

## The Need to Pay Attention to Sustainable Development in Port Cities (Case Study of George Town Malaysia)

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### Abstract

At the beginning of the Industrial Revolution, the relations between the city and the port have changed. While economic globalization is continuing to advance, coastal port cities have enjoyed increasingly prominent status and roles as the link between the sea and the land and an important window of foreign trade exchange. The large variety of jobs is the reason of port and port activities, caused to attract large number of immigrants so that it increased the scale of the physical city. Overpopulation and port activities threaten human resources, the environment, especially the balanced development of urban lands. In this article, scientific research, reports and programs that are examined in this field are reviewed. The port of George Town in Malaysia is a famous city. The development of the port, natural resources which were destroyed or polluted, construction that was carried out on it, and social and cultural foundations will be analyzed. Based on the job and ethnic diversity, different neighborhoods were formed. In the meantime, some sustainable development indicators have been ignored, and it provides new information to the authorities and planners.

**Keywords:** sustainable development, port city, physical development, and land use planning

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## لزوم توجه به توسعه‌ی پایدار در شهرهای بندری (مطالعه‌ی موردی جورج تاون مالزی)

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### چکیده

در آغاز انقلاب صنعتی، روابط شهر و بندر تغییر کرده است. جهانی شدن اقتصاد با تداوم پیشرفت شهرهای بندری ساحلی از جایگاه و نقش‌های برجسته‌ای به‌عنوان رابط بین دریا و خشکی و پنجره‌ی مهم مبادلات تجارت خارجی برخوردار شده‌اند. تنوع شغلی زیاد دلیل فعالیت‌های بندری است که باعث جذب مهاجران زیادی شده است به‌طوری‌که افزایش مقیاسی و فیزیکی شهر را به دنبال داشته است. افزایش جمعیت و فعالیت‌های بندری، منابع انسانی و محیط‌زیست به‌ویژه توسعه‌ی متوازن زمین‌های شهری را تهدید می‌کند. در این مقاله به مطالعه‌ی تحقیقات علمی، گزارش‌ها و برنامه‌هایی که در این زمینه مورد بررسی قرار گرفته‌اند، می‌پردازیم. بندر جورج تاون مالزی معروف است. با توسعه‌ی بندر، منابع طبیعی تخریب یا آلوده شد، ساخت‌وساز در آن انجام شد و مبانی اجتماعی و فرهنگی مورد تجزیه و تحلیل قرار گرفت. همچنین، بر اساس تنوع شغلی و قومیتی، محله‌های مختلفی شکل گرفت. در این میان، برخی از شاخص‌های توسعه‌ی پایدار نادیده گرفته شده و اطلاعات جدیدی را در اختیار مسئولان و برنامه‌ریزان قرار می‌دهد.

**کلیدواژه‌ها:** توسعه‌ی پایدار، شهر بندری، توسعه‌ی فیزیکی و برنامه‌ریزی کاربری اراضی

## Introduction

Throughout history, most larger cities have been located on the coast, as ports and harbors were the hubs for most forms of trade, investment, and innovation. However, now there are other forces, such as global restructuring of trade and supply chains, changing logistics flows and technologies, modernization of fishing and shipbuilding, and growth of air passenger travel; as a result, many ports have lost their historical functions suffer rapid decline. However, the port city as a hotspot of decline can also offer opportunities as a hotspot for sustainable innovation, based on creative conjunctions of physical, social and economic resources (Ravetz, 2013).

Port-city relations have changed profoundly since the industrial revolution began facing cities to make port location and infrastructure changes. The industrial revolution led to rapid growth of cities so that the world's urban population was about 3% in 1800 reached to 9.68% in 2005. In addition, many urban centers could not accommodate this sudden influx of migrants, and as a result, the cities began to develop unevenly, and open spaces disappeared in recent years (Zakerian et al., 2019).

