

Incorporation of Dry Ports into the National Transport Policy: A Proposal for International Trade Acceleration

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The Malaysian National Transport Policy (NTP) aims to develop a conducive ecosystem for the transport sector, facilitate seamless cargo movement, promote public mobility, enhance public transport competitiveness, and build an intelligent and green transport system. However, the policy does not comprehensively cover the lack of assimilation of inland components with the seaport system. To close the gaps, this paper thoroughly discusses the three main objectives proposed for the study: first, to understand the current practicability status of the Malaysian NTP; second, to identify policy limitations concerning the integration of seaports and dry ports in Malaysia; third, to give constructive insights for future strategies to upgrade the Malaysian NTP for national and international trade development.

KEY WORDS

- ~ Dry ports
- ~ Seaports
- ~ National Transport Policy
- ~ Maritime industry
- ~ Sustainable development goals

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This study adopted a traditional literature review method incorporated with an integrative literature review analysis (ILRA) to scrutinise literature analysis. The findings of this paper indicate that Malaysia should develop a novel and comprehensive seaport-inland policy model integrated with the existing NTP model. Integrating dry ports with the seaport system is crucial to determining NTP sustainability and enriching the nation with an effective transportation system.

1. INTRODUCTION

Malaysia is a maritime nation with extensive coastal and marine areas managed by national, state, and local organisations. Malaysia has the total sea surface of 614,159 square kilometres, and the total extended continental shelf area of approximately 19,926.6 square kilometres, almost twice its landmass. The size of its Exclusive Economic Zone (EEZ) alone is 453,186 square kilometres. An estimated 70 per cent of the population lives along 4,800 kilometres of the coastline, which has a rich ecosystem and biodiversity. These unique advantages offer tremendous economic value and prospects to Malaysia. Major economic activities include offshore petroleum industry, marine transport, marine tourism, fisheries and aquaculture.

Malaysian seaports play a strategic role in the expansion of domestic and international trade. Malaysia has grown and is considered a critical node for logistics, supply chains, and transportation networks. In 2020, Malaysian trade increased by 4.3% (by volume) compared to 2019. The number of containers handled by Malaysian seaports increased from 18.14 million in 2010 to 24.96 million in 2018 (Malaysian Department of Statistics,

2021); about 70% of the cargo is containerised. According to the United Nations Conference on Trade and Development (UNCTAD), Malaysia is the world's fifth best-connected country in shipping line connectivity, ahead of the Netherlands and the United States. Malaysia is a container transshipment hub in the region and a market leader in handling and exporting oil and gas

products. Over the last ten years, Malaysian ports have recorded a compounded average growth of 3% in cargo throughput. Following a drop in 2017 due to a change in the shipping line market and overall lows in global seaborne trade, cargo throughput recovered in 2018, totalling to 568 million tonnes (Figure 1).

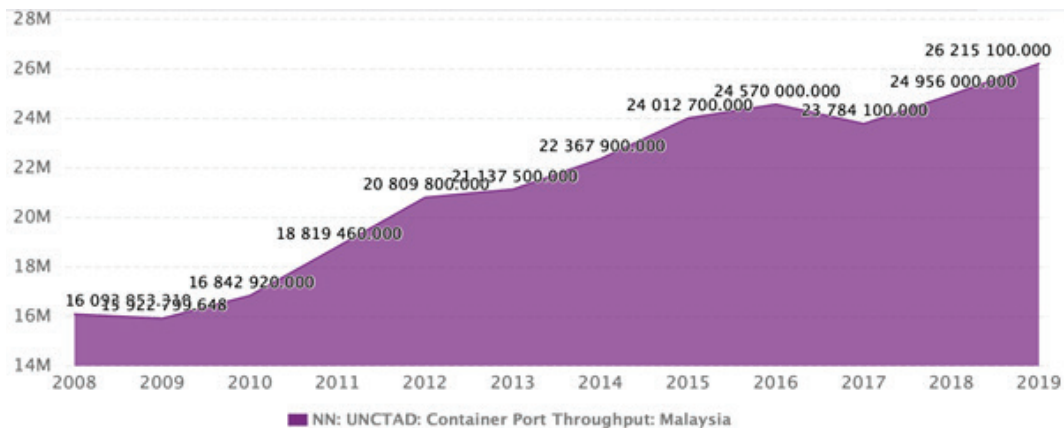


Figure 1. Cargo throughput at Malaysian ports.

Nowadays, the most significant challenges faced by maritime nations are sustaining economic benefits and political stability. Considering the Malaysian National Transport Policy (NTP) 2019-2030, the Malaysian seaport policy lacks attention. According to Malaysian NTP, there are two seaport system management strategies: Strategy 2.3 aiming to upgrade hinterland connectivity to gateways and connect corridors to improve economic distribution. Given that the road side has a far higher share than the rail side (98:2), dry ports need to get more involved to balance it. Strategy 3.4 is aimed at strengthening infrastructure or facilities and intensifying digitalisation to improve connectivity, accessibility and acceptability. These strategies were formulated to reduce bottlenecks and facilitate cargo movement to seaports and airports. The hinterland connectivity of seaports and airports is frequently cited as a major concern in cargo transportation, resulting in increased costs and delays in the movement of goods. Some challenges include an imbalanced modal split heavily reliant on roads, traffic congestion, and inland facility limitations (such as warehouses and depots) (Chen et al., 2016; Jeevan et al., 2018; Malaysian National Transport Policy, 2019).

Furthermore, economic corridor development necessitates additional coordination and alignment between agencies to ensure optimal infrastructure and service development. Besides, additional connectivity between various transport nodes (seaports, airports, terminals, and inland ports) via roads and rail lines would reduce delays and costs associated with

the transportation of passengers and goods. Furthermore, first and last-mile connectivity should be given more attention to ensure greater use of public transportation services. It is critical to facilitate seamless connectivity between various modes of transportation (rail, airports, seaports, and roads) (Chen et al., 2016; Jeevan et al., 2018; Malaysian National Transport Policy, 2019).

The establishment of the MISC in 1968, followed by the establishment of PNSL and the Domestic Shipping and Licensing Board, demonstrated the increased importance of the shipping sector to the economy at an earlier stage. The cabotage policy was undoubtedly implemented to facilitate the crucial trade between West and East Malaysia. Domestic vessel tonnage increased from 500,000 in 1990 to 1.4 million in 1999 (MASA, 2000; Saharuddin, 2001). However, Malaysia's current cabotage policy implementation is outdated because scholars have not conducted studies recently. In addition, ocean-related issues are growing: illegal, unreported and unregulated (IUU) fishing, indiscriminate exploitation of ocean resources, worsening degradation of marine and coastal environments, increased competition among users of coastal areas, and state disputes over the extent of national waters (Terashima, 2012).

The outcomes of this study will provide guidelines and assistance to Malaysian seaport operators to improve governance, persevere and address the challenge of upholding high levels of competitiveness in the global seaport industry. This paper has three main objectives: (1) understanding the current

practicability of the Malaysian NTP, (2) identifying the limitations of Malaysian policy on integrating seaports and dry ports, and (3) offer constructive suggestions for future strategies to improve the Malaysian NTP and national or international trade development.

In addition, Chapter 2 discusses the development of maritime policy, focusing primarily on the national integrated ocean policy, while Chapter 3 focuses on the methodological flow of this research. This chapter explains in great detail how we drew information from other papers and the integrative literature analysis approach. Chapter 4 discusses the output of this research. Last but not least, Chapter 5 gives the conclusion and presents the impact of this research, also explaining how this paper closed the research gaps.

