90	2.53
Eritrea	156	1.90	2.23	2.01	2.79
Congo, Rep.	157	2.17	2.17	2.17	2.58
Afghanistan	158	1.99	2.12	1.85	2.48
Congo, Dem. Rep.	159	1.70	1.84	2.10	2.04

Somalia	160	1.75	1.75	1.75	1.88

*Ranking and score are provided by the World Bank

Data source: World Bank

Notes: the scores are ranged from 1.0 to 5.0 with 1.0 as the lowest and 5.0 as the highest

Appendix 3: Trade Cost and Economic Performance

Country	CE*	CI*	GDP/C*	VAS**
Afghanistan	3545	3830	456.96	51.05
Albania	725	710	3700.74	64.82
Algeria	1248	1318	4566.89	30.96
Angola	1850	2840	4237.35	30.23
Antigua and Barbuda	1133	1633	13006.3	77.01
Argentina	1480	1810	9124.34	59.06
Armenia	1665	2045	3030.71	44.46
Australia	1060	1119	51085.68	77.91
Austria	1180	1195	44916.36	69.43
Azerbaijan	2980	3480	5843.17	29.53
Bahamas, The	930	1380	22664.86	82.62
Bahrain	955	995	18184.2	N/A
Bangladesh	920	1305	674.93	52.96
Barbados	N/A	N/A	15034.88	N/A
Belarus	1772	2115	5817.9	46.88
Belgium	1429	1600	43006.13	77.65
Belize	1505	1650	4057.15	N/A
Benin	1049	1400	741.07	N/A
Bermuda	N/A	N/A	89739.31	91.44
Bhutan	2230	2805	2183.44	37.94
Bolivia	1425	1747	1978.85	49.86
Bosnia and Herzegovina	1240	1200	4427.35	64.39
Botswana	3010	3390	7426.63	52.49
Brazil	1790	1975	10992.94	66.63
Brunei Darussalam	630	708	31007.99	32.47

Bulgaria	1551	1666	6334.68	65.65
Burkina Faso	2412	4030	535.89	N/A
Burundi	2747	4285	241.79	46.56
Cambodia	732	872	795.17	40.73
Cameroon	1379	2167	1144.25	N/A
Canada	1610	1660	46212.03	N/A
Cape Verde	1200	1000	3344.87	72.07
Central African Republic	5491	5554	451.26	N/A
Chad	5902	8525	760.71	N/A
Chile	745	745	12639.52	57.02
China	500	545	4432.96	43.19
Colombia	1770	1700	6186.02	57.86
Comoros	1207	1191	739.51	N/A
Congo, Dem. Rep.	3055	3285	198.71	31.41
Congo, Rep.	3818	7709	2970.12	20.79
Costa Rica	1190	1190	7773.86	66.6
Cote d'Ivoire	1969	2577	1161.26	49.98
Croatia	1281	1141	13461.4	68.21
Cuba	N/A	N/A	N/A	74.49
Cyprus	740	845	28779.19	N/A
Czech Republic	1060	1165	18910.01	61.5
Denmark	744	744	56485.89	77.02
Djibouti	836	911	N/A	N/A
Dominica	1297	1310	6963.87	71.77
Dominican Republic	916	1150	5195.38	61.74
Ecuador	1455	1402	4008.24	54.91
Egypt, Arab Rep.	613	755	2698.37	48.48

El Salvador	845	845	3460.02	60.55
Equatorial Guinea	1411	1411	20703.1	N/A
Eritrea	1431	1581	402.96	N/A
Estonia	725	725	14062.23	67.6
Ethiopia	1760	2660	320.38	42.96
Fiji	654	630	3687.22	68.6
Finland	540	620	43863.97	67.87
France	1078	1248	39170.26	N/A
Gabon	1945	1955	8767.83	36.23
Gambia, The	831	885	550.69	58.72
Georgia	1329	1316	2613.69	69.38
Germany	872	937	40163.82	71.21
Ghana	1013	1203	1319.08	51.13
Greece	1153	1265	25832.21	N/A
Grenada	876	2028	7499.52	77.69
Guatemala	1182	1302	2873.08	32.46
Guinea	855	1391	474.47	33.15
Guinea-Bissau	1545	2349	551.33	N/A
Guyana	730	745	2994.45	45.92
Haiti	1005	1545	663.91	N/A
Honduras	1193	1205	2018.75	60.94
Hong Kong SAR, China	625	600	32374.48	92.84
Hungary	1015	1085	12863.13	65.44
Iceland	1532	1674	39522.05	N/A
India	1055	1025	1375.38	55.14
Indonesia	644	660	2951.7	37.71
Iran, Islamic Rep.	1090	1735	N/A	N/A