During the emerging period, early cities near the coastal and river locations were established due to the foreign trading between Western and East Asian regions. During this period, the cities were located between two ancient civilizations, namely China and India. These cities witnessed the land use changes and exchange of commodities. Ports, markets, warehouses and whole settlements became hierarchically distributed from the coastline. During the early colonial period, the waterfronts functioned as international trade and attracted European traders. The prosperous colonial described the colonial administrative buildings were usually based in a fort. The modern or transitional period has been an era of independence. Most of the historical buildings have been transformed into commercial structures. Some have been demolished and lost their former activities, while others have been transformed into modern commercial buildings (Zhao et al., 2019).

This paper deals with the development and land use in port areas, emphasizing the physical and spatial planning of such. The project aims to examine how development and use of lands can be planned through the municipal and local levels. The research gathers and discusses a number of different theories concerning port city planning. Population growth, resource consumption and environmental pollution draw public attention to sustainable development. The case study method has been used in this research, and sustainable development and social and economic aspects of sustainable physical development have been studied. This study also reviewed the effects of George Town port on the physical growth of the city in the sustainable framework development, and the effects of indicators will be examined. The evolution of the port city of Georgetown will be analysed.

## Materials& Methods

A comprehensive search was launched in June 2021 using the Science Directs, Research gate, Springer, ACADEMIA, Scrip science, EBSCO, SCIELO, SID, Sci, NOMAG and SCOPUS databases. The search continued until September this year. Articles were searched from 1985 to 2021. The keywords used were the port city, sustainable development, sustainable city, sustainable port, urban lands, colonial cities, the industrial revolution, Georgetown port, city-island, history of port cities, city growth, city size, urban resilience, port development models, globalization and ports, pier and cities, tourist cities, historic cities. The search was not limited to year of publication or language. This review article considered only the studies that directly referred to sustainable development, port city, land use, and physical development of George Town. Inclusion criteria were valid articles indexed in the mentioned databases.

## Discussion

A search result based on the strategy of this research was found in a total of 4000 articles. After leaving the articles and according to the inclusion criteria, finally, 80 articles were examined in this research. These 40 articles were between 1995 and 2021.

Today, one of the basic concepts in planning is attention to sustainable development. Overall, sustainable development means using and managing natural resources in a way that retains the capacity of existing ecosystems for future generations.

Urban form and its study are always dependent on the researcher and their background. From the research on literature review above, urban morphology analysis provides a comprehensive spatial context by first identifying the drivers of development and second situating spatial trends in history. In considering architectural and geographical approaches to the study of urban form, the morphological analysis requires the classification of urban tissue by kinds, period of development, and ranking of scales to understand the production and transformation process of urban form, and to guide quality design practice. Following these three levels of organization, this research combined spatial and analytical tools to offer an integrated conceptual framework for studying the sustainable urban form (Figure 1) (Hermand & Quesada, 2019).

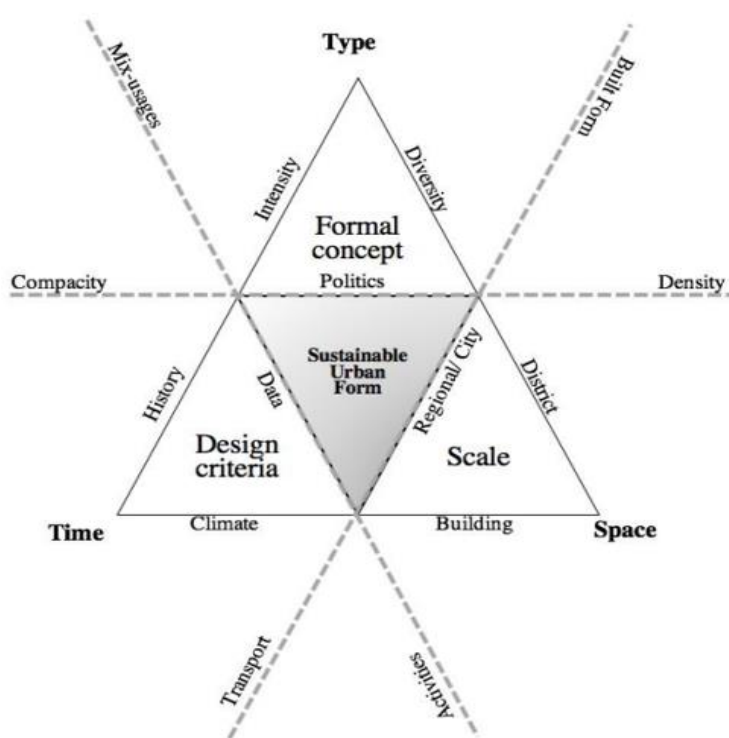


Fig 1. Conceptual framework to build a sustainable urban form (Hermand & Quesada, 2019).