2. MARITIME POLICY DEVELOPMENT

The development of an effective national integrated ocean policy should be aligned with the 2030 sustainable development agenda. The maritime agencies and industry must work together towards balancing the three dimensions of sustainable development: maritime economy, ocean health, and coastal community. Thus, developing an effective national integrated ocean policy is difficult due to its scope overlapping with integrated ocean policy, which goes beyond maritime policy coordination. Moreover, land-based activities account for 70%–80% of marine pollution (Koivurova, 2009). The maritime policy framework creates an appropriate symbiotic relationship between neoclassical economics and interventionism. As the name implies, it provides the sector with a framework within which it has a better chance to achieve both its own and the goals of the government. It differs from subsidisation policies in that it is unlikely to provoke shelter strategies and does not cause indecency by supporting non-viable businesses (Van, 2001). Established policy areas typically operate based on their values and traditions, a fact reflected in the legal system, where various legal regulations guide action on sectoral issues related to ocean areas; policy supervision is entrusted to various ministries and agencies (Koivurova, 2009). Developing a measurable maritime industry framework with appropriate monitoring is a vital and rapidly growing field. Developing a set of clear and measurable maritime industry policies translated into concrete actions and systematic monitoring of the effects of such actions in relation to the objectives is critical for progress planning, control, and reporting (Othman et al., 2011).

Given that seas and oceans are interconnected, actions in one sea or policy area that impact the sea may have positive or negative, intended or unintended consequences in other seas or policy areas. As previously stated, the overarching principle of Maritime Spatial Planning is the ecosystem-based approach (Schaefer and Barale, 2011). The European Union and Canadian marine policies have essentially the same goals of promoting

economic development so that potentially conflicting uses of the ocean can coexist and prosper while maintaining the long-term health of ocean ecosystems.

Both policies are guided by the same overarching goals: decision-making principles (e.g., the precautionary principle) and management principles (e.g., an ecosystem approach and co-management). Furthermore, specific objectives are expressed in strikingly similar terms (e.g., promoting economic prosperity, stimulating better marine science, building maritime heritage, and taking international leadership to adopt the law of the sea). The shared goal of becoming an international leader in ocean governance exemplifies the similarities between the two policies; however, the methods by which they intend to achieve that goal demonstrate the differences in their approaches (Koivurova, 2009).

United Nations Convention on the Law of the Sea (UNCLOS), which entered into effect in 1994, adopted the twelve-mile territorial waters regime, the archipelagic regime, the two-hundred-mile exclusive economic zone (EEZ) regime, and reformed the continental shelf system in response to the demands of coastal states for the expansion of ocean areas under their sovereign rights. It established the "common heritage of mankind" system for the deep-sea bed and the mineral resources therein to discourage further claims. The Convention emphasised marine environmental protection and conservation and strengthened international initiatives to prevent marine pollution. It also encouraged cooperation in transferring ocean-related know-how and technology to developing countries and scientific ocean research for peaceful purposes (Terashima, 2012).

Malaysia is considered business-friendly and attractive for foreign and domestic investments. However, to maintain and improve competitiveness in the face of global economic, technological, and environmental issues and the COVID-19 global crisis, Malaysia should review its maritime policy regime, develop a comprehensive maritime framework for sustainable development, and address the need for a national maritime agency by establishing a national coordinating entity that would accelerate the emergence of "Malaysia as a truly maritime nation".

2.1. Hinterland Connectivity

From a seaport perspective, its hinterland is an area containing the majority of export/import related businesses, which cannot be delimited because hinterlands differ in terms of time, distance, mode of transportation and commodity (Notteboom, 2008). The inland transport facilities linked to seaports, for example container freight stations and dry ports, will benefit customers in terms of service, including time and cost, and their capacity should be sufficient to accommodate a large number of containers and have efficient road and rail transport connections to destinations (Roso, 2008; Salleh et al.,

2021a). The identification of the role of hinterland in this southern region, as well as of the types of hinterlands they cater for will reflect the ability of these seaports to enhance their operational efficiency, seaport services and hinterland accessibility, IT use, transportation network, connectivity, as well as the vertical integration in the supply chain, especially among the key components, which requires the implementation of IR 4.0 (Salleh et al., 2019; Jeevan et al., 2020; Salleh et al., 2021b, Selvaduray et al., 2022).

The macro-economic hinterland perspective focuses on transport demand, i.e. a set of logistics sites, with a focus on production and consumption, while the physical hinterland perspective studies the transport supply, looking into the network of nodes and terminals connecting seaports with their hinterland. However, the logistical hinterland perspective is more focused on how trade flows are organised, taking into account the existing macro-economic and physical setting. Modal choice, combined with the synchronisation of maritime and inland freight distribution, tends to be the main issue from the logistical hinterland perspective. Accordingly, the seaport- hinterland relationship does not pertain exclusively to physical transport networks but also to global supply chain networks, which involve different actors (Roso et al., 2009)

3. METHODOLOGICAL APPROACH: INCORPORATING TRADITIONAL LITERATURE REVIEW WITH AN INTEGRATIVE LITERATURE REVIEW ANALYSIS

This study has three main objectives: first, to understand the current practicability of the Malaysian National Transport

Policy; second, to identify policy limitations concerning the integration of seaports and dry ports in Malaysia; third, to give constructive insights for future strategies to upgrade the Malaysian NTP for national and international trade development. A traditional literature review method (Chuah et al., 2022) was used incorporated with integrative literature review analysis (ILRA) to scrutinise the outcomes and achieve the study goal. Figure 2 shows the methodological procedure used in this research.

This paper will utilise both methods to obtain sufficient information related to the research objective. Table 1 shows the criteria used in the traditional literature review.

According to Snyder (2019), the ILRA is expected to highlight new or emerging topics, review the proposed topics and gravitate toward the conceptual ground as the research scope develops. In addition, this methodology has become the primary option due to the involvement of an innovative data collection procedure that combines inputs, views or perspectives from different research areas. This qualitative methodology aims to assess, criticise, and synthesise the literature based on the proposed research topic to develop new perspectives or frameworks (Torraco, 2005). Conversely, the ILRA gives a valid and significant contribution to the field of study (Snyder, 2019). In addition, this paper considers several perspectives that will be used for the primary research agenda and to develop a conceptual framework that will be the main strength of the ILRA (see Table 2).

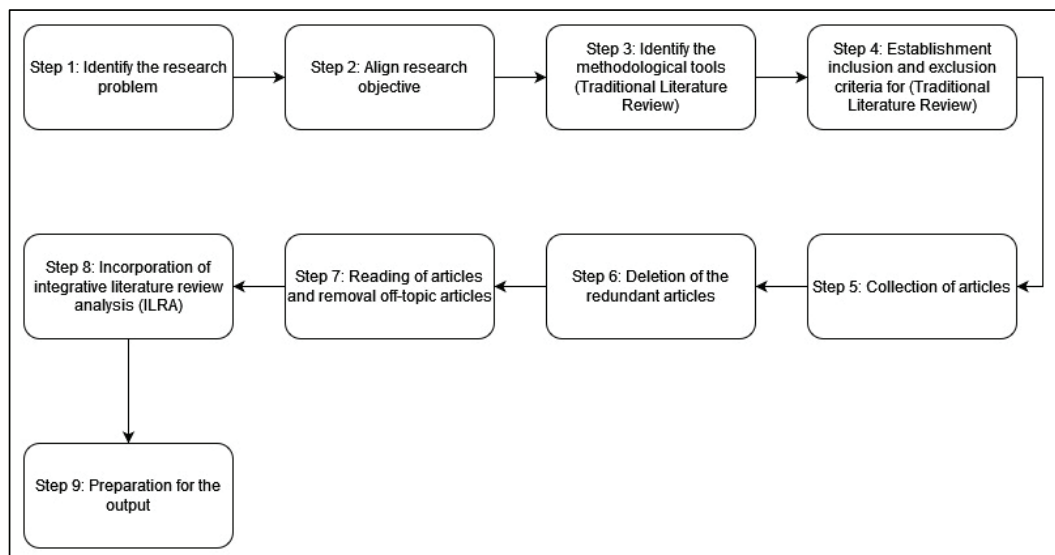


Figure 2. Methodological procedure.