Iraq	3550	3650	2532.32	N/A
Ireland	1109	1121	45873.19	N/A
Israel	670	605	28522.41	N/A
Italy	1245	1245	33786.64	72.87
Jamaica	1410	1420	4964.19	72.77
Japan	880	970	43063.14	71.46
Jordan	825	1335	4370	65.86
Kazakhstan	3005	3055	9070.01	52.76
Kenya	2055	2190	794.77	56.32
Kiribati	1070	1070	1422.62	66.51
Korea, Rep.	790	790	20540.18	58.54
Kosovo	2230	2280	3150.15	68
Kuwait	1060	1217	45436.79	N/A
Kyrgyz Republic	3010	3280	880.04	51.35
Lao PDR	1860	2040	1158.13	35.45
Latvia	600	801	10723.36	74.05
Lebanon	1000	1200	8781.44	71.18
Lesotho	1680	1610	1003.7	59.51
Liberia	1232	1212	323.65	37.86
Lithuania	870	980	11046.05	68.34
Luxembourg	1420	1420	103574.2	86.73
Macao SAR, China	N/A	N/A	51998.91	92.57
Macedonia, FYR	1376	1380	4434.49	60.89
Madagascar	1197	1555	426.63	N/A
Malawi	1713	2570	362.3	49.92
Malaysia	450	450	8690.57	48.52
Maldives	1550	1526	6570.43	82.04

Mali	2202	3067	613.04	N/A
Malta	N/A	N/A	19624.85	65.38
Marshall Islands	945	970	3015.21	N/A
Mauritania	1520	1523	1044.55	38.94
Mauritius	737	689	7577.11	69.35
Mexico	1420	1880	9127.54	61.41
Micronesia, Fed. Sts.	1295	1295	2648.18	N/A
Moldova	1765	1960	1631.53	-96.49
Mongolia	2131	2274	2249.77	46.26
Montenegro	775	890	6509.72	70.11
Morocco	577	1000	2795.49	54.96
Mozambique	1100	1475	393.72	44.76
Namibia	1686	1813	4875.97	72.88
Nepal	1960	2095	534.52	47.84
Netherlands	895	942	46622.9	74.16
New Zealand	855	825	32407.07	N/A
Nicaragua	1140	1220	1455.84	56.72
Niger	3545	3545	348.8	N/A
Nigeria	1263	1440	1443.21	N/A
Norway	830	729	85443.06	58.18
Oman	725	660	20790.84	N/A
Pakistan	611	680	1016.61	53.38
Palau	1070	1022	7626.58	N/A
Panama	565	915	7614.01	78.94
Papua New Guinea	664	722	1382.28	19.45
Paraguay	1440	1750	2840.35	57.31
Peru	860	880	5283.22	57.28

