



Future Opportunities for Port City Development: A Reciprocal Evaluation for Competitive Advantage for Malaysian Seaports

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ABSTRACT

The seaport is a crucial feature of economic progress since it facilitates commerce, provides additional benefits to a port and city and enables domestic and international companies to expand their openings in the market. One of Malaysia's least urbanised areas is the East Coast Region (ECR) of the Peninsular, which is also experiencing several development challenges. For instance, many inhabitants are poor or unemployed, while many households suffer from a low income. The region also is underdeveloped in logistical and transportation terms, as well as in its infrastructure and related facilities. This study presents an analysis of how the 'port city' has been defined, the ways that ports and cities exist symbiotically, and the principal influences over the way port cities develop. This study employed semi-structured interviews with 14 respondents, the majority of whom possessed considerable knowledge and experience in the related field. The result shows that eight factors influence port city development, such as facilities and infrastructure; relationships; port city planning; port performance and competition; green environment and quality of life; population growth; port city attractions and benchmarking. In addition, the port-city reciprocation needs to be strengthened to boost economic growth in the ECR of Peninsular Malaysia.

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1. Introduction.

A port can be a key driver of the economy of a city or region, with its influence extending far past its frequently isolated and secure location. Ports exert considerable impacts on terrestrial and marine environments, while they affect both urban and rural residents, especially when the city hosts the headquarters of shipping and maritime operations. The growth of a port

needs to acquire various forms of knowledge from an extensive array of players in the public and private domains. These parties should hold a stake in the port's economic well-being, the logistical and transportation requirements, as well as the effects it has on the environment of the surrounding city and marine locations (Hein, 2016). Furthermore, several players with a public role in port cities worldwide have voluntarily organised networking initiatives, aiming to gather delegates who belong to the maritime cluster of industries. These include groups of shipping and import-export organisations, handlers of cargo, maritime agencies and union workers. Also involved are representatives of a port's own groups, such as its chamber of commerce, its municipality, as well as the port authorities and those of the region (Merk, 2013).

From the ancient world until today, the development of ports has been associated with the growth of a town or city next to or near the port (Hoyle, 1989). Table 1 illustrates this, despite initially including just Stages I to V. Nevertheless, it is clear that

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inside many towns and cities that contained ports, these first port facilities, harbours and natural estuaries underwent development to become industrial ports. A further phase saw industrial activities shift away from the water's edge to the interior and perhaps subsequently to a purpose-built location outside the boundaries of the city. Finally, many waterfronts experienced redevelopment (Monios et al., 2018). The addition of Stage VI reflects a subsequent version of the transition, in which the city-port links underwent renewal and extra elements came into consideration, for example, globalisation and transport chain intermodalism. Stage VII is newly recovered whereby the dry ports have been applied as an interface between seaports and city to ensure the continues growth of regional development as well as the concept of geologistics can be applied effectively throughout the region (Jeevan et al., 2015; Zain et al., 2022).

Table 1: Different stages of a typical port city's physical development.

Period	Stage and characteristics
Ancient/medieval to 19 th century	I Primitive port city: Close spatial and functional association.
19 th to early 20 th century	II Expansion of the port city: Commercialism and industry grow rapidly, forcing the development of the port past the city limits. Linear quay facilities and general cargo operations.
Mid 20 th century	III Modernised and industry-focused port city: Separation and larger area required due to expansion of industry, particularly featuring oil refineries, containers and roll-on-roll-off.
1960s - 1980s	IV Retreating from the water's edge: Increasingly separated areas of maritime industrial development arising from seafaring technological developments.
1970s - 1990s	V Waterfronts redeveloped: Considerably large terrestrial and marine spaces consumed by sizeable modern ports; original cores undergo urban renewal.
1990s - 2000+	VI Connections between port and city rediscovered: Role of the port transformed by globalising and intermodal factors; concept of integrated port and city enhanced by urban redevelopment.
2001-2022+	VII- Reintegration of port city concept via dry ports: This new dimension will be a substantial source to stimulate regional development and geologistics application in particular region.

Source: Hoyle (1989); Jeevan et al., (2015); Zain et al., (2022).

It is possible to measure the direct economic effects of ports on their city by assessing various factors. These include the volume of cargo, the gross value and the number of jobs directly linked to the port area activities. The services associated with the area of the port also have connections to the backward and forward linkages, as well as the jobs indirectly created by such activities. None of these would occur in cities if they did not have ports (Bazan-Lopes, 2002). Zhang and Lam (2013) and Xiao and Lam (2017) supported this concept, stating that local employment, taxation and economic functions were principally generated when a port city first developed due to the handling of cargoes that took place. According to Chan and Yip (2010), ports in different regions developed further improvements to their ports to compete with others and meet the demands of sea transport organisations. Some ports aim to have the leading global container port throughput. The ports of Hong Kong and Singapore have competed with each other for decades.

According to Shan et al. (2014), port cities operate both

as ports and cities, with both features being interdependent. The authors noted that developing seaports might assist the host cities to gain an economic boost due to the flows of cargo, passengers and finance, as well as various value-added functions. Additionally, seaports might be able to stimulate infrastructural expansion that features, for instance, links to roads and railways, which would be economically advantageous for the city. Various internal and external elements have influenced the relationships between ports and cities since the 1960s. In particular, global systems of transportation have changed, there has been a maritime industry revolution and port infrastructures have taken on new designs (Bazan-Lopes, 2002). The majority of the world's large cities have supporting seaports, and a city's growth rate can also be attributed to seaport merchandise. Ports are fed by the hinterland and port cities are served by ports (Radhakrishnan, 2017). Historically, nearly all cities on the coast have contained a port, with all of these sustaining an urban development. Therefore, the port has been regarded as the engine of nearby urban and regional economic growth (Xiao and Lam, 2017). Marketers of cities might also use ports as key promotional elements. For instance, the port of Rotterdam is identified as a major factor in the city's economic development and one of its primary attributes, while the label 'world port city' is key to the city's marketing.

The future role of the city will be crucial as the world continues to change rapidly. Cities are focal points of the activities related to the economy and knowledge, and the majority of the world's population are city dwellers (Rechnitzer and Filep, 2009). Moreover, the city has historically driven greater levels of production and expansion, and cities are predicted to be vital to national and regional development and competitiveness (Zain et al., 2022). Given this background, the interactions between the principal operations of oceanic maritime trading, the port's economic functions and the facilities inland are crucial to any port. These interfaces represent the structures and links of the intermodalism between the land near the sea and that of the interior (Notteboom and Rodrigue, 2005; Rodrigue et al., 2014). Therefore, the port city is a timely and critical topic to be explored especially from the Malaysian perspective. Owing to the significant of this paper, several aims have been designed including exploring the characterisation of port city from the local point of view, discovering the mutual roles of ports and city in economic development as well as investigating the enablers that influencing the port city growth.

1.1. The growth of seaports in the East Coast region of Peninsular Malaysia.

Malaysia can be defined as an oceanic country strategically bounded by the South China Sea and the Straits of Malacca. The South China Sea separates the two large land masses that comprise the main parts of the country, namely East Malaysia and West Malaysia (the latter is referred to as Peninsular Malaysia) (Soon and Lam, 2013). The State or Federal governments, being higher authorities, control the establishment of ports in Malaysia. At present, there are seven (7) main federal ports in Malaysia: Port Klang, Penang Port, Kemaman Port, Kuantan Port, the Port of Tanjung Pelepas (PTP), Johor Port and Bintulu

Port. The State Governments of Sabah and Sarawak are the controlling authorities of all the ports in Sabah and Sarawak, respectively, except Labuan Port and Bintulu Port (MOT, 2020). In addition, the benefits from mining, as well as the oil and gas industries, are realised by various private port facilities and jetties, including Port Dickson and Lumut (Heide, 2020). As Chen et al. (2016) noted, Penang Port, Port Klang, PTP, Johor Port, Bintulu Port and Kuantan Port are the main seaports in Malaysia.

Kelantan, Terengganu and Pahang are the three states that constitute the eastern region of Peninsular Malaysia (or the ECR of Peninsular Malaysia). Compared to other regions in Peninsular Malaysia, this region remains the least built-up. It faces various development issues, including high levels of poverty and unemployment, low household incomes, poor logistics and transport, a low rate of urbanisation and inadequate infrastructural facilities. These problems hamper the economic development of this region (Bhuyan and Siwar, 2011). Compared to states in the southern (Johor Bharu) and central regions (such as Kuala Lumpur, Selangor, Negeri Sembilan and Melaka), the economic output of areas such as Kelantan, Pahang and Terengganu has not been good (Hassan et al., 2011).