Table 1.

Criteria used in the traditional literature review.

Criteria	Inclusion	Exclusion
Time frame	2015-2020	Before 2015
Field	Seaport & dry port	Other than seaport & dry port
Language	English	Other than English
Region	All countries	<i>Nil</i>

Table 2.

Modification of ILRA to meet the research objective.

Source: Adapted from Snyder (2019).

*New segment in ILRA compared to the previous model.

No.	Approaches in ILRA	Initial concept of ILRA (Applied in existing research)	Alteration of ILRA (Applied in this paper)
1.	Purpose	Critique and synthesising	Explore, critique and synthesising
2.	Research questions	Inductive or deductive	Complementary approaches
3.	Search strategies	Mixed approaches	Open sources
4.	Sample characteristics	Research articles, books or other published text	National Transport Policy and other related policies.
5.	Analysis and evaluations	Taxonomy or classification	Theme classification
6.	Contributions	Model or framework	Malaysian seaport- introduction of the dry port policy model
7*.	Recommendations	Future direction of the model or framework	Component of the Malaysian seaport-dry port policy model in NTP

4. RESULTS AND DISCUSSION

This section discusses the outcomes of the review of existing literature. This section focuses on seaport policy trends, the current policy on seaport integration with inland components, dry port policy, and the National Transport Policy. The outcome of these results and discussion will be used to propose the extended version of the Malaysian National Transport Policy.

4.1. Current Seaport Policy Trends

Table 3 illustrates the outcomes of traditional literature review and ILRA on related seaport policy literature, based on

nine relevant port-related papers dealing with seaport policy. Table 3 clearly shows that the government should implement a seaport policy that acts as a catalyst and guide to seaport stakeholders for the governance of all operations regulated by the port authority to ensure safety, administration, operation, development, trade and investment levels adequate for seaport and shipping stakeholders. Seaport policy should be construed as seaport regulation that provides and adopts rules relating to the safety of ships anchored in and out of or entering or leaving seaports and shipping operations in the vicinity of the seaport. Figure 3 shows the evolution of seaport policy research over time, focusing on the key milestones and central concepts that have been introduced and examined.

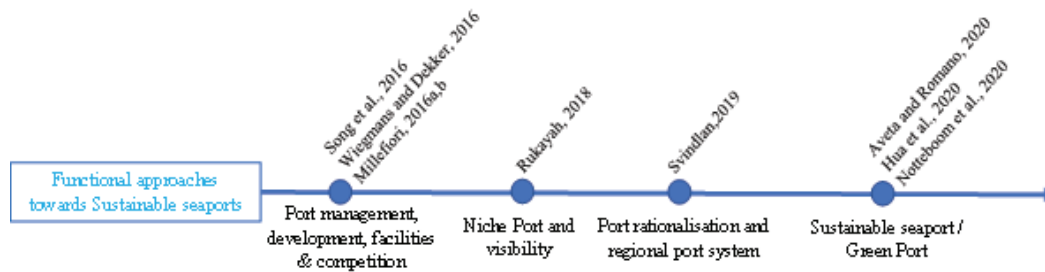


Figure 3.

Evolution of seaport policy research overtime – key milestones and main concepts introduced and examined.

Based on the results, regulation priority, as well as international and domestic policies for seaports are practices defined to provide facilities, technical equipment and similar assets like anchors, cargo loading and unloading, and passenger embarking and disembarking services. In Malaysia, the Merchant Shipping Ordinance (MSO), 1952, specifies regulatory capacity and new amendment rules on the impact of specific sections on operating practices in the shipping and port industries.

Seaport policy formulation should be comprehensive and must not focus solely on specific seaport needs. Non-comprehensive policy formulation is considered a loss (Song et al., 2016; Wiegmanns and Dekker, 2016; Millefiori, 2016a; Millefiori, 2016b). Moreover, the established seaport policy should outline in detail the development of better-equipped and sustainable seaports by supporting a clean environment guided by environmental compliance and marine safety (Aveta and Romano, 2020; Hua et al., 2020; Notteboom et al., 2020).

Previous authors have highlighted five areas of study: i) port facilitation and development, ii) port management competition, iii) foreign investment, iv) port sustainability, and v) historical ports. This study focuses on one of these aspects.

Wiegmanns and Dekker (2016) state that port development is effective when the government and port authorities jointly enforce existing policies to ensure that port facilitation comprising various major infrastructure and technical facilities is managed systematically.

When a country has a planned shipping and port policy developed in cooperation with port agencies and port stakeholders, it is easier to enforce the policy owing to city hall and port facilitation sessions that are understood by the authorities, who obtain project approval and cooperate with the ministry; this is prevalent in Italy (Aveta and Romano, 2020).

Moreover, port facilitation and development will be more successful when the government conducts a detailed research to analyse sustainable port development and on the basis of that analysis identifies a suitable site for the port to ensure easy and effective shipping and port operations. The efficient use of the

latest technologies, such as machinery, cargo transportation, and cargo manifest will ensure simplified cargo operations when port facilitation and development are among seaport policies, as stated by Millefiori (2016a). Seaport policy generally takes into account environmental protection by ensuring optimal energy use through optimised air control ensuring emissions stay at minimum levels where green policy is emphasised, and the local government supports the port authority (Jeevan et al., 2021b). In order to ensure that port authorities truly understand the seaport policy clearly, China enforces governance policy that provides for air and marine environment control in all its ports (Hua et al., 2020).

Notteboom et al. (2020) claim that green port emphasis on clean and sustainable port development measures comes to the fore when governments draw up the policy, and significant players in the shipping and port industry understand it. In their opinion seaport policy includes five major implementation categories like green ports, operations, and land logistics actions. It is essential to prove that the policy proposed by the government needs to be enforced to ensure that the control and operation of green ports are maintained effectively and efficiently because actors at all levels fully understand the actual intent of the port policy (Notteboom et al., 2020).

As indicated in Table 3, there are six dimensions: i) port budget and performance, ii) port facilities and development, iii) port competitiveness, iv) port geography, v) green port, and vi) sustainable port structure. However, only two main dimensions have been studied (Millefiori, 2016b; Svindlan, 2019; Notteboom et al., 2020). Seaport policy should contain port facility elements to ensure ports' readiness to provide and offer efficient and comprehensive services to all port users and for all transportation modes, including sea-based transport.

For instance, success was achieved when Chinese ports allowed foreign and local investors to invest in technical aspects, assets, make capital and equity investments in the maritime industry. Indeed, seaport policy liberalised by the Chinese government is highly commendable as government, private,

and foreign cooperation is vital but requires strategic oversight of all facilities and offers provided based on the seaport policy (Millefiori, 2016b)

Port facilities and development dimension were also studied by Svindlan (2019) who argues that the government must focus on its port development duties, while stakeholders should handle the increasingly challenging and widespread trade movement evolution. Therefore, the physical development and expansion of port structures are the primary bases for development, considering port visibility and ports being feeder ports for regional, national, and global ports. Development should be tiered and integrated through existing seaport policy-based compliance practices.