Philippines	630	730	2140.12	55.12
Poland	884	884	12303.21	64.83
Portugal	685	899	21358.43	74.5
Puerto Rico	1250	1250	25862.73	49.31
Qatar	735	657	72397.61	N/A
Romania	1275	1175	7539.36	66.66
Russian Federation	1900	1850	10481.37	60.57
Rwanda	3275	4990	529.41	52.8
Samoa	820	848	3388.07	62.18
Sao Tome and Principe	690	577	1215.49	N/A
Saudi Arabia	615	686	16423.44	37.76
Senegal	1098	1940	1033.91	60.25
Serbia	1398	1559	5269.64	N/A
Seychelles	876	876	11129.81	N/A
Sierra Leone	1573	1639	325.48	30.37
Singapore	456	439	41986.83	72.08
Slovak Republic	1530	1505	16036.07	61.2
Slovenia	710	765	22897.94	65.94
Solomon Islands	1023	1237	1261.04	N/A
South Africa	1531	1807	7271.73	66.69
South Sudan	N/A	N/A	1504.9	N/A
Spain	1221	1221	29956.16	71.22
Sri Lanka	715	745	2400.02	57.76
St. Kitts and Nevis	850	2138	12846.87	74.5
St. Lucia	1700	2745	6947.43	79.87
St. Vincent and the Grenadines	1075	1605	6171.62	73.31
Sudan	2050	2900	1487.69	46.81

Suriname	995	945	8292.46	51.27
Swaziland	1754	1849	3503.16	45.49
Sweden	697	735	49359.87	71.84
Switzerland	1537	1540	70561.44	N/A
Syrian Arab Republic	1190	1625	2892.76	N/A
Taiwan	N/A	N/A	N/A	N/A
Tajikistan	3350	4550	820.18	56.64
Tanzania	1262	1475	526.56	47.21
Thailand	625	795	4613.68	42.96
Timor-Leste	1010	1015	765.95	N/A
Togo	940	1109	529.65	52.63
Tonga	650	725	3544.01	60.94
Trinidad and Tobago	808	1250	15613.73	40.14
Tunisia	773	858	4193.55	59.72
Turkey	990	1063	10049.77	63.4
Turkmenistan	N/A	N/A	4392.72	37.01
Tuvalu	N/A	N/A	3237.66	67.48
Uganda	2780	2940	514.51	50.28
Ukraine	1560	1580	2973.98	60.39
United Arab Emirates	521	542	39624.7	43.6
United Kingdom	950	1045	36256.01	77.66
United States	1050	1315	46611.98	78.78
Uruguay	1100	1330	11741.7	64.44
Uzbekistan	3150	4650	1377.08	45.07
Vanuatu	1540	1410	2833.33	N/A
Venezuela, RB	2590	2868	13657.75	42.05
Vietnam	555	645	1224.31	38.33

West Bank and Gaza	1310	1225	N/A	N/A
Yemen, Rep.	890	1475	1290.62	62.87
Zambia	2664	3315	1252.49	43.58
Zimbabwe	3280	5101	591.29	46.96

*in USD
** in percentage of GDP

Data source: World Bank

Acronym

CE: Costs to Export

CFI: Comparative Fit Index

CI: Costs to Import

EC: European Commission

ECVI: Expected Cross Validation Inde

GDP: Gross Domestic Product

GoF: Goodness of Fit

GVA: Gross value added / GPD per capita

IFI: Incremental Fit Index

LPI: Logistics Performance Index

NFI: Normal Fit Index

OECD: Organisation for Economic Co-operation and Development

OMA: Opportunity-Motivation-Ability

PPP: Public Private Partnership

RDT: Resource Dependency Theory

RFI: Relative Fit Index

RMSEA: Root Mean Square Error of Approximation

SEM: Structural Equation Modelling

TC: Trade Cost

TCE: Transport Complex Economy

TEU: Twenty-Foot Equivalent Unit

TF-MA: Macro Level Trade Facilitation

TF- MA01: Efficiency of customs and border staff

TF-MA02: Quality of trade and transport infrastructures

TF-MI: Micro Level Trade Facilitation

TF-MI01: Ease of arranging competitively priced shipments

TF-MI02: Competence and quality of the logistics services

TF-MI03: Ability to track and trace

TF-MI04: Frequency that shipments reach consignees within the expected deliver

VAS: Value Added to Service

Glossary

Accessibility: the extent to which users/actors can obtain the required resources at the time that they are needed.

Actor: parties who act as network members of an agglomeration.

Agglomeration: concentrations or clusters that appear at the higher levels of geographical resolution. Agglomeration results when decision makers perceive that certain countries or locations offer special advantages.