As outlined in the ECER Master Plan (2019), high out-migration and low household incomes are two features of the eastern region of Peninsular Malaysia, where socioeconomic growth is lagging. Limited jobs were created for the locals as a result of low levels of private investment. To pursue higher income and better employment opportunities, many of the local population have moved to the more developed urban areas, mainly in the southern and central regions. Thus, the poor situation in ECR Malaysia proves that the economic imbalance occurs in the East Coast and West Coast of Peninsular Malaysia. On the West Coast such as the Port of Klang, the economy is growing rapidly due to the strong interaction between the city/industry and the Port, so it is far different from the economic performance in the East Coast, except Kuantan Port which is directed towards the port city. Therefore, this needs to be focused again in the east coast area, especially in Ports and cities in the Kelantan and Terengganu areas.

According to Jeevan et al. (2021), employability, quality infrastructures, quality of life and job growth are not such significant elements of regional development, especially in the ECR of Peninsular Malaysia. Clearly, there must be equilibrium in economic development. This would ensure this region develops in the right direction towards economic equality.

In the ECR of Peninsular Malaysia, the main port is Kuantan Port, which faces the South China Sea. A major deep-sea port in the north-east, it mainly handles conventional cargo, iron, bauxite and chemicals (refer to Figure 1). Southern Thailand is bounded by Kelantan’s location, and it has become the ideal and preferred site of the Logistics Centre for the north-east of Peninsular Malaysia, as well as a Cross-Border Gateway, owing to its closeness to Indochina. The expansion of Tok Bali Port (also known as Tok Bali Supply Base) is a key government development (Kelantan State Sustainable Development Master Plan, 2019). Located on the east coast of the Peninsular in Terengganu State, the port of Kemaman is a deep seawater

port, which has the capacity to handle shipping of over 150,000 DWT, while it also manages cargoes of goods that are dry bulk and liquid bulk, as well as general (Rauzilan and Suhrah, 2021).

Figure 1: The spatial organisation of port city in Malaysia.



Source: Authors.

In general, the impact of international trade has a significant impact on Malaysia’s seaport industry. In 2020, Malaysia’s container port traffic was recorded at 26.6 million TEUs, a reduction from the prior year’s figure of 26.8 million (CEIC, 2021). Table 2 shows the number of TEUs processed by West Coast (Port Klang, PTP, Penang Port, Johor Port) and East Coast (Kuantan Port) Malaysia’s seaports from 2011 to 2020.

Table 2: Container Throughput (TEUs) in West Coast and East Coast Malaysia’s seaports.

Year	West Coast	East Coast
2011	18,938,906	132,796
2012	19,462,092	136,101
2013	19,761,663	126,548
2014	21,235,769	131,244
2015	22,803,308	140,959
2016	23,502,803	128,897
2017	22,524,029	147,041
2018	23,728,833	149,912
2019	25,192,701	154,150
2020	25,483,640	149,882
Total	222,633,744	1,397,530

Source: Malaysia Transportation Statistics (2020).

In comparison to Kuantan Port (ECR of Peninsular Malaysia), the data in Table 2 reveals that seaport capacity expansion has focused more on West Coast Malaysia’s seaports. Furthermore, the data in Table 3 shows that the overall freight traffic in Port Klang, PTP, Penang Port and Johor Port has been greater than that of Kuantan Port and Kemaman Port. As a result, in the central and northern areas, there is an urgent need for port city growth that would lead to local growth. In comparison to other places, the level of seaport operations on the east coast is not

as strong. As a result, it is critical to build good bonds between seaports and urban centres to improve the output of both aspects.

Table 3: Total Cargo Throughput by Ports, Malaysia, 2011-2020 ('000 Freight Weight Tonnes).

Year	Port Klang	PTP	Penang Port	Johor Port	Kuantan Port	Kemaman Port
2011	194,168	115,459	29,390	32,674	15,207	3,998
2012	197,907	118,991	29,328	25,909	16,064	6,681
2013	200,278	122,667	30,081	26,979	19,332	4,359
2014	217,289	134,040	30,047	27,303	21,367	4,864
2015	219,786	138,466	30,314	28,652	40,030	6,480
2016	245,457	129,342	30,978	28,122	16,341	5,824
2017	212,308	130,522	32,773	28,376	17,462	5,516
2018	220,700	139,807	34,409	31,012	17,998	5,111
2019	243,108	137,203	33,128	31,144	26,099	8,119
2020	221,421	144,625	30,035	30,036	27,266	6,956

Source: Malaysia Transportation Statistics (2020).

In 1989, Hoyle elaborated on the variables and complexities related to port city development across the globe. These elements and procedures have environmental, political, legislative, economic and technological dimensions, among others. Nevertheless, there is very limited published research on this topic. Studies have explored themes such as port city planning (Van den Berghe and Daamen, 2020; Hein, 2021), port spatial development (Chan and Yip, 2010; Ouariti and Jebrane, 2020), port city competitiveness (Douglass, 2004; Zhao et al., 2017); port city policies (Merk, 2013; Lacalle et al., 2020); port city relationships (Ducruet, 2007; Chen, 2017; D'agostini and Jo, 2019) and port city sustainability (Wagner, 2019; Zheng et al., 2020). The paradigm of the port city concept in Malaysia has received minimal consideration in the research undertaken so far. Most studies related to the port city concept in Malaysia are less or not conducted in the ECR of Peninsular Malaysia. While, at the global level, lack of studies focused on port city development factors/concepts, and not presented, specifically in this context. Studies in Malaysia especially on the West Coast area, for example, a study by Abdullah et al. (2012) focused on port city development and quality of life in Pasir Gudang Port, Johor, Malaysia, and a study by Shah et al. (2010) focused on the physical development of port city in the Port of Klang. Shah et al. (2010) study did not empirically discuss the concept of port city development and emphasized on the change in land use form within the urban area, distribution of physical activities and the direction of land use expansion of the port city area. This current study is the first phase for ECR of Peninsular Malaysia, and in the future will be discussed empirically based on quantitative data (survey) to confirm the factors obtained to further strengthen the results.

Overall, the literature is necessary to prove that with the existence of the relationship between the city and the port according to certain phases, however, this development phase does not mention in more detail the tangible and intangible factors for the development of the port city. For this reason, the interview method helps the researcher to identify wider factors in supporting the concept of port city development in the ECR of Peninsular Malaysia, and the findings of this study, hopefully,

can be referred to by other stakeholders of other ports. Therefore, the research objective was to investigate the concept of port cities and their development, focusing on the east coast of Peninsular Malaysia. This research analysed the definition of a port city, the reciprocal roles of the port and the city, as well as the potential factors that influence the development of port cities.

2. Methodology.

As Noble and Smith (2014) stated, the generic name 'qualitative research' means a set of techniques and approaches for gathering interpretative or explanatory data focusing on meanings and subjecting that data to analysis. Fulfilling the objectives of the current study required a qualitative approach because the topic has to be comprehended and only minimal studies had been conducted on this subject. According to Creswell (2014), exploration is a key element of qualitative research so it can be an advantage if a researcher has no knowledge of which variables are the most important and thus need to be examined.

Three forms of interviews were outlined by Stuckey (2013), Jamshed (2014) and Merriam (2009): highly structured or uniform, semi-structured and unstructured or informal. This study featured fourteen (14) respondents, each of whom experienced an in-person semi-structured interview. They were from various organisations, including port authorities, the ministry of transport, port operators, logistics operators, the regional planning division and state authorities, and were included to obtain insider perspectives or views on port city development (see Table 4). The main purpose of an interview is to obtain a special kind of information. Face-to-face interviews allow researchers to explain questions that are difficult for respondents to understand in order to obtain clear and accurate answers (Oltmann, 2016). The researcher wants to discover what is in and on someone else's mind or to determine the other person's perspective (Patton, 2002). In addition, the semi-structured interview is more powerful than other types of interviews for qualitative research because it allows researchers to acquire in-depth information and evidence from interviewees while considering the focus of the study. Moreover, it allows flexibility and adaptability for researchers to hold their track as compared to an unstructured interview, where its direction is not fully considered. It is anticipated that an expert who has more work experience will be able to offer more exact details compared to someone without such experience, which ensures the outcomes have greater validity.