Norway demands perfection in technical and operational aspects of its ports that depend on port functionality with respect to the storage of cargo and shipping capacity over a specified time period to prevent smaller feeder ports from operating beyond their TEU capacity in that period. Norway introduced the seaport policy to maintain the level of cleanliness, environmental protection and sustainability through a strategically planned and systematic port (Svindlan, 2019)

Notteboom et al. (2020) emphasise that port development should be based on existing seaport policies instead of being arbitrary and conducted without transparent governance. Moreover, the authorities should make sure that port operations are clean and environmentally friendly through strategic port planning and ensuring that every supply chain movement in the port environment fully complies with environmental requirements stated in Sustainable Development Goals (SDG) towards a well-established and truly sustainable port.

However, success will be achieved if all major port stakeholders understand and act in keeping with the concept of port development planned by the Ministry of Transport and Maritime Affairs in Belgium and the Netherlands. Facility provider and port development dimensions should follow the drafted schedule and development rules contained in the seaport policy.

The dimension sub-section highlights the capacity of the Port Budgetary and Port Performance dimensions as the most critical elements in the study of the seaport policy literature reviews. Countries that have developed after the beginning of international trade ensured that each port service focuses on the financial capability and expenditure of the services that the port wants to provide. Therefore, seaport policy must meet financial governance requirements to increase the facilities comprising each activity and program development. This will indirectly stimulate port performance to a predetermined level for extended periods.

Ports that have been in operation for a long time must be constantly repaired, and structural rehabilitation maintained so that the damage does not continue increasing repair costs. For example, the existing ports in the United Kingdom and some EU member states give immense attention to financial vigilance to ensure that the funds allocated by countries and unions are fully utilised to ensure the sustainability of ports with respect to the type of facilities and assets needed by significant port players. Planned port development should be compatible with the government's cohesive and precise financial provisions made through the national budget for the shipping and port industry (Song et al., 2016; Wiegman and Dekker, 2016).

Table 3.

Summary of literature on seaport policies.

No	Title	Region	Remarks	Authors
1.	Modelling port competition from a transport chain perspective	United Kingdom	Findings: This paper deals with the competition between two ports related to hinterland and transshipment. It emphasises the development of port facilities considering the financial costs. Scope: Port management competition Dimension: Port budget and port performance	Song et al., 2016
2.	Benchmarking deep-sea port performance in the Hamburg-Le Havre range	European Union	Findings: This study examines the effectiveness of major western European ports offering port facilitation. Scope: Port facilitation and development Dimension: Port budget and port performance	Wiegman and Dekker, 2016

3.	A distributed approach to estimating seaport operational regions from lots of AIS data	People's Republic of China	Findings: This paper deals with the need to increase facility capacities for all modes of transportation to be able to compete with other ports and port services. Therefore, foreign investment must be considered by the promoters of comprehensive provisioning in all types of transport and service modes and port operations. <hr/> Scope: Foreign investment <hr/> Dimension: Port facilities	Millefiori, 2016a
4.	Scalable and distributed seaport operational areas estimation from AIS data	Netherlands	Findings: This study looks at how governments need to ensure that seaports are located appropriately to their geographical location to facilitate efficient shipping operations and ship transport using new technologies that benefit the port environment. <hr/> Scope: Port facilitation and development <hr/> Dimension: Port geography	Millefiori, 2016b
5.	Exploring the position of an old Semarang sea port: based on Javanese city pattern	Indonesia	Findings: This study is related to the history of seaports that have existed for a long time. The ports serve as transit locations on the coast, facilitating sustainable seaport development. However, rapid development has obliterated the existing ports. So, the local government must restore the seaport to align it with its historical purpose and image. <hr/> Scope: Historical sea port <hr/> Dimension: Port structure sustainability	Rukayah, 2018
6.	Port rationalisation and the evolution of regional port systems: the case of Norway	Norway	Findings: This study explores the evolution of container port systems involving regional port feeder requirements. In this regard, small ports are used as drivers for regional ports. They ensure that small ports continue to operate to facilitate development and achieve effectiveness taking into account the latest developmental needs despite their traditional aspects. <hr/> Scope: Port sustainability <hr/> Dimension: Port development	Svindlan, 2019
7.	A port planning case study: the freight strategy of the new Central Tyrrhenian Sea Port Authority 2017-2020	Italy	Findings: This study involves the development of ports, ultimately leading to port competition in providing efficient and effective port infrastructure. It is necessary to have optimal strategies devised by the ministry to re-evaluate the existing infrastructure and reallocate the infrastructural facility required by the Port Authority in Italy. <hr/> Scope: Port facilitation and development <hr/> Dimension: Port competitiveness	Aveta and Romano, 2020

8.	Evaluation and governance of green port development practice: A seaport case of China	People's Republic of China	Findings: This study deals with the development of ports to stimulate the economy and energy consumption. Therefore, to ensure that the port can reduce the high pressure, it is best to test it by making the port environmentally friendly. The question is how to ensure effective and comprehensive green port practices. For success, the government must formulate a port governance strategy that defines levels of control and regulates the pollution of the marine environment. Scope: Port facilitation and development Dimension: Green port	Hua et al., 2020
9.	The role of seaports in green supply chain management: Initiatives, attitudes, and perspectives in Rotterdam, Antwerp, North Sea Port, and Zeebrugge	Belgium and Netherlands	Findings: This study explores the need for green ports to practice supply chain management between organisations. The role of green ports is essential to mobilise a prosperous shipping sector. Stakeholders must ensure port development in five major areas: green ports, green operations, and green land logistics actions. The aim is to make the development of green ports feasible. In addition, the involvement of key actors in green ports is essential so that such experts carry out directional control and operation. Scope: Port facilitation and development Dimension: port development and supply chain	Notteboom et al., 2020

4.2. Current Trends With Respect to Seaport Integration With Dry Port Components

Table 4 illustrates the outcomes of traditional literature review and ILRA on port integration based on 12 papers published by authors dealing with seaports. Figure 4 shows the evolution of the integration of seaports with dry port components. Table 4 highlights the authors' need to improve the quality of port services for specific ports based on targeted case studies.

Most authors have attributed port integration to increasing trade. However, the preparations to meet some basic requirements have not progressed as much as necessary. Authors have used case studies to stress the issues and demonstrate the

level of port readiness, which is the main point they want to draw their readers' attention to when it comes to focus groups in the port domain.

Table 4 also explains that port integration includes all port operation activities like shipping, port, cargo, rail and operational resource activities (Yang et al., 2019). Specifically, the primary function of an integrated port is the provision of freight (warehousing, transshipment, etc.) and ship (piers, refuelling, repairs) services at the port (Franke et al., 2019). It directly proves that port integration does not mean the consolidation of ports into mega ports. Instead, it implies the integrated organization of operations within the port to function comprehensively and effectively.

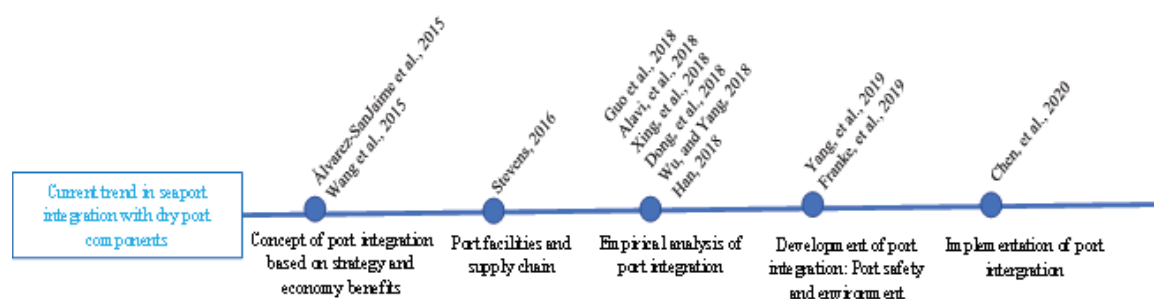


Figure 4. Evolution of port integration with inland components.