Central place theory: a geographical theory to explain the number, size and location of human settlements in an urban system. Focus is on how tertiary (i.e. trade and services) activities are allocated among settlements or central places and how central places are distributed over the landscape.

Cluster: a geographical concentration of interconnected businesses.

Competitiveness: the ability of a firm, a sector, or a country to perform, in relation to the performance of other firms, sectors or countries.

Connectivity: the state of being connected.

Downstream activities: a general business term that refers to the location of a company in the supply chain. Downstream activities are the business processes which occur after the company's business activities, typically the processes dedicated to getting goods to the end customers.

Economic agglomeration: benefits that firms obtain by proximity to other firms in their industry.

Economic development: sustained and concerted actions that promote the standard of living in a specific area.

Economic performance: assessed in terms of achievement of economic objectives.

Economic indicators: measure macroeconomic variables (e.g., GDP per capita) that enable economists or decision makers to assess how well an economy is performing against identified objectives.

Economic growth: demonstrated by increases in market productivity and gross domestic product (GDP).

Economy of scale: the cost advantages that firms obtain due to size or scale of operations, with decreasing cost per unit of output.

Entry barriers: obstacles that makes it difficult for a firm to enter into a given industry or market.

External economy of scale: factors outside the boundaries of a firm that allow reduction of per unit production cost. External economies of scale increase the productivity of an entire industry, geographical area or economy.

Externality or network externality: network effect is commonly found in positive network externality, which are the benefits that firms obtain, and then more firms in related fields cluster together.

Free trade zone: a special economic zone in a geographical area where goods may be handled without the intervention of the local customs authority.

Foreland: cargo destination that are connected by shipping services from the cargo sources.

Gateway: a location that offers accessibility to a large system of circulation of freight. Gateways reap the advantages of a favourable physical location that is highly accessible. It is a trading and transport hub for the entrance and the exit of merchandise in a country.

Geographical concentration: the geographical location of a specific cluster. Indicates the extent to which a small number of countries account for a large proportion of a certain economic phenomenon (or economic activity).

GDP (gross domestic product): GDP is a measure of the size of an economy. An aggregate measure of production equal to the sum of the gross value added of all resident, institutional units engaged in production (plus any taxes, and minus subsidies, on products not include in the value of their outputs).

GDP per capita: GDP divided by mid-year population.

Hinterland: area where demand for cargo movement is generated.

Knowledge transfer: transfer of knowledge, expertise, skills and capabilities from one unit to another.

Location: why and where firms conduct business activities in a particular area.

Location decision: made by business managers to select an appropriate place for their business firm.

Location theory: assumes that firms or industries seek to identify factors that promote agglomerative tendencies.

Network: can be viewed from both managerial and physical perspectives. Network-based management refers to a collection of techniques that take advantage of linkages between members of a network. A physical network consists of nodes (i.e., physical locations to

handling goods) and links (i.e., transport modes to transport goods from one node to other nodes).

Nodes and Links: nodes are the physical location where goods are handled and transferred from one transport mode to another. The links between nodes connect the transport infrastructure on which various transport modes operate.

National competitiveness: the competiveness of a nation that can attract and maintain successful firms. National competitiveness also links to the enhancement of standards of living.

Nationalization: a stage of growth within a country due to physical proximity of firms.

Resource dependency: actors who are network members provide functions that are complementary to those of other actors in a network. Hence, there is mutual dependence on the resources of other members in the network.

Relational resources: resources connected to relations with upstream and downstream business partners.

Social capital: resources derived from a related network to reduce trade costs and enhance the economic performance of a country.

Spatial structure: arrangement of places/locations (and economic activities) that affect how economies function and has implications for social capital.

Spatial variation: distribution of resources that affect how places/locations (and economic activities) are arranged.

Ties to industry: extent to which users are linked with their industry.

Trade facilitation: activities or measures that improve efficiency and reduce the associated costs for the movement of goods in international trade.

TCE: an economy that emerges from the joint location of transport-related activities that have substantial trading links with one another.