All the interviewees were well-experienced members of staff with a wide knowledge of the maritime industry and town planning, especially in the ECR of Peninsular Malaysia. The interview sessions were conducted from December 2021 until February 2022, and the information was constantly updated to include any changes over time. Prior to the interview sessions, the questions were designed to ensure the sessions would be guided and remain within the context under discussion. The questions were designed in two sections; Section A focused on the demographic profile such as type of organisation, position in the organisation and years of experience, while section B emphasizes the research questions, which are the definition

Table 4: The experts who participated in the interviews.

ID	Type of organisation	Position in the organisation	Years of experience
P1	Seaport Authority	Senior Manager	18
P2	Ministry of Transport	Senior Manager	24
P3	Ministry of Transport	Executive	7
P4	Seaport operator	Senior Manager	19
P5	Ministry of Transport	Senior Manager	11
P6	Seaport operator	Operation Manager	8
P7	Seaport operator	Senior Manager	20
P8	State authority	Senior officer	22
P9	Regional planning division	Senior Manager	18
P10	Seaport operator	General Manager	24
P11	Regional planning division	Senior Executive	13
P12	Seaport authority	Senior Manager	30
P13	Logistics operator	Senior Manager	21
P14	Regional planning division	Chief Operating Officer	25

Source: Authors.

of a port city from a local perspective (B1), the reciprocal role played by port and city (B2), as well as the factors that influence the development of a port city (B3).

The average duration of the interview session with each respondent was one to two hours. Purposeful sampling was the technique used to obtain the samples, so this was classified as a process of non-probability sampling. Qualitative researchers make extensive use of purposeful sampling to identify and select cases that are rich in information connected to whichever topic is the focus of the study (Palinkas et al., 2015). Purposeful sampling means a selection is made of specific respondents and for specific events to obtain relevant data that cannot be obtained from other respondents (Maxwell, 1996; Tongco, 2009). Purposeful sampling was more likely to be used in this study because the main respondents consisted of players with expertise in land and port development. Qualitative researchers generally estimate sample sizes by employing the concept of data saturation (Guest et al., 2020; Ishak and Bakar, 2014; Lebar, 2017; Creswell, 2013). As supported by Charmaz (2006), the data collection process stops when the category or theme has reached a saturation point, a step that was applied in this study. Failure to reach data saturation compromises the validity of one's research (Fusch and Ness, 2015).

The research question or questions are answered through the data analysis process. The responses can be referred to as categories, themes or findings (Merriam, 2009). Audio recordings were collected when gathering data from the interviews in the current study. Each recording was transcribed, after which codes and themes were identified by analysing the data. Themes were obtained through thematic analysis, and these provided an elaboration of the port city concept in Peninsular Malaysia's east coast region, with a particular focus on the Ports of Kuantan and Kemaman, as well as the Tok Bali Supply Base. Atlas.ti software and conventional manual methods were used to perform inductive thematic data analysis. Following the thematic analysis technique, an analysis of the qualitative data was performed and then a search through the dataset was conducted to locate, analyse and present patterns that repeated (Braun and

Clarke, 2006). Thus, the aim of thematic analysis is to use interview data to locate patterns in their themes. As shown in Table 5, the process contains six steps, as recommended by Braun and Clarke (2006).

Table 5: The step-by-step thematic analysis procedure.

Steps	Description of the process
1. Familiarisation with the data	Data transcribed; data can then be read and re-read, with initial thoughts noted down.
2. Generating preliminary codes	Data's notable features are coded; data connected to the codes are collated.
3. Searching for patterns or themes	Potential themes may provide codes, which are collected and checked to determine whether the themes would effectively relate to the coded extracts and generate a thematic analysis map.
4. Reviewing themes	Themes are checked; a thematic map is generated.
5. Defining and naming themes	Each theme's specifics and the overarching study message are refined through continuous analysis; basic meanings and names for all themes are established.
6. Producing the reports/manuscript	Last analysis; an academic report produced.

Source: Braun and Clarke (2006).

3. Results and Discussion.

According to Creswell (2007), to obtain reliable information and meet the criteria, diversity among the selected respondents needs to be considered. Therefore, the respondents had to have experience related to ports and the land/region around ports (see Table 4).

3.1. Descriptive Analysis of Demographic Information.

Based on Table 6, the respondents held various positions, including Executive, Senior Manager or Officer, General Manager and Chief Operating Officer. Most of the respondents involved in this study consisted of senior managers (78.58 per cent). Generally, senior managers were actively involved in this study because these middle-level managers are generally responsible for implementing the goals set by the top management. Al-Khalifa and Aspinwall (2000) concluded that middle-level managers are good sources of information because they execute the decisions made by the top management. In fact, their role is to interact with both the top management and daily operations employees, as well as be able to understand company performance. Since most top managers are not actively involved in day-to-day operations, the role of the middle manager is also important to communicate the company's mission,

goals and priorities to its employees, as well as offer suggestions and feedback to the top management (Hirte, 2018). Thus, it is undeniable that these middle managers could understand the highly important and closely interrelated features of the development of ports and cities, as well as provide accurate input when answering the interview questions.

In addition, the top management (general managers and chief operating officers) played an important role as respondents because they were involved in the formation of plans to carry out objectives and policies, and they also delegated the tasks of running an entire business. ‘Chief executive’ is the title generally used to refer to company’s officer with accountability for the organisation’s overall actions and outcomes (Steiner, 1969). Given these attributes, most of the selected stakeholders were able to contribute comprehensive information to this study. Information was generally obtained from respondents who had extensive experience concerning the issues studied. This is evident in the fact that 50 per cent of the total respondents had work experience of more than 20 years, while 35.7 per cent of the respondents involved had work experience of between 11 and 20 years. Finally, 14.3 per cent of the respondents had less than 10 years of work experience. Thus, this specific group provided answers that had significant implications for the current study. In terms of the participants’ experience, nearly nine in ten had been involved for over 10 years. Therefore, their information was valuable and the validity of this section’s data was further justified.

Table 6: General background of respondents.

	Percentage (%)
1. Position in the organisation	
Chief Operating Officer	7.14
General Manager	7.14
Senior Manager / Officer	78.58
Executive	7.14
2. Years of experience	
<10 years	14.3
11-20 years	35.7
>21 years	50
3. Type of organisation	
Port Authority	14.3
Port operator	28.6
Ministry of Transport	21.4
State authority	7.14
Regional planning division	21.4
Logistics operator	7.14

Source: Authors.

Table 6 also shows the employment fields of the respondents who were knowledgeable about port city development. A total of 28.6 per cent of the respondents were port opera-

tors. A total of 21.4 per cent consisted of respondents from the Ministry of Transport and regional planning division. Meanwhile, port authority respondents made up 14.3 per cent; finally, the smallest group of respondents were logistics operators and those from the state authority, comprising about 7.14 per cent. In general, the majority of the respondents involved in this study were senior managers with extensive experience, views and knowledge of the maritime industry and urban planning. As the main study focused on the factors influencing the development of ports and cities, the main party that needed to be considered was the port operators (from Kuantan Port, Kemaman Port and Tok Bali Supply Base, all of which are located in the ECR of Peninsular Malaysia). Similarly, the regional planning division, port authority, and state authority were very useful in providing input on how the strong relationship between the port and the land is firmly established. In conclusion, all the stakeholders cooperated directly in providing information on the port city development concept.

In this study, themes or categories were generated based on the concept of port cities in the ECR of Peninsular Malaysia. The data collected from the results of the interviews were analysed with Atlas.ti software. This software is used specifically to process and analyse qualitative data (as are NVivo software, CAQDAS and NUD.IST). The research questions were used to inform the coding procedure. At this point, the category development was assessed to ensure they would be able to give descriptions of the port city concept from a Malaysian outlook. The next section discusses the answers to the research questions. All the interview data were anonymised to protect the confidentiality and anonymity of the participants, who are referred to as respondents *P1* to *P14*.