According to Dong et al. (2018), seaport integration is vital for global supply chain operation and affects maritime logistics (hinterlands). It proves that port integration is comprehensive in terms of the description of port services. Chen et al. (2020) interpreted that port integration to provide services entrusted to the port authorities ensures that the facility environment and operations empower port operations, improve socio-economic aspects because shipping companies use port services sustainably, benefitting both the port authorities and the country. In this regard, Xing et al. (2018) interpreted that port integration explains operational services in terms of budget management, as a base level of port taxes and payments for services provided by the port authority to shipping companies is imposed. These funds can be used to improve future port services.

Tax revenue is significant for any port, but it is easier to generate if used to improve operations and services to the maximum extent possible without obstacles to shipping companies and port stakeholders. Álvarez-SanJaime et al. (2015) also show how ports have the welfare of their stakeholders' in mind when imposing taxes. Also, Xing et al. (2018) had a similar observation about the relationship between taxes and port services. Álvarez-SanJaime et al. (2015) argue that service development also involves transportation facilities to harmonise port facilitation to the optimum level. This study can lead to service optimisation that will create perfect competition by offering attractive and stimulating port services to shipping and transport companies that use the best services offered by the port.

The scope of port integration deals with the impact of port integration on competition between regional ports (Wu and Yang, 2018). Hence, the authors stressed the need for all parties to work together and provide port facilities in both sea- and dry ports, considering the continuous nature of cargo transport operations and stakeholders' need to have operational services with hinterland ports; government officials put less emphasis on this aspect. Furthermore, the scope of port integration is a subsection in the port supply chain. In general, the port supply chain is a seaport strategy that involves the functional role of port organisation (externally) which includes the involvement and participation of port supply chain integration (PSCI).

Therefore, Stevens (2016) highlighted the need to use the biofuel supply chain, attract new flows, and conduct and foster value operation flows by making the bio-industry a new cluster. Port authorities need it to introduce alternative energy sources into seaport operations. New energy is an option that would help counter the rising cost of petrol. According to Han (2018), the port supply chain flow implies the provision of facilities which improve logistics to achieve supply chain efficiency in South Korea's Busan Port.

Yang et al. (2019) suggest that port integration encompasses development, strategy, economy and logistics. The scope of

development is essential for ports to improve the quality of the currently inadequate services. Hence, port enforcers need to ensure the development of port industry with comprehensive facilities, especially in small ports. Meanwhile, strategy defines restructuring regulations, strategic port planning, optimising resources, and optimal port functionality to be coordinated across all ports (Wang et al., 2015). Therefore, early port development stages must comply with port regulations to ensure the enforcement of port sustainability at the highest levels.

Furthermore, Guo et al. (2018) discussed the economy-related scope; the authors highlighted the importance of port development and expansion, considered the contribution of government subsidies to the development of port facilities that enhance efficiency for domestic and national economic benefits. The tendency to encourage local investment is important because ports can be equipped with comprehensive and up-to-date infrastructure and technologies to ensure that the invested assets help mobilise port facilities comprehensively.

The scope of logistics is the last discussion related to Alavi et al.'s port integration plan (2018). Logistics equipment is the main factor driving effective capability in the port area to ensure smooth movement through integrated supply chain. Seaports and terminals should be upgraded to ensure the continuity of facilities. Table 4 lists port integration dimensions. Though the scope involves strategy, the economic aspect must be addressed because, due to the emphasis of the paper, port facilities and services are provided to promote the economic interests of the port and the country. Therefore, local and foreign investment is encouraged in the port sector to achieve a sustainable level of development. In addition, Wang et al. (2015) explained that port facilities and development could be achieved through planning and strategy in the form of adoption of complimentary shipping and port regulations and policies. Achieving regulatory and policy compliance would reduce barriers to the construction of strategic port facilities.

Alavi et al. (2018) focus on the port integration dimension. In the author's view, port logistics services are of utmost importance for comprehensive mobilisation and efficient logistics in the port. The government encourages the use of integrated biofuel supply chains. Therefore, biofuel services at the port can be well-coordinated to allow biofuel use to meet transport flow needs at the terminal through adequate economic planning (Stevens, 2016)

In conclusion, low tax collection affects port service improvement and their effective use by shipping companies. Port facilities and services must be developed but are hindered due to the lack of financial resources, causing delays in sustainable, integrated, and effective port development. Therefore, the government should provide appropriate allocations through local investment and funding of local port enforcers, especially private agencies.

Table 4.

Summary of literature on port integration.

No	Title	Region	Remarks	Authors
1.	The impact of the integration of port and inland transport services on port competition	General	Findings: Considering inter-port rivalry, this paper investigates the economic benefits and welfare of integrating port operations with inland transportation services. While ports benefit from such integration, it may be harmful to public health. <hr/> Scope: Port integration <hr/> Dimension: Economy	Álvarez-SanJaime et al., 2015
2.	Port integration in China: Temporal pathways, spatial patterns and dynamics	People's Republic of China	Findings: This research paper discusses the Chinese port integration strategy intended to increase benefits. Several factors have effectively driven port integration in China: legislative tools and spatial planning, optimisation of shoreline resources and port functionality, and port competition with the same hinterland. <hr/> Scope: Supply chain <hr/> Dimension: Integration	Wang et al., 2015
3.	Port supply chain integration: Analysing biofuel supply chains	General	Findings: This research paper discusses port requirements for biofuel supply chain integration. Port authorities can integrate biofuel supply chains by expanding their function and fostering flows, attracting new flows, conducting value-adding operations, creating a bio-industry cluster, and serving as an information hub. <hr/> Scope: Foreign investment <hr/> Dimension: Port facilities	Stevens, 2016
4.	Port integration method in multipoint regions (MPRs) based on maximum social welfare of the external transport system	People's Republic of China	Findings: This research paper deals with the economic principle of maximising the social benefits of an external transport system and calculating the total internal transport cost of the external transport system. It also discusses an integration method with multi-period investment. Asset idling is also proposed considering excess port resources. <hr/> Scope: Economy <hr/> Dimension: Port integration	Guo et al., 2018
5.	Port logistics integration: Challenges and approaches	General	Findings: This research paper highlights that seaports are highly dependent on efficiency, especially in terms of logistics practices, functions and activities, and the manner of their integration with the supply chain. It also states that seaports and terminals need to improve through logistics integration. <hr/> Scope: Logistics <hr/> Dimension: Integration	Alavi et al., 2018