## George Town

In most developed countries, the land near to the water bodies was developed earlier than the inland areas. Many settlements and civilizations in the world, including Malaysia, began from the riverbanks. For example, many cities in Malaysia such as Kuala Lumpur, Kuala Terengganu and Melaka were established closed to waterfront (Zhao et al., 2019).

After WWII, when the British proposed merging the Pulau Pinang into the Federation of Malaya, it caused opposition from the local upper and the middle class. Although the British promised to keep the status as a free trade port, the Malaysia federal government revoked this status in 1969, leading to the decline of George Town in the 1970s and 1980s directly. Once lost the free trade port status, high unemployment appeared in George Town; what was worse, under the dominance of the government, port activities were moved to Seberang Perai, as a result, both the entrepot trade and traditional commercial center in the Beach Street were declined. In the late twentieth century, George Town gradually transformed into

a service-oriented society, from the producing city to the consuming city. The service industry was comparatively concentrated in the urban area (Zhao et al., 2019).

The Historic City of George Town is situated in northeast of Penang Island, located off the coast of northern Peninsular Malaysia. The State of Penang consists of the Penang Island and a piece of land called Seberang Jaya in Peninsular Malaysia. The historical site refers to the inner city of George Town, which was the first British port city in Southeast Asia. Due to George Town's unique tangible and intangible cultural heritage, the city was inscribed as a UNESCO World Heritage Site on 7 July 2008, with a Core Zone comprising 109.38 hectares (Pourjavadi et al., 2013; Noori et al., 2009). There is also a Buffer Zone (150.04 hectares) which serves as a layer of protection to the Core Zone (Chan et al., 2017; Liu et al., 2008). Growth in the global cruise market has increased interest in Malaysia from cruise shipping companies. With its pier right next to George Town's UNESCO world heritage site, Penang is one of the ports that will benefit most from the rise in cruise tourism. The joint venture agreement between MMC and Royal Caribbean Cruises Ltd signed in 2018 is anticipating this growth with a proposed MYR 155 million terminal expansion to accommodate larger cruise ships (Mohit & Harun, 2007).