3.2. Definition of A Port City from Local Perspective.

All fourteen (14) experts who participated in this study agreed that ports and cities are ‘interdependency’ or supportive of each other. Based on the view of expert *P1*, “ports cannot grow without the support of the community or city itself. The industrial sector and urban communities need port services to obtain raw materials or sell goods abroad.” Respondent *P4* claimed that “the city integrates with the port, thus [the] city [is] developed due to [the] port activities, while the port is developed to support the community as well as [the] economic activities related to the port itself.” The interdependence between port and city was also mentioned by respondent *P14*, who said that a city is built around a port, whereby the port and maritime industries have a strong influence on the local economy and the city assists in supporting the development of the port. This interdependence, also known as the interconnection or interrelationship between the port and the city, has been realised by many scholars, such as Veenboer (2014), Ducruet (2006), Hall and Jacobs (2012) and Zhao et al. (2017).

Moreover, respondents *P5*, *P6* and *P13* claimed that the definition of a port city can be related to ‘transport connectivity’. According to respondent *P5*, “in Malaysia, we are not yet a port city, but we are heading towards a port city, because a port city is complete with resources or facilities - such as transportation

including [via] sea, land and air - that are in one place.” Meanwhile, P6 stated that “a port city has a link with three modes of transportation: road, water and air. The presence of these three components is considered as fulfilling [the criteria of] a port city.” Finally, P13 defined a “port city as the area that is equipped with transport links. If there is integration between these modes of transportation between seaport and land, it will make it easier for stakeholders to enhance the local economy.”

Respondents P7, P12 and P13 emphasised that the definition of a port city can be viewed in the context of ‘facilities and infrastructure’. Respondent P7 pointed out that “most ports, such as Shanghai and Rotterdam, are built close to the city. In terms of development, the city builds based on the surrounding facilities. Therefore, a port city needs facilities to support the port. For example, in Pahang, there is an industrial park that supports Kuantan port.” Meanwhile, P12 defined a port city as “a port that has facilities for the purpose of ships loading or unloading goods as well as having connectivity between port and city.” Finally, P13 defined a port city as follows: “there are basic facilities in the city. ... Johor Port has a strategic place; for example, the ... factories and shipping lines are located close to each other.”

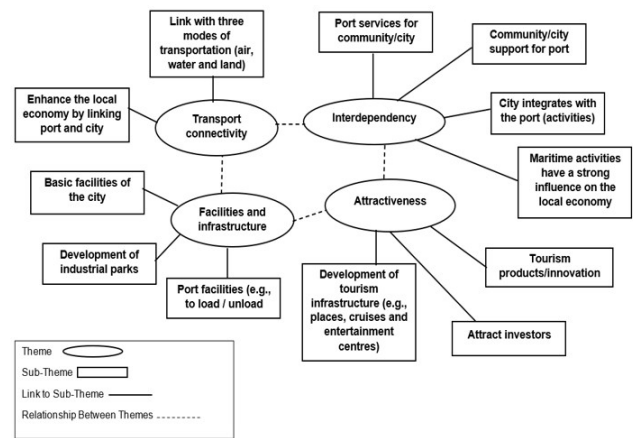
According to Benckendorff (2014), ‘attractiveness’ is a core component of tourism. An attraction can be a place, person, event or thing that is the focus of the tourist’s attention, and the reason why the tourist has been attracted to a destination. The historical development of the concept of the attraction has an inextricable link to the expansion of tourism. In other words, there are ports (beside ships and their operators) that create the material and organisational conditions for the development of maritime tourist voyages (Miotke-Dzikegiel, 2007). When arriving at the Port Klang, Penang Port, Port of Tanjung Pelepas, Kuantan Port or Bintulu Port seaports in particular, tourists, ships’ passengers and crew members have the chance to roam around to discover the unfamiliar cultures of these new regions (Jeevan et al., 2019). Activities in specialised seaports that are focused on tourism are known as seaport tourism (Jugovic, 2006). Respondent P10’s view was that “when the port combines with the city, ... there are many attractions [and] places for visiting. Some tourists use cruise ships with elegant services to travel or holiday at specific destinations.”

A principal element of economic development in the long term is investment. Any region with sufficient infrastructures might be investment targets, while the inhabitants will be able to easily and conveniently perform their daily activities, enabling increased productivity (Windhyastiti et al., 2019). If the government develops the infrastructure connected to tourism, it indicates their intention to draw investments into specific areas. The outcome is an expansion in the tourism sector and greater welfare for the surrounding inhabitants. Penang, Port Klang, Kota Kinabalu, Langkawi, Melaka and Kuching are the six such areas in Malaysia. Each port has infrastructure focused on cruises and scheduled arrivals of these cruises, while immediate tourist-centred products can often be readily accessed.

Langkawi, Penang, Port Klang and Melaka are examples of cruise terminals in Malaysia whose locations are near to various immediate attractions. As a result, passengers from the

cruises have the chance to easily access the atmosphere of a major city and other ecotourism facilities, beach areas, traditional cultural activities and unfamiliar foods. Port in Malaysia are also well-equipped with wide-ranging and up-to-date features, while they offer suitable berths for international cruise ships (Tourism Malaysia, 2017). In conclusion, port cities can be defined as cities with ports that feature the components of water-based and land-based transport hubs. Moreover, ports are advantages in the ways they contribute to port cities’ growth (Cong et al., 2020). The themes that define port cities, as derived from local perspectives, are summarised in Figure 2.

Figure 2: Summary of themes of definition of a port city, as generated from a local perspective.



Source: Authors.

3.3. The Reciprocal Roles of The Port and The City in Economic Development.

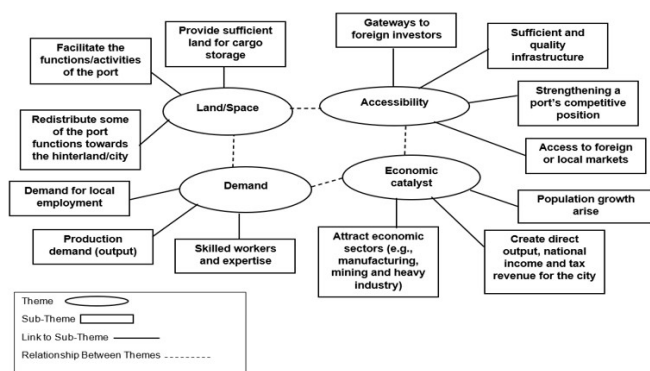
A port is a transport hub, with a location next to the sea and near to river systems, that offers water-based intermodalism facilities that allow ships to enter and exit safely. A port acts as a centre from which to distribute the trading system’s industrial and agricultural produce because it is an assembly point as well as a water- and land-based transport hub (Cong et al., 2020). Port development also requires support services based in the city itself. Respondents P1 and P8 believed that, “ports need to meet the services needs of the community. For example, in the context of Kuantan Port, the target is to serve not only the Pahang region but also the entire ECR of Peninsular Malaysia.” According to P8, “the main role of [the] city is to provide sufficient land for cargo storage or to facilitate the functions/activities of the port.” Respondent P14 also highlighted that “the city will provide [a] supply of goods or commodities, [the] workforce and [a high-]quality living environment. [The] city also plays a role in addressing challenges faced by [the] port, such as [the] scarcity of land, by redistributing some of the port function towards [the] hinterland, i.e., to freight redistribution centres/inland ports.” Jeevan’s (2017) view was that a dry port could develop as an extended seaport, as a regional intermodal node and as an interface terminal inland.

Excellent accessibility is of vital importance to all port cities and hinterlands. Respondent P7 pointed out that “airports and

seaports are important as gateways to foreign investors and global supply chains.” According to Munim and Schramm (2018), if ports have high-quality infrastructures and logistics, the country itself benefits by being more locally and globally accessible, while it also has the chance to branch out into global markets. As Notteboom et al. (1997) claimed, the competitiveness of a port can be strengthened considerably by combining infrastructural quality, access to the hinterland and levels of production. Notteboom et al. (2022) also noted that the port has become a gateway to networks inland, which are frequently substantial. This type of gateway is a nodal point from which flows of intercontinentally transported goods are transhipped on to areas of the continent, while the reverse is also the case.