6.	Pricing strategies for port competition and cooperation	People's Republic of China	Findings: This paper deals with the integration of incorporated ports; price discrimination or a standardised pricing approach may be chosen. Port integration is always beneficial to the merger, and the merger should pursue a price discrimination policy. <hr/> Scope: Port integration <hr/> Dimension: Environment	Xing et al., 2018
7.	The effects of regional port integration: The case of the Ningbo-Zhoushan Port	General	Findings: This paper examines the effects of regional port integration in multiport regions. Its found that a higher degree of regional port integration can reduce handling charges and increase container throughput and the threshold effect. <hr/> Scope: Port integration <hr/> Dimension: Economic	Dong et al., 2018
8.	Analysis of the case of port cooperation and integration in Liaoning (China)	People's Republic of China	Findings: This paper focuses on the process of port cooperation and integration due to China's slowing economic growth. The negative consequences of an oversupply of port services have become more apparent. As a result, the importance of port cooperation and integration has been recognised, and port cooperation and integration methods have been extensively covered. <hr/> Scope: Port integration <hr/> Dimension: Economic	Wu and Yang, 2018
9.	Assessing the impacts of port supply chain integration on port performance	South Korea	Findings: The focus of this paper is the port supply chain, primarily port integration for port customers and suppliers in terms of the facilities provided. <hr/> Scope: Port supply chain <hr/> Dimension: Port performance	Han, 2018
10.	Port integration in a region with multiport gateways in the context of industrial transformation and upgrading of the port	People's Republic of China	Findings: This research paper discusses the ways in which over-capacitated ports can transform and upgrade their industry and tries to determine the optimum scale of port clusters. Lastly, it proposes a new port integration model. <hr/> Scope: Development <hr/> Dimension: Multimodal	Yang et al., 2019
11.	Initial port integration concept for EC and NB systems in EU DEMO tokamak	European Union	Findings: This paper discusses environmental building and port management system issues from the safety aspect. It highlights the basic functional, conceptual, and operational port structure requirements. <hr/> Scope: Port safety environment <hr/> Dimension: Development	Franke et al., 2019
12.	Port recentralisation as a balance of interest	People's Republic of China	Findings: This research builds a theoretical framework for interpreting various regional government implementations of port integration embedded in the social-economic environment. <hr/> Scope: Port integration <hr/> Dimension: Implementations	Chen et al., 2020

4.3. Current trends in dry port research

The research on the transportation of cargo to and from the inland division has been substantially developed, which is clear from the emergence of terminology variations for inland nodes, such as dry port, inland clearance depot, inland container depot, inland terminal, inland port, logistics centre, logistics park, freight village and other terms which have been proposed based on native terms (Notteboom and Rodrigue, 2009). The concept of dry ports is most frequently used for inland nodes due to its flexibility and operational agility compared to others. Owing to these operational benefits, the demand for this node has been increasing as a supporting node, especially for seaports and transportation networks (Rodrigue et al., 2016).

Figure 5 shows the current trends in dry port research. Table 5 presents the outcomes of traditional literature review and ILRA on dry port-related literature based on 12 relevant papers from the domain of dry ports. Table 5 illustrates the division of the current research scope on dry ports into seven scopes: strategic transport planning, port planning, transport integration, logistics network, requirement and function, transport facilitation, governance, and port management. Meanwhile, most investigated dry port research dimensions include freight distribution, port geography, economic development, geographical, economic, port and transportation facilitation, seaport development, container system, rail network, transportation services development, planning and development, and container handling.

Dry ports in intermodal freight transport systems are considered the logistical preparation for determining the best routes and schedules for a fleet of vehicles delivering transportation services between dry-port-based intermodal system terminals (Crainic et al., 2015; Chang et al., 2015). The strategic structure for several factors in assessing dry port position in developed countries and stakeholders are divided into three categories: dry port customers, dry port service suppliers, and the general public (Nguyen and Notteboom, 2016). An integrated approach focused on multi-criteria decision-making to selecting the best location for a dry port and examining the relationship between logistic policy and dry port location (Komchornrit, 2017).

A logistics gravity model was built to study the radiated inland regions from dry ports. Principal component analysis was used to measure the logistical efficiency of dry ports (Wei et al., 2018).

Port and transport facilities and strategic planning are necessary to ensure successful transportation networking facilities that meet port operation and other requirements (Jeevan et al., 2018). By analysing a broad sample of dry ports worldwide, this paper attempts to identify the general characteristics of dry ports (Nguyen and Notteboom, 2019). Integration of inland freight distribution systems is essential for efficient container seaport systems. The role of interdependence between dry ports and container seaports is explored to determine how dry port operations affect container seaport competitiveness (Jeevan et al., 2019).

This study shows that higher storage prices do not necessarily increase dry port profit. An extremely high storage price will reduce shippers' total costs, especially for shippers with high production rates. If the seaports' cut-off time is short, shippers with low production rates would have to bear high expenses. Low setup costs will also bring cost savings to shippers and increase dry port profit (Qiu and Xu, 2019). The research has shown that a dry port scheme with one dry port and several shippers faces price issues due to quantity discounts in rail transportation. The dry port is the winner in the contest, and the shippers are the losers (Qiu and Lee, 2019).

The dry port research assesses six thematic areas: port policy and governance, port management and strategies, competition and performance, planning and development, dry port operation, and spatial analysis (Miraj et al., 2020). The research papers discuss the transportation of containers from the harbour to the dry port and back. Different strategic aspects must be evaluated to estimate the time required for container handling within and outside the terminal. The following factors must be considered: congestion degree, the identification of the best strategy and mathematical model to identify the number of containers to be stocked in dry ports. These are described taking into account congestion degree and the identification of the best strategy (Facchini and Mossa, 2020).

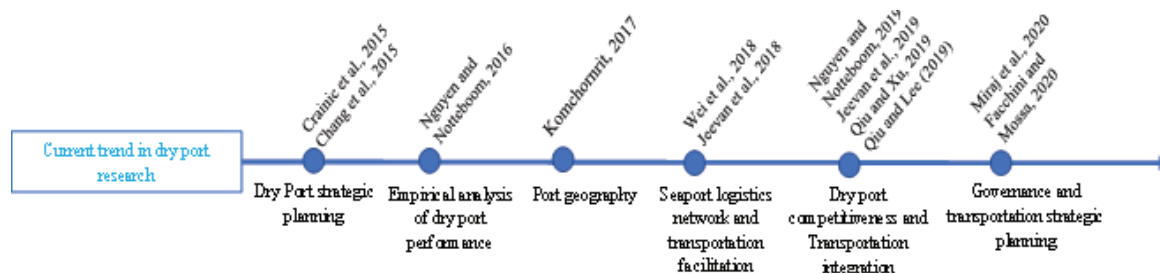


Figure 5. Evolution of dry port research.

Table 5.

Summary of literature on dry ports.

No	Title	Region	Remarks	Authors
1.	Modelling dry-port-based freight distribution planning	General	Findings: The research paper discusses dry ports and intermodal freight transport systems. It considers the issue of logistical preparation in terms of identifying the best routes and schedules for a fleet of vehicles providing transportation services between dry-port-based intermodal system terminals. <hr/> Scope: Strategic planning of transport <hr/> Dimension: Freight distribution	Crainic et al., 2015
2.	A two-phase model for dry port location with an application to the port of Dalian in China	People's Republic of China	Findings: This paper explains the port location planning policy and related decision-making. <hr/> Scope: Port planning <hr/> Dimension: Port geography	Chang et al., 2015
3.	A multi-criteria approach to dry port location in developing economies with application to Vietnam	Vietnam	Findings: This paper presents the viewpoints of various stakeholders, a strategic structure for the inclusion of several factors in the assessment of dry port position in developed countries. Stakeholders are divided into three categories: dry port customers, dry port service suppliers, and the general public. <hr/> Scope: Strategic planning of transport <hr/> Dimension: Developed economies	Nguyen and Notteboom, 2016
4.	The selection of dry port location using a hybrid CFA-MACBETH-PROMETHEE method: A case study of Southern Thailand	Thailand	Findings: This research suggests an integrated approach focused on multi-criteria decision making for selecting the best location for a dry port and examining the relationship between logistics policy and dry port location. <hr/> Scope: Transport integration <hr/> Dimension: Geographical	Komchornrit, 2017
5.	The role of dry port in hub-and-spoke network under Belt and Road Initiative	People's Republic of China	Findings: This paper investigates a logistics network linking inland regions through dry ports based on a two-stage logistical gravity model. First, a simple logistical gravity model is constructed to study the radiated inland regions from dry ports. Principal component analysis is used to measure the logistical efficiency of dry ports. <hr/> Scope: Logistics network <hr/> Dimension: Economy	Wei et al., 2018
6.	Determining the influential factors of dry port operations: Worldwide experiences and empirical evidence from Malaysia	Malaysia	Findings: The paper explains the port and transport facilities and strategic planning necessary to ensure successful transportation networking facilities and meet port operations requirements. <hr/> Scope: Strategic planning of transport <hr/> Dimension: Port and transportation facilitation	Jeevan et al., 2018