## Environment

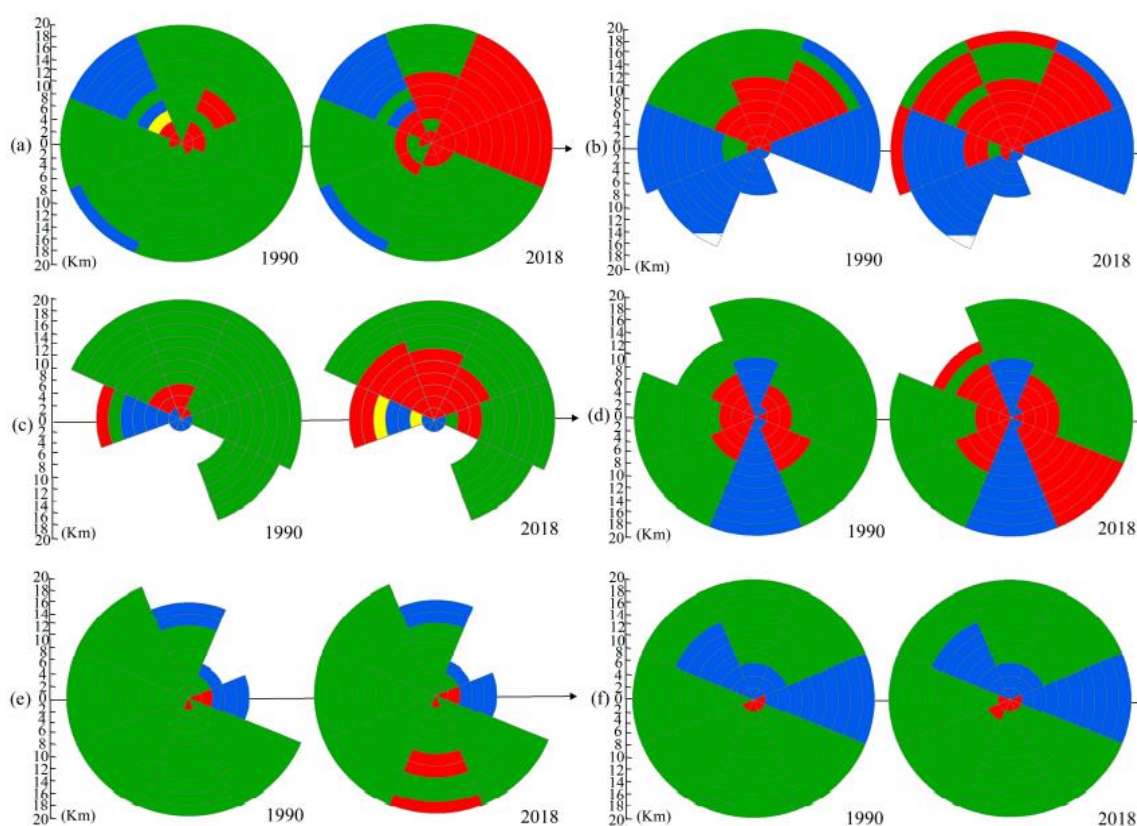
Jenkins (2008) states that there are two standards that this area are set as colonial settlement in the early phase. The first standard shows the region provides a suitable position for the jetty, which, the jetty in the sea can dock the small vessels. The second standard is that the area makes the construction of the defensive fort possible, which can protect the jetty and the commercial area that developed around the defensive fortress (Zhao et al., 2019).

Historically, George Town was built on swampy land and became a British colony in 1867 (Pinang, 2011).

Built-up area for year 2018 is expected to have 925.77 square kilometers. This year's land demand can be determined by calculating land density with expected population in the George Town Conurbation at year 2018. Data from the Department of Statistics Malaysia (2018) for years 2000 and 2010 are applied to Equation 5 to determine the population estimation of year 2014 and 2018. Therefore, total population at year 2014 and projected year 2018 are 2,779,383 and 3,031,037 people. The population density at year 2010 and year 2014 are approximately 2,849 and 3,066 people in one square kilometer. In projected year 2018, the population density will become 3,274 people in one square kilometer. Based on the number of populations, the model can be used to determine area to be developed in the future (Setyowati et al., 2021).

George Town's core zone is defined by its high concentration of significant cultural sites and buildings. The core zone is approximately 109 hectares (42 percent) of UNESCO heritage area and contains nearly 1,900 historic buildings. The buffer zone is approximately 150 hectares (58 percent) of the heritage area and is meant to serve as a buffer against development immediately around the heritage area (Liang, 2017). Despite the positive impacts that UNESCO designation can bring, it can also inadvertently create challenges in terms of livability. In George Town, increased tourism has brought a higher cost of living and lower paying jobs, resulting in unaffordability for local people (Noori et al., 2009), and making it more challenging for them to stay and work in the heritage area. Local residents are pushed farther away from the city center and replaced with investors and workers from outside of Malaysia. This leads to a decrease in ethnic diversity and a gradual decline of traditional skills and craftsmanship (Liu et al., 2008). To address the challenges that have arisen since the declaration, the government has tried to foster organizations that simultaneously work on these problems and organize the work inside the heritage area (sayed Mahmoud et al., 2021). The urban land areas around Penang Port were concentrated mainly around the George Town Port of Penang Island and the Beihai port on the mainland, and they extended as far as 8 km from the port's center. Over the past 30 years, the urban land areas have expanded inland along the port Penang has expanded toward the west, and the mainland area has expanded mainly to the southeast. The expansion area on the mainland was larger than in Penang (Yang et al., 2020).