Port cities can develop more extensively if they have a port. Ports produce goods, operate and develop in ways that expand direct output, jobs and the city’s tax returns, as well as the country’s revenues. Long-standing port cities have become more prosperous and new port cities (for instance, Singapore, Shenzhen, Hong Kong and Dubai) have grown due to the development of modern industrial systems and transport. According to respondent P14, “ports provide important economic opportunities, which [include] access to global supply chains.” Port play a major role in accelerating industrial development and driving Gross Domestic Product (GDP) growth. Port activities create demand for local employment, provide fiscal revenue, attract various economic sectors and enable better access to foreign or local markets. Respondent P12 agreed that “a port city provides socio-economic benefits to the urban population. Thus, population growth arises from economic growth.” Meanwhile, respondent P14 said that “the role of a port city [is to be] an economic catalyst for the region. It opens up other economic sectors, including manufacturing, mining, heavy industry, finance, services, etc.” The themes involved in the ports’ and cities’ reciprocal roles, as derived from a local outlook, are summarised in Figure 3.

Figure 3: The themes involved in the port’s and city’s reciprocal roles, as derived from a local outlook.



Source: Authors.

The reciprocal integration between seaports and city are crucial because there are many disadvantages that gained by city form seaports and vice versa. For example, the city will be affected by less healthy lifestyle of residents due to indus-

trial pollutions. More specifically, land reclamation, air, water, noise and odor pollution are among the major environmental impacts stemming from port development (Zain et al. 2022). In that case, the adaptation of 4th industrial revolution in seaport sector may prevents these issues to enlarge dramatically. On the other hand, competition between public and freight transportation, optimum usage of limited infrastructure in the city, high cost of living, limited option for human resource are some of disadvantages provided by city to seaports (Zain et al. 2022). Owing to issues due to the seaport and city integrations, several strategies can be proposed such as developing the master plan for post city ecosystem development, integration the port city with the advancement of IR 4.0, introducing the usage of inland terminal as a medium to connect seaport and cities and integration port development planning with environment impact assessment for a sustainable environment. In addition to that, the fundamental question needs to be answered especially on the key factors that influencing the port and city development. This section is crucial for ensuring seaport and city to sustain after the integration has been done.

3.4. The Factors Influencing Port City Development.

This section discusses the factors that influence port city development from a local perspective. Figure 4 shows the cluster (theme) and sub-themes connected to influences on port city development in the ECR of Peninsular Malaysia, based on the interviews conducted with fourteen (14) respondents or experts. As stated by Creswell (2009), themes (also known as factors, categories or nodes) are outcomes obtained based on research questions. For each theme, all the text excerpts were removed from the transcript and classified into subcategories using Atlas.ti. The development of this theme provided a basic analysis of the respondents’ views on port city development. The results revealed that eight (8) themes were found in this study; these are described in the following section.

3.4.1. Facilities and infrastructure.

Most respondents emphasised that port facilities and infrastructure (e.g., warehouses, cranes, berths, telecommunications, technology, breakwaters and good water quality) are very important in developing a port city. In addition, adequate infrastructure is also needed around the land close to the port (e.g., roads, railways, bridges, telecommunications, buildings, space, houses, as well as special routes or roads for heavy vehicles) to support the port activities (P3, P4, P5, P6, P7, P10 and P12). Respondent P3, from the Ministry of Transport, noted that “the port needs to provide more warehouses before moving towards the port city. Thus, warehouse development requires large-scale road infrastructure for heavy vehicle routes, as well as to overcome heavy vehicle routes in residential areas. Therefore, the parties involved must look at the factors involved as a whole.” Respondent P5 stated that “the type of road [i.e., the material used] to the port is different, [and it should be suited] more to heavy-duty vehicles.” In addition, respondent P10 suggested that “specific roads or highways need to be built for trucks or heavy vehicles.” Thus, public vehicles

have to use different roads or routes to avoid traffic congestion, while road damage and safety aspects need to consider the public. In addition, the movement of heavy vehicles to and from the port can be accelerated without interruption from public vehicles (R5 and R10). Other than roads and warehouses, ports need sufficient facilities and infrastructures to support industry or customers (P4, P5, P6, P7 and P10). These include breakwater, dredging and quay or berth constructions (P4 and P10); cranes; ship anchorage areas; terminal yard and vessel traffic services; the equipment used for marine oil spills (P5); marine radar and logistics hubs (P6); and wharves to handle large ships (P7 and P10).

Additionally, access to transport has a crucial part to play in forming a city's spatial setup, from which its economic and social possibilities are also created and shaped (Sun et al., 2016). Respondents P4, P7 and P11 believed that *“transport connectivity [railways and roads] is necessary in Malaysia to facilitate economic activity, to handle cargo between ports and industries and to speed up connectivity between ports and customers or [the] land.”* Respondent P3 mentioned that *“in terms of connectivity to [the] land, the majority of commodities/goods are delivered by truck [road] from the port.”* P14 also noted the need for *“good infrastructure, high accessibility and connectivity, including multimodal or intermodal transport.”* Therefore, transport connectivity is a result of close collaboration between ports and the surrounding cities. Thus, a complete range of facilities and interconnections between port and land are necessary (P1, P2, P8, P9, P11 and P13). Respondent P1 pointed out that *“if the land is not developed, the port function cannot be utilised to the maximum extent. Therefore, industry, rail, road networks and all [other] facilities must be developed.”* Meanwhile, respondent P2 mentioned the internet connection problems around the port and on land: *“thus, the port side needs to get faster internet access and, at the same time, the community can also enjoy the use of the internet.”* These statements indicate that the development of a port must align with the development in the area around the port or on land.

Respondent P8, from the state authority, argued that *“the land area of the ECR of Peninsular Malaysian needs to improve or upgrade some infrastructures - such as [the] roads, bridges, traffic, communication [and] public transport in order to facilitate [the] port and community.”* Respondent P8 further explained that *“the bridge needs to be improved as there is not enough height for ... passing ships. Moreover, maintenance work at the shipyard cannot be carried out as [ships] cannot enter through the low-altitude bridge.”* Respondent P9, from the regional planning division, said that *“the development of tourism platforms and free industrial zones are needed to support [the] port activity and move towards the port city.”* She also added that port city development requires basic facilities and adequate infrastructures, such as a water supply, electricity, telecommunications and space for commercial activities. In addition, housing development is important to support population growth. The views of respondents P11 and P13 were that *“physical factors for port city development [were needed,] such as roads and highways, industrial parks and business premises.”*

The main limitation on ship handling is the depth of the port's water area. Ship movements in such areas are connected with problems like shallow water, which can have an impact on the sea bed. Such events can result in ship hulls being damaged (Galor, 2007). As stated by respondents P2, P4 and P7, *“the main limitation on ship handling is the depth of [the port's] water. An adequate water depth is necessary to accommodate larger ships. Accordingly, large ships involve cheaper costs for traders.”* Respondent P6 claimed that *“water depth is the most important factor to ensure that the port is built in the long run. If the incoming ship has a depth problem, [this] has a very big impact, i.e., the ship will move to another port.”* According to respondents P5 and P10, *“the water depth in the port must be adequate, particularly for large ships. There is a port on the ECR of Peninsular Malaysia that has a deep-sea [section] but the area is still small to accommodate large ships; thus, the next plan is to extend the wharf. To develop or extend a new wharf, it is necessary to [build a] breakwater so that the ship is not exposed to risk.”* Respondent P3 stated that, *“ports with naturally deep water do not need to spend substantial amounts on ensuring an adequate water depth.”* Meanwhile, respondent P11 stated that the *“geographical location and water depth are the physical characteristics of port city development.”* Mei-e and Baoguo (1998) claimed that the development of a port is influenced by several key elements: the depth of the water, the condition of the waves and the land area next to the port.

This study also found that technology is an important factor in the development of a port city (P1, P4, P5, P9 and P12). Respondents P1, P5 and P9 pointed out that *“through information technology, many work processes can be shortened or accelerated to reduce waiting times, for example, developing systems for free zones, ... cargo handling and the online documentation process for imports and exports.”* Therefore, ports must switch from the traditional methods and develop a more fully automated system (P4), while they also need high-tech cranes that make container handling more productive, efficient and reliable (P12). Since the volume of traffic is expanding, modern ports need to guarantee that the way they handle cargoes is well-performed, reliable and efficient. This reduces the period of time that a ship needs to berth in the port and enables operations to avoid interruption. Logistical organisational changes and the usage of new digitalised technology are required to achieve this (Ilin et al., 2019). Ports are part of a complex urban setting as they provide important economic opportunities, such as access to global supply chains, while cities are the centres of knowledge, innovation and the specialisation of production and services (Notteboom et al., 2022). Recently, ports' operating environments have altered substantially. While technology has developed rapidly, the size of vessels is constantly increasing, as is the proportion of cargo containers. Cargoes can be handed far more quickly due to automated cargo-handling (Hinkka et al., 2016).