7.	The relations between dry port characteristics and regional port-hinterland settings: Findings for a global sample of dry ports	General	Findings: By analysing a broad sample of dry ports worldwide, this paper attempts to define the general characteristics of dry ports. Scope: Requirement and function Dimension: Development	Nguyen and Notteboom, 2019
8.	The impact of dry port operations on container seaport competitiveness	Malaysia	Findings: This paper discusses the integration of the inland freight distribution system essential for an efficient container seaport system. It explores the interdependence of dry ports and container seaports, in an attempt to determine how dry port operations affect the competitiveness of container seaports. Scope: Transport integration Dimension: Container system	Jeevan et al., 2019
9	Optimising rail transport service in a dry port system	General	Findings: This study shows that higher storage prices do not necessarily increase dry port profit. An extremely high storage price reduces the total costs of shippers, especially those with high production rates. If the seaports' cut-off time is short, shippers with low production rates have to bear high expenses. Low setup costs bring cost savings for shippers and increase dry port profit. Scope: Transport facilitation Dimension: Rail transportation	Qiu and Xu, 2019
10.	Quantity discount pricing for rail transport in a dry port system	General	Findings: The research paper discusses a dry port scheme with one dry port and several shippers; there is a price issue due to quantity discounts in rail transportation. The dry port is the winner in the contest, and the shippers lose. Scope: Transportation integration Dimension: Transportation services development	Qiu and Lee (2019)
11.	Research trend in dry port studies: A systematic review of two-decades	General	Findings: This dry port study explores six thematic areas, including port policy and governance, port management and strategies, competition and performance, planning and development, dry port operation, and spatial analysis. Scope: Governance and port management Dimension: Planning and development	Miraj et al., 2020
12.	Optimal dry port configuration for container terminals: A non-linear model for sustainable decision making	General	Findings: This paper discusses container movement from the harbour to the dry port and back. Different strategic aspects must be evaluated to estimate the time required for handling containers within and outside the terminal based on degree of congestion. Strategic identification requires a mathematical model to identify the number of containers to be stocked. It is described considering the congestion degree and the optimal strategy. Scope: Strategic planning of transport Dimension: Container handling	Facchini and Mossa, 2020

4.4. Current content of the National Transport Policy

Table 6 shows the results of traditional literature review and the ILRA on the national transport policy literature reviews. They resulted in the acquisition of 11 relevant papers from authors working in the field of national transportation policy. According to Table 6, most of the previous researchers were dedicated to investigating two main scopes - transport policies and strategic planning. In addition, almost eleven dimensions have been detected, including data analysis, social economy, transportation development management, policymakers, strategies, transport strategy, social and political aspects, transportation, sustainable modes of transport and safe transport (see Table 6).

Social media information harvesting is essential in the transportation context and in terms of the challenges that need to be addressed. It demonstrates that information gathered from social media can complement and enrich traditional data collection methods and provide new insights (Grant-Muller et al., 2015). Before the financial crisis, the transportation policy and governance considered the political and structural dynamics, paving the way for a high-cost and low-cost solution to the expansion of transportation infrastructure. The lessons learned from this research paper can be applied to sustainable transportation efforts internationally and before the financial crisis (Rau et al., 2016). The paper used content analysis to analyse secondary data to assess road transport policy and examine the challenges transport management faces in the Gombe state and Nigeria in general. The system theory served as a theoretical framework for the investigation (Umar and Bappi, 2016).

Future transport concepts and strategies are assessed by investigating the evolution of the Hungarian Transport Policies and the need for a sustainable transportation system. The study assumes a sustainable economy, which is challenging for policymakers. Policymaking effort copying should be avoided to reduce the economic and social costs of transportation (Osztér, 2017).

Emberger et al. (2017) demonstrate how the transportation strategy has evolved, why passenger and freight transportation became the primary priorities of the planning process and transportation strategy (drawn up separately for roads and railway) in the framework of an integrated transport planning process. The development of a national transportation policy depends on the country's political system and the way its environment influences transportation as a public policy (Skrzypiński, 2018).

Establishing an organisational structure to examine two empirical case studies on the national transportation strategy is vital. It summarises the content of each document before analysing it in terms of the various categories of social impact. The study's findings reveal that the spending distribution of the two national strategies/plans differs. Funded projects have distributional effects that are less socially equitable than the strategies/plans (Rye and Wretstra, 2019). The consequences and opportunities for a shift to more environmentally friendly modes of transportation are required to steer developments in the right direction (Johansson et al., 2019). Policymakers who promote more compact and connected community planning can find strong guidance about what to prioritise, broadening the emphasis from activity facilitation to genuine inclusion.

It discusses interventions, including the five interventions that global analysts described as incredibly successful for making cities more available, and outlines various types of transportation policy instruments and governance reforms (Rode et al., 2019). Matveeva (2020) indicates that dry port studies are divided into six thematic areas: port policy and governance, port management and strategies, competition and performance, planning and development (including dry port operation), spatial analysis (including dry port operation), and port operation (including dry port management and strategies).

Table 6.

Summary of literature review on national transport policies.

No	Title	Region	Remarks	Authors
1.	Transport policy: Social media and user-generated content in a changing information paradigm	General	Findings: The research paper highlights the main requirements for a social media information harvesting methodology in the transport context and the related challenges. It demonstrates that information harvested from social media can complement and enrich traditional data collection. <hr/> Scope: Transport policies <hr/> Dimension: Data analysis	Grant-Muller et al., 2015

2.	Transport policy and governance in turbulent times: Evidence from Ireland	Ireland	Findings: This research paper deals with transport policy and governance in these turbulent times. It offers lessons relevant for sustainable transport efforts at the international level and before the financial crisis. The paper considers the political and structural dynamics that paved the way for a high-cost and low-cost solution to the growth of transportation infrastructure. <hr/> Scope: Transport policies <hr/> Dimension: Social economy	Rau et al., 2016
3.	Road transport policy and socio-economic empowerment in Nigeria: a case of Gombe state transport service	Nigeria	Findings: The paper assesses road transport policy and examines the challenges faced by transport management in the Gombe state and Nigeria. The paper adopted content analysis based on secondary data and system theory as its theoretical framework. <hr/> Scope: Transport policy <hr/> Dimension: Transportation development management	Umar and Bappi, 2016
4.	Transport policies in Hungary - historical background and current practices at national and regional levels	Hungary	Findings: This paper aims to create future transport concepts and strategies to investigate the evolution of the Hungarian Transport Policies. The need for a sustainable transport system assumes a sustainable economy, which is a massive challenge for policymakers. Parallel policymaking should be avoided to minimise the economic and social costs of transportation. <hr/> Scope: Transport policies <hr/> Dimension: Policymakers	Oszter, 2017
5.	Transport policy planning in Germany - An analysis of political programs and investment masterplans	Germany	Findings: This research paper deals with the comprehensive transport policy program of the federal government <hr/> Scope: Transport policies <hr/> Dimension: Strategies	Fichert, 2017
6.	National transport policy in Austria – from its beginning till today	Australia	Findings: The paper explores a transportation plan, as well as where and why it was devised. It explains the development of transportation strategy goals and why passenger and freight transportation became a priority in the planning process and transport strategy (road, rail separated) towards an integrated transport planning process. <hr/> Scope: Transport policies <hr/> Dimension: Transport strategy	Emberger, 2017
7.	Transport Policy from the standpoint of political and systemic analysis	General	Findings: This research paper discusses the development of a national transport policy with respect to political system and its environment, that affect the transport policy as a public policy. <hr/> Scope: Transport policies <hr/> Dimension: Social and political	Skrzypiński, 2018