**Fig 2. Gradient direction maps of each port in 1990 and 2018: (a) Port Kelang; (b) Port of Singapore; (c) Malacca Port; (d) Penang Port; (e) Belawan Port; and (f) Dumai Port (Yang et al., 2020).**

but tourism development without urban environmental protection is not a sustainable way for townscape conservation. The environmental deterioration can be presented as follows: Firstly, lack of vegetation in the shophouse blocks. It is generally asserted in the technical literature that vegetation does serve physiologically to mitigate noise effects by screening off visually the adjacent noise source (Herrington, 1974; Reethof & Heisler, 1976; Smardon, 1988) meanwhile, balance the air temperatures and reduce the air pollution in different scales. Secondly, urban environment pollution caused by the tourism industry (Zhao et al., 2018).

#### *Society*

When Light landed at Penaga Point, present day Esplanade or Padang, on 17 July 1786, accompanying him were five of his staff and 14 European civilians comprising "two merchants, a tavern-keeper, a ship's carpenter, a caulker, a cooper, a planter, a dealer, a blacksmith, a builder, a shopkeeper, a beach-master, a mariner and a ship-builder" (Gin, 2015).

For the construction project and activities, Light's record in October 1786 showed that the inhabitants in George Town increased very fast, Choolias, Chinese and Christians, they were disputing the ground, everyone building as fast as he can. The population structure was composed of English, Dutch, Portuguese, Armenians, Arabs, Parsees, Chinese, Choolias, Malays, Burgesses, Burmese, Siamese, and Javanese, etc. In this period, China Street had emerged in the town and the Malay Town located at the west of Chulia Street. The Chinese and Tamil populations became established on the island, and a commercial district grew to meet the colonial enterprise (Zhao et al., 2019).

In 1960s, tourism industry began to be promoted in Malaysia. Many Malaysians travelled to Singapore. The most significant international travel among the Malay Muslims during this period was pilgrimage to Mecca. The departures took place at Port Klang and Penang Port where relatives and friends bid the pilgrims goodbye for the three months journey by ship. At that time, ship being the only transportation to bring pilgrim to Mecca. Commercial

air travel to Mecca was introduced 20 years later. According to Malik bin Hussin, who used to manage the welfare of pilgrims to Mecca back in 1950s, Hajj season was the busiest season at the time where Muslims across the region would arrive and depart to Mecca. He was quoted (Chan et al., 2017).

Population Changes George Town comprises of multicultural communities. Whilst the main general groups are Malays, Chinese and Indians; they can also further be divided into smaller communities with diverse ethnic origins. But the State of Penang is with a predominantly overseas Chinese population. In 1970, the total population of Penang State was 776 thousand. The Chinese descendants comprise of 56% of the total population. This percentage has since then gradually reduced to about 40% in 2015. Nonetheless, the absolute number of Chinese descendants is still increasing, for example, from 437 thousand 1970 to 690 thousand in 2015. The increase is primarily in a number of suburban areas outside of George Town. From 2000 to 2010, for instance, the Chinese population of George Town increased 3.7% in comparison with 12% increase in the Chinese population in the entire Penang. Long-term time series data on population trend within the George Town World Heritage Zone is not available. But the reduction of the resident within the zone has been suggested by various agencies working in heritage conservation. In the earlier history of Penang, the Chinese descendant community has also been organized around trade and commerce (Pourjavadi et al., 2013). For instance, the manufacturing hub of Southwest Penang Island experienced a 4% of annual population growth over the past 20 years, comparing to the Northeast (2%) and George Town (0.85%). The Penang overseas Chinese society has transformed from a traditional trade society and population concentrated in George Town. The traditional social structure, such as clan associations, has encountered substantial challenges in searching for its roles and identities in the modern industrialized society (Pourjavadi et al., 2013). However, there are opportunities, there are threats in the expansion of tourism too. Tourism could contribute to the protection and revitalization of cultural heritage and urban landscape but might negatively affecting the social fabric of the local community, the economic structure, and thereby forcing the locals to gradually leave the area as they are unable to support themselves with increasing living cost and feel unable to cope with the overwhelming presence and foreign social behaviors of the tourists. They may also succumb to the market tendency to sell their properties as the value rises or retreat to less expensive areas to rent a space. In an extreme case, tourist gentrification is described as "museification" where local resident has been hollow out (Chai, 2011).