Based on the findings, training centres also influence the development of port cities. According to respondent P7, *“in parallel with the development of a port city, stakeholders need to develop training centres to support the marine environment.”* Meanwhile, respondent P8 noted that *“ports and governments*

need to develop training centres for residents to gain skills and provide employment opportunities for them.” The Malaysia Shipping Master Plan 2017-2022 outlined the government’s emphasis on developing the Maritime Education and Training Blueprint. This was due to the need to enhance the industry’s development since greater skills and expertise were required in this sector (Boonadir et al., 2020). Therefore, there is a need for manpower with high levels of skills and expertise (who may be derived from the city/residents) to contribute to the development of the port city. According to respondent P9, “communities or residents, especially young people, must be prepared with [the] skills and expertise that contribute to the port and the economy.” Moreover, respondent P3’s view was that “infrastructure and skilled manpower must be sufficient to develop the port city.

3.4.2. Relationships.

The relationships between collaborators, investors, the government, agencies, the community and politics have become important factors in the development of port cities. Respondents P1 and P5 recommended that “the port needs to link with all parties, such as the government, agencies and the community, in the development of the port city.” Therefore, the port and the city cannot grow or develop on their own. In addition, respondent P13 stated that, “there is the need to connect with the community through surveys and take the public’s views on port city development.” The port and the government should provide an initial explanation to the residents in the surrounding areas about the development of the port city; for example, the advantage of a port city is that it can provide employment opportunities and offer training schemes to residents (P2 and P8).

Respondent P4 said that “the government must participate in developing facilities at the port [e.g., breakwater and dredging constructions] in terms of cost or major investment.” Meanwhile, respondent P6 agreed that, “cooperation with the government was needed to overcome the problem of sedimentation in rivers or seas, which requires a considerable budget.” Finally, respondent P14 believed that “[the] relationship among the stakeholders may create a sense of ownership and responsibility to work towards a common vision.”

Respondents P1, P4, P11 and P12 stated that “developing a port city must have full collaboration [between] the Federal and State governments [i.e., the local authority], industry, [the] port, the Economic Planning Unit, [the] Ministry of Transport, [the] Town and Planning Unit, [the] East Coast Economic Region Development Council [and] other parties related to the development of the areas.” A port is a supply-driven industry (providing services and facilities) (P4). While respondent P7 and P13 believed that “through collaboration, stakeholders can exchange ideas and encourage investment. For example, ports [could] make agreements with shipping lines and introduce the services offered to attract customers.”

In the context of investment, the government and other stakeholders need to find investors to build industries, so investment from the land [in industry] is important to develop [the] port (P12). If there is no development on land, there is no reason

to invest and to develop the port (P1 and P4). The government and the stakeholders need to play a role in port and land development as this involves major investment or a large budget. Meanwhile, P7 and P9 pointed out that, “building a strong relationship with the government is very important to attract large investors. Therefore, the government, with the support of other agencies and [the] private sector, needs to implement strategies to attract foreign investors.” Additionally, communities can only participate by being entrepreneurs and supporting the activities of the port if government incentives (finance) can be provided. Port cities can only develop if their budgets are augmented through government assistance (P4, P5 and P7).

As Acar (2019) claimed, a stable political environment can facilitate the expansion of the economy. A country will tend to be adversely affected without both a stable political environment and the development of its economy. Having achieved political stability, a country might be able to develop more quickly in economic terms. Therefore, port city development must be in line with stable politics (P12). Thus, political stability is very important for port city development since politics is a driver of the development of an area (P1, P5 and P7). Respondent P13 concluded that “Malaysia needs stable politics to develop the port city.” Thus, the effects of political instability can slow the port city development process.

3.4.3. Port city planning.

The management of a port generally includes various forms of planning, which take the servicing of users’ needs as the driver of the utilisation of resources. The results of the current research indicate that some of those responding expressed the view that the development of a port city required both port and city planning. Notteboom et al. (2022) classified forms of planning into short- (one to three years), medium- (three to five years) and long-term (10-30 years). Respondent P1 stated that “a port city needs a development plan by developing industries around the port, whereby it must be supported from the government side.” Urban planning relates to attempts to ensure that land use is ordered and regulated in efficient and ethical ways, which prevents disputes over land use. Land development within the jurisdiction of a government can be managed through land use planning. The ability to achieve this enables government bodies to plan for the community’s needs and safeguard environmental resources. The activities related to society, culture and the economy that occur at different places but form a system of activities characterise the ‘urban area’ (Rodrigue, 2020). According to respondent P13, “[the] development of a port city needs some arrangement of the facility in or around the port [e.g., clinics, markets, police stations] and the parties or companies closest to the port are shipping liners, forwarding [companies] and factories so that movement of cargo is faster. Residential areas need to be situated far away from the seaport.” Respondents P2, P3 and P5 recommended that “arrangement[s] for land use such as residential areas [and] infrastructure must be done comprehensively, not only focusing on seaport development, and the location of the port needs to be away from residential areas or populated areas must be [some] distance from the port.” The view of respondent P13 was that

“port development areas must not interfere with residential areas.” Meanwhile, respondent P14 pointed out that “port and city planning must be integrated and synchronised.”

Seaport cities are artefacts of seaports and their growth depends on seaports (Radhakrishnan, 2017), so the port and the city must work together to promote local economic growth (P1, P4, P6, P8, P9, P10 and P13). Based on the view of respondent P1, “to create a city around the port, the government needs to develop the surrounding areas such as [with] roads, business premises, housing and other land development.” It can be concluded that [the] development phase not only focuses on the port but the surroundings are also involved. Meanwhile, P10 and P13 emphasised that, “the land is important and it is a major factor in the development of a port city.” Therefore, P4, P6, P8 and P9 proposed additional land or space be allocated for industrial development and administrative areas around the port, as well as to facilitate the general welfare of the residents. Meanwhile, respondent P9 emphasised the zoning of areas for mixed development. This means that there should be sections for industries and commercial areas close to the port, and the commercial areas must be centralised together with the public facilities. Thus, the development of land requires spatial relationships between the port or its economic areas and the city. In historical terms, cities have often been sited due to the formation of a port, which would enable trading between countries, attract investment and facilitate the process of urbanisation (Zhao et al., 2017). According to Sun et al. (2016), access to transport, policies connected to space and interactions between neighbourhoods combined to expand the use of land for industry or commerce.

3.4.4. Port performance and competition.

A port provides various services for ships, cargoes and transportation to the hinterland. Ports have been required to provide services more rapidly since shipping lines have been in increasing demand. As a result, numerous ports worldwide have developed and modernised so they can improve their performance (Dayananda and Dwarakish, 2020). In a summary by Park et al. (2014), productivity in terms of operations, assets (equipment) and finance are the three main indicators of port performance. This study found that the port performance indicators include capacity, efficiency and effectiveness.

The role played by ports in modern supply chains is continually expanding. The capacity of a port and its terminals is measured by the highest tonnage of throughput it can handle, TEU, while this can also be assessed by its handling capacity over a set time period (Lagoudis and Rice, 2012). Respondent P1 reported that “there are several ports on the ECR of Peninsular Malaysia experiencing under-capacity [i.e., too little space]. For example, a port should be able to handle 10 ships/vessels a day. But [the number of] ships entering the port [may] reach 15 ships a day, so those five ships need to wait.” Meanwhile, respondents P3, P4 and P12 noted that “in order to develop a port city, the capacity of the port can be increased to the optimum level [e.g., port services, facilities, infrastructures, number of ships, container and cargo].” In contrast, a city may

be hampered in its development next to a port by various limitations and poor-quality logistics (Zhao et al., 2017).

Port efficiency and effectiveness are the components of port performance. Generally, the term efficiency means how a port performs operationally, how it can maximise its output using the resources it possesses or its capacity to produce a set output with a specific amount of resources (Notteboom et al., 2022). Meanwhile, effectiveness illustrates the success with which resources are used to achieve the objectives pursued (Mihaiu et al., 2010). According to respondents P1 and P13, “the faster the port can handle cargo, the more ships will come.” Thus, a port needs to ensure efficient cargo handling so that the ship arrives and departs on time (P10). In addition, respondent P6 noted that “the effectiveness of port city development is how many job opportunities [are created for] the locals.”