8.	Swedish and Scottish national transport policy and spending: Social equity analysis	Sweden	Findings: This paper aims to create a framework for two empirical case studies on the national transport strategy. It summarises the content of each document before analysing it in terms of the various categories of social impact. The study reveals that the two national strategies/plans differ in their spending distribution and that the projects financed are relatively less socially equitable in their distributional effects. <hr/> Scope: Strategic plan <hr/> Dimension: Transportation	Rye and Wretstra, 2019.
9	Appraisal of a regional public transport project: Document and interview analysis on a light rail case in Sweden	Sweden	Findings: The research paper deals with the consequences of sustainable modes of transportation and the shift necessary to steer developments in the appropriate direction <hr/> Scope: Transport policies <hr/> Dimension: Sustainable modes of transport	Johansson et al., 2019
10.	National transport policy and cities: Key policy interventions to drive compact and connected urban growth	General	Findings: The paper aims at policymakers who promote more compact and connected community planning, giving them strong guidance about what to prioritise, broadening the emphasis from activity facilitation to genuine inclusion. It discusses 21 highly debated interventions, including five that global analysts described as incredibly successful for making cities more available, and outlines various types of transportation policy instruments and governance reforms. <hr/> Scope: Transport policies <hr/> Dimension: Policymakers	Rode et al., 2019
11.	National transport policy in the context of association agreement implementation	Ukraine	Findings: This dry port study assesses six thematic areas, including port policy and governance, port management and strategies, competition and performance, planning and development, dry port operation, and spatial analysis <hr/> Scope: Transport policies <hr/> Dimension: Safe transportation system	Matveeva, 2020

4.5. New and Comprehensive Seaport-Inland Policy Model

Dry port ensures cross-border freight movement as an effective inland transaction (Jeevan et al., 2021). It is connected to one or more modes of transportation, handles, stores and inspects goods or cargo in international trade and executes applicable customs control and formalities. Dry port provides all port services except for cargo loading to and from seagoing ships. Dry port functions include container handling and storage,

container stripping and stuffing, breakbulk cargo handling and storage, customs and other border control inspection and clearance, container light repairs, freight forwarding and cargo consolidation, banking /insurance/financial services, transport booking/brokerage, and value-added services (e.g., packaging, labelling, long term warehousing). Dry ports allow the transition of cargo movement from inefficient to efficient combinations of transport (mainly all road to rail plus road). Figure 6 below explains a novel and comprehensive seaport-inland policy model in this research.

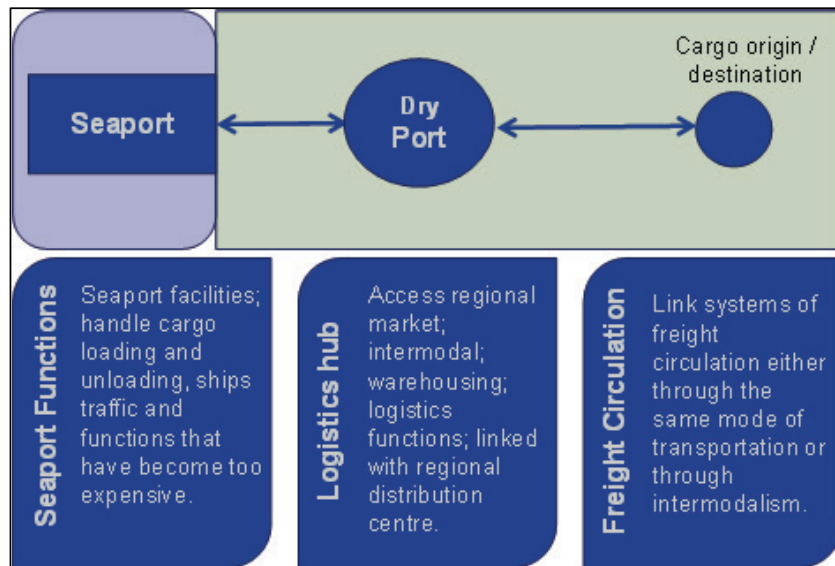


Figure 6. New and comprehensive seaport-inland policy model.

The benefits of dry ports result from modal diversion in four ways: through net reduction of transport operating cost, which will increase trade, net reduction of environmental damage, net improvement of public safety (reduced accident costs), and a net reduction in transport infrastructure maintenance cost. Dry ports located close to cargo sources (or trade generating locations) and distant from seaports allow transport costs to be optimised by employing: small-medium sized trucks for the transport of breakbulk cargo between the cargo source and the dry port and railways for the transportation of containers between the dry port and a seaport. Dry port services are essential indicators of a successful container terminal. It could have an effect on resource utilisation for terminal operation and create the potential for the future growth of the terminal (Mokhtar, 2022).

5. CONCLUSION AND IMPLICATIONS

The Malaysian NTP focuses on creating an ecosystem conducive to the transport sector to increase economic competitiveness, promote people's mobility, and protect the environment. However, the dry port component is not included in the Malaysian NTP. The current NTP model does not include any dry port components, whereas the comprehensive seaport-inland policy model has the dry port components. To close the gaps, this study provides a thorough discussion based on integrative literature review analysis (ILRA), which is used to examine literature and understand the current practicability of the Malaysian NTP. It also discusses the limitations of seaport and dry port integration policies in Malaysia and gives constructive

insights for future strategies aiming to upgrade the Malaysian NTP for national and international trade development. The integration of dry ports in the seaport system is crucial for ensuring NTP sustainability and enriching the nation by providing an effective transportation system. The application of ILRA will be significant in exploring the content of Malaysian maritime policy-related documents.

Seamless cargo movement is a crucial enabler for economic competition in the transportation industry, and the dry port aspects are fundamental to solving the current problems in the transportation system. Thus, assimilating dry ports with the transportation system under the Malaysian NTP will resolve some standing issues and increase the potential of the industry to develop a robust transport system. The policy will be enforced effectively so that all stakeholders maintain the control and operate seaport-dry port components effectively and efficiently.

Dry ports will handle the ongoing intermodal integration between seaports and their hinterland through long-distance rail and road network corridors. They are likely to be more critical elements within logistics and supply chains, mainly owing to their role as buffers where containerised consignments can be cheaply stored, waiting to be forwarded to their final destinations.

The development of dry ports worldwide has underlined an emerging functional relation between the seaport and the hinterland with the relative uniqueness of each dry port model. By integrating the seaport with the dry port or its hinterland, supply chain sustainability is a strategic step in extending the seaport life cycle. The hinterland of a port is a highly dynamic and complex concept that has undergone significant reforms following a series

of disruptive developments in trade and transport. It has gained significant importance, and is increasingly shaping the seaport ecosystem. However, the issue of assimilation of seaports and dry ports with all those components or parameters into a single approach is still challenging and remains to be addressed.

CONFLICT OF INTEREST

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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