The issue of preservation of culture and urbanization Culture is defined as lifestyle and norms that we practice every day. Urbanization Culture is defined as lifestyle and norms that we practice every day and inherited from generation to generation. The community member preserves the culture by practicing it day today. However, in modern lifestyle, some of the culture considered as not fixed will be left out and will soon be discarded by the communities. In this situation, for the purpose of tourism, some "extinct culture" such as the culture of Baba Nyonya, have to be retrieved and revive and practice in order to be able to perform to tourists, such as live in Baba Nyonya's style house and enjoy Baba Nyonya lifestyle. Therefore, the preservation of culture usually tied up with "old lifestyle" The dilemmas occur when the preservation of culture is tied up to the "old lifestyle" which contradicts modern living (sayed Mahmoud et al., 2021).

Ever since the 1820s, Penang's economy has been deemed healthier than that of other states in Peninsular Malaysia (Kharas, 2010). Penang's higher GDP per capita attests to its rising middle class. According to Kharas (2010), the 'middle class', also known as the 'consumer class', is indeed an economic driver whereby this category's income elasticity for consumer durables and services is greater than one. According to a global definition, the middle class consists of households with daily expenditures ranging from US\$10 and US\$100 per person (Kharas, 2010). Studies have shown that a new wave of emerging middle class is growing rapidly, especially in the Asia-Pacific region. For instance, Asia-Pacific middle class numbers will rise from 28% in 2009 to 66% in 2030. Concurrently, Asia-Pacific's share of world spending will also rise from 23% (2009) to reach 59% in 2030 (Zhao et al., 2019).

Finally, the interrelationships both in urban morphology and cultural pluralism ideally characterized metropolitan city and immigrant society under the colonial regime. As aforementioned, though the continued expansion of the immigrants, Europeans, Chinese, Indians, Bugis, Arabs, Americans, Persians Siamese, Burmese, and Sumatrans were living together, increased with it, cultural pluralism was generated (Kerschner & Huq).

Although the increase in population in the city is a byproduct of the process of urbanization, this will also create problems in the city in terms of accommodating the needs of the urban community in terms of preparing better infrastructure, public facilities and so on. This issue can also affect people who live in part of the city that is environmentally unhealthy, which potentially invites more crime activities. Increasing crime and social problems will therefore affect urban sustainability and livability. Although it has been reported by the state police that crime rates in Penang have dropped by 26% in the first six months of 2015 (Pourjavadi et al., 2013), measures are required from the state government to further intensify efforts in order to safeguard the communities from crime attacks and thus ensuring the welfare and safety of the urban communities to sustaining the city's livable status (Dawood, 2019).

In a developing country like Malaysia and for a dynamic city like George Town, the pace of industrialization and urban growth has put a toll onto the environmental welfare and its social wellbeing. Thus, creative solutions should be put in place and actions should be taken to address these issues and the problem. In other words, urban development policy framework will have to link the efforts towards more sustainable development in a variety of sectors including housing, energy, waste disposal, economic, and cultural heritage (Zhao et al., 2019).

### **Economic**

Since George Town was established in 1786, most of the time this city was governed by British power, comparatively, the political environment was stable than other colonies which were inundated with events like protests, armed conflicts, parades and demonstrations. The key target in the Straits Settlements has gained more and more actual benefits, as we have seen, the issued and repealed of Free Trade Act with the concept of free port were mainly focused on their own benefits. Thus, this flourishing port city developed with agriculture, handicraft industry, entrepot trade, and finance (Zhao et al., 2019).

Revocation of free port status in the 1960s has given a tremendous impact to the waterfront development. The state suffered economic decline and immense unemployment (Salim & Mohamed, 2018).