The definition of port competition is competing for trading activities. The terminal forms the unit of competition, while the respective trades’ chain managers are the logistical, transportation and industrial organisations. The broad definition of the port complex is co-developed by the authorities and policy makers of the port (Notteboom et al., 2022). Even within a particular region, the operators of ports and container terminals may be competing vigorously due to the modern dynamic business context (Kaselimi et al., 2011; Liu et al., 2020). The services and efficiency of a port operator can only be improved if they recognise and reassess the competitive elements involved (that is, their services’ capacity, efficiency and costs) (P1). According to Liu et al. (2020), answers to these forms of competition are strenuously reviewed and evaluated by the operators of ports and container terminals. For example, the Port of Hong Kong is facing major competition from the Port of Shenzhen as the latter’s costs are lower and its efficiency is rising. According to respondent P5, “the growth of a port depends on the goods or commodities handled. It is also a competitive factor among other ports.” Respondent P12’s view was that “to build a larger port, there must be many factories to support [the] activities of the port, and the most important thing is the goods to be marketed.” Innovative ways of producing goods have profoundly impacted ports since more volumes must be moved. The expansion in overall worldwide trade has been matched by the growth in maritime demand. A rise in trade boosts maritime demand, while the reverse is also the case. The growth in global production and maritime demand are clearly correlated (Chai, 2005).

3.4.5. Green environment and quality of life.

Going green is a trend of seaports all over the world and environmental management has become a critical aspect of a port’s operation. Managing the environment has various benefits, offering consumer satisfaction, improved corporate reputation, savings on costs and protection for the environment (Teerawattana and Yang, 2019). The economy of a maritime city is vitally affected by shipping (UNCTAD, 2017), atmospheric pollution might be generated and, in residential areas on the coast, human health and the sea itself might be adversely affected (Gonzalez et al., 2018). Since many port cities suffer through the diversion elsewhere of the potential financial

gains, they frequently become negatively impacted by pollution of the local environment, as well as higher levels of traffic congestion and crime. These factors reduce the urban competitiveness of port cities, thus impairing their capability to attract investors (Merk, 2013; Merk and Hesse, 2012; Zhao et al., 2017). According to respondent P5, “*the development of a port city should [bring] a [better] quality of life [to] the port and land/residents’ areas.*” Therefore, the port and land area must be clean, so the port, industry and community must comply with green practices (P2). Respondent P12 supported this, saying “[*the] development of a port city needs to consider green elements or environmental factors.*” It can be concluded that the pollution at a port and around the industrial area must be kept under control.

In general, green application has been detected as an influencing factor for port city development. This application is significant due to many issues has been raised in seaport which has been a main contributor for pollution and climate issues which affects the progress of sustainable development of the nation. The combination of seaport and city boosting the interrelationship of intermodal transportation, effectiveness in last mile connectivity and efficient interconnectivity with various mode of transportation which eventually lead to minimum congestion and cleaner environment especially through the application of modal shift in intermodal system. Reduction in empty vehicle movement, the implementation of co-modality as well as utilising inland terminals eventually prevents the issue of decarbonization. This healthy cooperation between seaport and city extend the sustainable growth in city as well in seaports especially by enhancing job opportunities, investment opportunities, infrastructure growth and additional business development.

The application of lean, agile, resilience and green (LARG) is an additional advantage for seaport for being sustainable in the maritime trade with the support of the resources from adjacent cities (Salleh et al. 2020) Owing to these benefits, the symbiosis collaboration between seaports and city may produce a sustainable environment for business and human factor growth. The application of concept from 4th industrial revolution may assist seaports to be more sustainable because these nodes have employed substantial planning for waste management services, alternative energy services, and waste reception facilities, as well as proposing the usage of affordable and clean energy (Salleh et al. 2021 & Jeevan et al. 2022). These procedures protect the environment in the cities and improving the competitiveness of the seaport from the trade perspective.

According to Abdullah et al. (2012), a review of various countries’ development models for port cities indicated the crucial requirement to integrate the land use planning of both ports and their urbanised areas. However, matters of logistics and transport efficiency appear to be the priorities when port areas improve their infrastructures, while the comfort and quality of life of the inhabitants tend to be disregarded. Many residential districts close to ports suffer from ongoing dependence on heavy goods vehicles, which leads to more highways, congestion and road accidents. Thus, the port city areas’ inhabitants and employees might experience a reduced quality of life. Nevertheless, the port and the city often remain in close proximity,

and the expansion of many ports’ activities tends to mean that more products must be transported through urban areas. This adversely affects the flow of traffic and life in the city, while it also creates a more noticeable discrepancy between the principles of developing urban areas and those linked to developing ports (Zanne et al., 2021). While the port may be a valuable hub and impact its associated regions positively, there remains the need to address various challenges.

Respondent P2’s view was that “*the port location needs to be away from residential areas for the safety and comfort of [the] residents.*” Moreover, ports need to identify the types of commodities handled on their premises (e.g., flammable items or chemicals), which could pose a danger to the surrounding population (P4). Generally, many consider the area immediately around a port to be bleak, unsafe, unclean and unappealing, while such districts typically contain aesthetically poor buildings and enormous, noisy and polluting equipment. Many locals may experience a sense of disconnection from the port, especially when the latter has shifted from the city (Notteboom et al., 2022). Respondent P11 supported this, saying “*ports must look at the overall safety aspects of the population [congestion, accidents and criminal].*” In addition, respondent P8 pointed out that “*to develop a port city, not only [must] factories ... be developed around the port, but [also,] from the security aspect, it is necessary to provide fire and rescue departments, police, customs departments and other security intelligence departments to increase the safety of residents.*”

3.4.6. Population growth.

A growth in population entails numerous effects, including the national population’s age structure, migration to other countries, wealth gaps and the scale of the nation’s working population. The overall growth of the economy is affected by and affects these factors. Gross Domestic Product (GDP) changes are used to measure national economic growth. The use of the formula ‘population multiplied by per capita GDP’ allows GDP to be broken down into its constituent parts: population and economic features. The expansion of the economy equates to the growth in both population and per capita GDP, which is normally given in changes by percent (Peterson, 2017). In line with respondent P4, “*population growth and increased economic activity have led to urban growth.*” As Chen et al. (2018) stated, the population bases of port cities are connected to the throughput of the ports, with the port scaled reflected through this indicator. The throughput of a port is influenced by several complicated and mutually influential factors. These include the structure of a region’s industry, the growth of the urban population, as well as international economics and trade. Meanwhile, respondent P5 noted that “*population growth affects port development.*” However, respondent P9 emphasised that “*the population must reach a sufficient level to develop the port city.*”

3.4.7. Port city attractions.

As argued by Palyvoda et al. (2020), a seaport’s attraction to investors is influenced by external and internal elements. The former include the extent to which the state regulates activities,

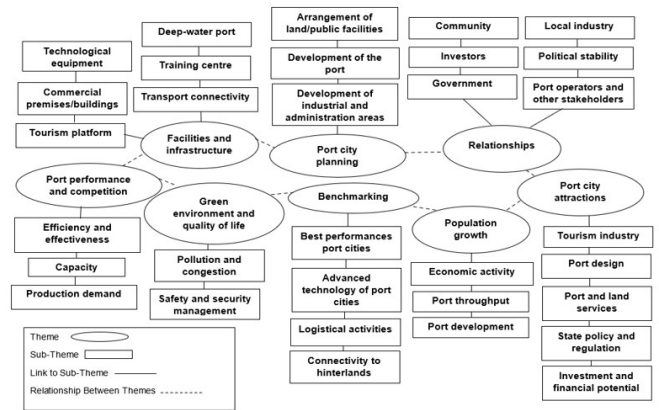
how the region's maritime economy and complexity have developed, the port's appeal in material and technical terms, as well as its appeal to investors. The latter include the port's potential productivity, its finances, its managers, its investment schemes and the extent to which development has featured innovation. According to respondent P5, "[the] development of a port city needs to create a future plan to attract many investors to cover operating costs [e.g., dredging or maintenance]." Respondent P8 said that "[the] development of a port city requires [the attraction of] investors to the hospitality industry and not just [to] develop production plants." Respondent P10 noted that "the city must have interesting places for tourists to visit. The city grows with visitor support, if there is an attraction near the city." Finally, a beautiful port design can be an attraction for the visitor (P13).