Urban system: developed by Henderson (1974[230]). Relies on three factors that influence the size of cities: land input, labour, and capital. Related to the benefits of economies of agglomeration and congestion cost.

Upstream activities: a general business term that refers to the location of a company in the supply chain. Upstream activities are the business processes that occur before the company's business activities, typically the processes dedicated to getting raw materials from suppliers.

User: national shipping centre users are parties who have substantial trading links with one another and select a joint location to conduct transport-related activities. Examples of RSX users include traders involved in trading activities, logistics service providers who provide logistics related support services, liner shipping companies that provide regular sea transport services, container terminal operators who handle containers and ships.

Value chain: a set of activities of a specific industry for delivering a valuable product or service.

Value creation: activities that increase the worth of goods or services for customers in the market, and create better value for shareholders in the industry.

Notes: The author collects the explanation of the glossary from various sources.

Statistical Term

Absolute fit: fundamental indication of how well a proposed model fits the data.

Chi-square testing: determines the differences between the observed and the predicted or model covariance matrixes. The relative chi-square equals the chi-square (x^2) divided by the degree of freedom (*df*).

Comparative fit index (CFI): compares the fit of a target model to that of an independent model in which the variables are assumed to be uncorrelated. A value of CFI that approaches 1 indicates an acceptable fit.

Construct: unobservable or latent concept that can be defined in conceptual terms but cannot be directly measured, but must be approximately measured by using multiple indicators.

Correlation coefficient: indicates the strength of the correlation between two variables. The sign (+ or -) indicates the direction of the relationship. The values can range from +1 to -1, with +1 indicating a perfect positive relationship, 0 indicating no relationship and -1 indicating a perfect negative relationship.

Correlation matrix: a table that shows the inter-correlation among various variables.

Cronbach's alpha (α): measure of reliability that ranges from 0 to 1, with values of 0.60 to 0.70 deemed the lower limit of acceptability.

Data collection: a process of gathering and measuring information from a variety of sources on specific variables to evaluate outcomes.

Discriminant validity: examines the degree to which two conceptually similar concepts are distinct.

Factor: the underlying dimension (construct) that summarizes or accounts for the original set of observed variables.

Hypothesis: a proposed explanation or a phenomenon.

Incremental fit index (IFI): based on the comparison of the fit of a substantive model to that of a null model. Although the value of this index should exceed 1, values that exceed 0.90 are already regarded as acceptable.

Loadings (or factor loadings): correlation between the original variables and the factors, and the key to understanding the nature of a particular factor.

Fit (or goodness of fit): describes how well a statistical model fits a set of observations.

Normal fit index (NFI): equals the difference between the chi-square of the null model and the chi-square of the target model, divided by the chi-square of the null model. Varies from 0 to 1 where 1 is ideal.

Relative fit index (RFI): takes the degrees of freedom for two models into consideration. Usually between 0 and 1, with 0 representing a poor fit and close to 1 representing a very good fit.

Reliability: related to the consistency of the measures. An assessment of the degree of consistency between multiple measurements of a variable.

Root Mean Square Error of Approximation (RMSEA): analyses the discrepancy between the hypothesized model with optimally chosen parameter estimates and the population covariance matrix.

Significance level: refers to a pre-chosen probability and the term *p* value (0.01 level and 0.05 level), which indicates a chosen probability. If the *p* value is less than the chosen

significance level, reject the null hypothesis (i.e., a type of hypothesis used in statistics proposes that no statistical significant exists in a set of given observations) and accept the sample provides reasonable evidence to support the alternative hypothesis (which is the hypothesis that is accepted if the null hypotheses is rejected).

Structural equation modelling (SEM): seeks to explain the relationships among multiple variables.

Variable: a logical set of attributes. A dependent variable represents the output or outcome in which variation is being studied. An independent variable represents inputs or causes.

Validity: the extent to which a measure or set of measures correctly represent the concept of a study. The degree to which a measure accurately represents what it is supposed to represent.

Notes: The author collect the explanation of the statistical terms from various sources.

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