Penang has been a key international trading port in the region since it was first founded by the British in 1786. Trade and agriculture were the main economic activities. While the importance of agriculture diminishing (to about 2% of GDP), trade had played a key role even after Malaya independent in 1957. During this period, trade had led to the development in basic infrastructure, communication and other service industries such as banking and legal services. The wealth generated by trade has also contributed to other social development, for instance, about 9% of the population had tertiary education in 2000, which is similar to the level in Italy. By 2008, there were 32 tertiary education institution in Penang (Chan et al., 2017). For instance, in the past few years, the site has undergone many changes especially the economic restructuring from household and business services towards tourism. A census did by Think City (2014) in 2009 and 2013 reported that a shift in the structure of the local economy evident in an increase in tourism, hospitality and creative industry aligned services. There were increase of 41 hotels, 47 restaurants/bars, 26 arts, culture and craft business, 21 travel & tourism services and 19 fashion, clothing & textile related businesses. There has also been a significant physical investment that has attracted 660 new businesses. Leveraging on George Town's cultural endowments and industries related to culture will contribute positively towards job creation, income generation and local economic growth (Chan et al., 2017).



Since George Town received WHS status in 2008, the types of jobs available and the price of rent have changed. Land values in the World Heritage area have increased, attracting foreign investors interested in tourist services, such as hotels and restaurants. The increased land value and rent for local residents made the option of selling their workplaces and houses more attractive than investing in preserving the buildings' architectural heritage. Therefore, many residents sold their land to foreign investors, who quickly converted them into tourist-centered businesses. Similarly, many traditional local eating establishments were replaced with expensive restaurants geared towards foreigners and tourists. At the same time, given the high costs to locals of restoration and preservation due to the strict rules of UNESCO WHS status (and the lack of government-run grant an increase in low-paying service jobs in the tourism industry in George Town since WHS was enacted—jobs often taken by foreign workers—has made it difficult for locals to afford the increased cost of living. The total labor force in the WHS has stayed relatively constant at around 22,000 workers, but within that labor force, as shown in 2008 to 2013 Think City study, there are more migrant workers and more laborer/general workers from other countries and regions (particularly Bangladesh, Cambodia, China, India, Indonesia, the Philippines, Myanmar, Nepal Pakistan, Thailand, Vietnam, Europe, and Australia). The increase in foreign investment and competition in the tourism sectors, and the resulting decrease in affordability, have shaken local business owners' confidence (sayed Mahmoud et al., 2021).

Although the state's free port status was revoked in 1969, Penang remains a vibrant port serving ships that ply this major sea route. By the same token, the island city of Penang has a network of excellent road systems, highways, and expressways. The Jelutong Expressway is a main conduit that connects the inner city of George Town to its surrounding suburbs and hinterlands. The island's linkage to mainland Peninsular Malaysia is enabled by two bridges. The first Penang Bridge (13.5 km) connects Gelugor (on the island) to Seberang Perai on the mainland. The Second Bridge, also known as the Sultan Abdul Halim Muadzam Shah Bridge, is 24 km in length. It opened on 1 March 2014 (Khoo et al., 2015). Consequently, Penang Island with good facilities and main employment opportunities have increased land value and housing prices which has made neighbouring regions especially in districts at mainland area become an alternative option for people to live. People started to look for cheaper developed area and these opportunities have been grabbed by private developers to venture potential area in mainland districts. The existence of First Penang Bridge and Ferry commuting from George Town to Seberang Perai have increased development in the Northern Penang neighboring area and Second Penang Bridge has increased development in the Southern Penang neighboring area. These great road networks have eased for people to commute from mainland to island. On the other hand, the existence of North-South Highway and Butterworth-Kulim Highway connecting Penang and neighboring regions from Kedah and Perak has attracted people to stay in the neighboring regions and commuted to work on a daily basis. The development in the neighboring regions will increase rapidly as the demand for housing and public infrastructure raised. New constructions of residential and business units and administrative complex foster the economy with the regions (Deng et al., 2009).

## Conclusion

A review of the articles revealed that the driving force behind the development of Georgetown is the port which has changed the functioning of the city over time. Depending on the type of function of the city, the amount and direction of physical development of the city was specified.

In expanding the city, natural, social and economic resources have been damaged and stressed. As a result, they have destroyed a large part of forests, estuaries, air, water and local jobs. Measures have been taken in this direction, but it does not seem to be enough. We are thinking of three turning points (a. The arrival of style on the island - June 17, 178b. Transfer of commercial port to Sabrang – 1969 C. Georgetown World Heritage - July 7, 2008) which have brought about major changes in the development of Georgetown. And the fourth factor we anticipate is post-coronary change in January 2022.

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