3.4.8. Benchmarking.

The management tool of benchmarking has its philosophical basis in continuous improvements and changes. Benchmarking is an attribute of the approach known as total quality management (Carpinetti and De Melo, 2002). Increased production levels and improved business performance are its main objectives. Since the port is a tertiary sector organisation, it is a suitable environment in which benchmarking can be applied. This approach can address the complicated context of the port (Cuadrado et al., 2004). As respondent P13 stated, "in order to develop the port city in the ECR of Peninsular Malaysia [Kelantan, Terengganu and Pahang], the stakeholder must refer to the best places of port cities in the world, such as Qingdao, Vancouver, Istanbul, Shanghai, Busan, Le Havre [and] Rotterdam." The Malaysian ports of Klang and Tanjung Pelepas (PTP) have been rated as belonging to the leading 20 ports worldwide. In 2021, each reached performance milestones, with the former processing a container volume of 13.64 million twenty-foot equivalent units (TEUs) and the latter processing a volume of 11.2 million TEUs (The Edge Market, 2022). This set of criteria indicate that Port Klang is a potentially international-class future port city, an evaluation determined through its activities related to logistics, throughput and infrastructure (Anor et al., 2012).

On the other hand, the most prominent port in Malaysia is the Port of Tanjung Pelepas (PTP), whose container terminal features advanced technology. Additionally, the inland area near the PTP has good connections to the port. It is convenient to move cargoes from the large industrial estates because the road system connects the port to highways between Malaysia and Singapore and between the north and south of Malaysia. Thus, the port has good connections to northern Peninsular Malaysia and the border with Thailand. In conclusion, to make the ECR of Peninsular Malaysia a port city, the authorities need to refer to the various ports that have moved towards being port cities in both the local and global contexts. Figure 4 summarises the themes of influences on port city development, as generated from a local perspective.

Figure 4: Summary of themes of influences on port city development.



Source: Authors.

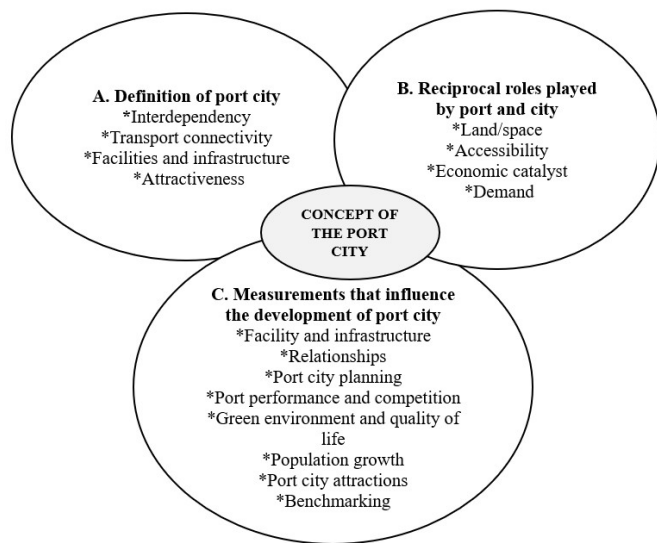
Implication and Conclusion.

The findings of the current study reveal Malaysian perspectives on the port city concept. Fourteen (14) respondents were interviewed to ascertain their views on the definition of a port city, the role of the seaport and the city, as well as the factors that influence the development of a port city (see Figure 5). Hein (2016), concluded that information or knowledge is needed from stakeholders for the economic growth of ports and cities. Parallel to this study, the respondents are made up of stakeholders such as seaport operators, seaport authority and regional planning. Hoyle (1989) summarizes the phase of port city development that has been going through since the late 19th century. The fact is, at that time, port development was necessarily linked to the growth of a city, so these two elements were interdependent on each other. In line with the findings of this study, it is believed that the definition of a port city can be viewed in the context of interdependency, transport connectivity, facilities and infrastructure and attractiveness (Figure 2); these features that must link the port and the land/city.

The idea or concept of defining the port city may guide the development of port city planning/policies for this country, particularly in the ECR of Peninsular Malaysia. When the port is developed, the surrounding cities also develop. It seems that both elements serve a wide variety of functions, and the resulting situation encourages port city interactions. Furthermore, the final phase (VII) of port city development (see Table 1) involves the integration of seaport and dry port operations, which connects the port function with the land/city (Jeevan et al., 2015). This finding is evidenced by the definition of the port city in the context of transport connectivity, facilities and infrastructure, where the dry port has been used as an interface between the port and the city to ensure the continuous development growth of the region.

These results also demonstrate that port cities play vital roles in enhancing regional development. The port also plays a considerable part in the culture, society and economy of its host city, while ports' connections to the wider world are also

Figure 5: Concept of port city development in East Coast region of Peninsular Malaysia.



Source: Authors.

important (Nicolini and Pinto, 2013). Simultaneously, each city has tended to grow into an influential place in which to conduct business. Cities can experience more dynamic economic expansion if businesses choose locations inside or near the city. The inhabitants can find appealing workplaces, shopping facilities, institutions of culture and education, new accommodation projects; in short, there is a complete infrastructure of society and technology (Witkowski and Kiba-Janiak, 2014). Therefore, the direct impact of ports on cities has been supported by Bazan-Lopes (2002). He concluded that various factors of the port positively affect the development of the city, for example, job opportunities for the local community can be offered through the activities of a port. Indirectly, the increase in cargo/goods can boost port activities, as well as contribute to the development of surrounding cities.

This study found that the reciprocal roles of the port and city can be viewed through the nodes of *land/space*, *accessibility*, *economic catalyst* and *demand* (Figure 3). Stakeholders such as the government or state authorities, port authorities, members of the community and port operators may optimise their role in port city development through collaborative or cooperative approaches to ensure that each party is not acting in isolation and that no one is left out of the port city development process. In addition, addressing these roles (as stated by the interviewed respondents) will enable ports and cities/land to more actively support the demand of both ports and cities, as well as overcome the challenges that hinder the development of port cities. Radhakrishnan (2017) supports that most large cities with good growth rates have developed port functions. As supported by Xiao and Lam (2017), the port has been considered as an engine of urban and regional economic growth.

Ports generally develop in different stages. According to Bird (1963), port evolution has three phases, from its primary establishment to its subsequent extension, which involves trans-

ferring from simple terminal facilities (wholesale and warehouse) to more advanced facilities. Transportation systems, as well as social, regional and economic activities, take place in port cities (Hoyle, 1997-1998). The current study found that eight (8) clusters/factors influence the development of a port city: *facilities and infrastructure; relationships; port city planning; port performance and competition; green environment and quality of life; population growth; port city attractions and benchmarking* (Figure 3). The typical seaport has experienced considerable alterations. Compared to their status as basic transition points between sea transportation and inland water systems, as well as importing and exporting goods to assist the surrounding industries, the port is now empowered, having become a business ecosystem and allowed numerous parties to conduct various operations (UNCTAD, 2021). According to the local perspectives, a state needs an industrial area to be able to grow in parallel with the port. For example, the Malaysia-China Kuantan Industrial Park (MCKIP) was developed together with the expansion of Kuantan Port. Contributions from industry are very important to the development of the port, so the port must provide extensive facilities to industries or customers. In line with Chen et al. (2016), the development of the port in the ECR of peninsular Malaysia needs to have a balance to overcome socio-economic problems compared to the main ports in Malaysia, which are more developed and geared towards port cities.

The development of port cities is dependent, to some extent, on governments, states, as well as other agencies and stakeholders. The seaport has been referred to as a catalyst for regional socioeconomic and spatial progress. Ports exhibit a range of functions, including transportation, industry, commerce, logistics and distribution, in addition to features connected to spatial development (Bochenski et al., 2021). Thus, the economy of a port might be significantly impacted if the stakeholders (including national and regional governmental institutions) can cooperate harmoniously. In short, it is hoped that the exploration of the port city concept will allow it to be translated into planning decisions, which can also deal with the entire port city conglomerate. In future studies, these factors can be explored on a larger scale to serve as guidelines for port cities in other areas.

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