Chapter 14

An investigation into the responsibility of cruise tourism in China

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1 Introduction

In the context of passenger transport, shipping is designed for the movement of people from one place to another place; in the maritime regime, however, cruise ships perform more than a basic type of passenger transport. A cruise ship provides a service to serve the passenger who inclines toward going for relaxation, interest, and pleasure. Cruise ships generally make occasional calls in a specified region of a geographical continent. Kendail (1986, p. 360) defined a cruise as the "transportation of pleasure-seeking travelers on ocean voyages offering one or more glamorous ports of calls." Also, Wild and Dearing (2000, pp. 319–320) described a cruise as "any fare paying voyage for leisure onboard a vessel whose primary purpose is the accommodation of guests and not freight normally to visit a variety of destinations rather than to operate on a set route." In the past few decades, we identify that the cruise ship experience appears to be a recreational experience (Mileski et al., 2014) and in a more relaxed atmosphere (Lau et al., 2014).

Cruise tourism can be traced back to the 1840s (Sun et al., 2011). Cruising was the preferred travel mode for the world's social elite during the 1920s. After the Second World War (1939–45), the decline of the cruising industry led to losing trade to passenger aircraft (Johnson, 2002). However, the turning point appeared in the 1960s. The blooming of the aviation industry had caused the cruise industry to undergo a revolution. The cruise ship was transformed from its original use as a postal or passenger transport in the historical era to a luxury cruise ship purely used for tourism, holiday, and leisure purposes in the contemporary era (Sun et al., 2014). Thanks to technological and scientific advancement in the

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past 30 years, it has created significant improvements in the power supply, design, catering facilities, and accommodation of cruise ships. The modern cruise ships generate stiff competition with the land-based holidays, including hotels (Lois et al., 2004). In doing so, cruise tourism has been considered an area of tremendous growth in the global hospitality and tourism industry (Marti, 2004). From 1990 to 2015, the number of cruise passengers increased at an average of 7% per year, up to over 23 million cruise passengers in 2015 (CLIA, 2016). More than 154 million passengers have taken a 2+ day cruise. Over 68% of the total passengers have been generated in the past 10 years (Rodrigue and Notteboom, 2012). In accordance with *2018 Cruise Industry Outlook,* Table 1 summarizes which geographical regions cruise passengers mainly came from during 2011 to 2016. In general, cruise tourism generates substantial economic benefits, including coastal city transformation, regional economic cooperation, and port economic development (Sun et al., 2014). In the long term, cruise tourism can create a significant contribution to a destination's economy, creating jobs and generating revenue. Also, cruise tourism can avoid urban relocation by generating local jobs (CBI Ministry of Foreign Affairs, 2016).

Starting from 2000, various frequent cruisers are looking for attractive destinations, diverse cultures, and wonderful experiences which they would find in Asian regions, notably in China (Lau et al., 2014). The influx of a large number of cruisers within a limited time and an increasing arrival number of

TABLE 1 Demand for cruising from different regions (2011–16)

Regions	Number of cruise passengers (millions)
United States	11.5
China	2.1
Germany	2.0
United Kingdom	1.9
Australia	1.3
Canada	0.8
Italy	0.8
France	0.6
Brazil	0.5
Spain	0.5

(Data from Cruise Lines International Association, Inc., 2017. 2018 Cruise Industry Outlook. Cruise Lines International Association, Washington, United States.)

cruise ships will aggravate the problems. Since the Chinese cruise industry is definitely gaining much attention and rapid development in recent years, there is an urgent demand for exploring the negative externalities behind the cruise tourism and investigating the association between cruise industry economic development and environmental impacts. Reducing the negative impact of cruise tourism means that we can decrease the potential risks of cruise industry development. In other words, it is necessary to promote the cruise industry in a reasonable and moderate approach under the framework of responsibility and sustainability, so as to ensure the healthy development of the cruise industry in the forthcoming years.

Due to cruise industry being a resource-dependent industry, it brings various negative impacts, consisting of environmental degradation, resource squeeze, marine pollution, to name but a few. Thus, how to reduce the negative impacts of cruise tourism and generate responsibility in cruise tourism is now highly addressed in the cruise industry. The accountability and sustainability of cruise tourism will be a key issue that the stakeholders cannot avoid in the development process (Carić, 2016).

In this chapter, we have conducted a literature review about the research trend in cruise shipping. Traditionally, the researchers (e.g., Rodrigue and Notteboom, 2012; Jia et al., 2013; Sun et al., 2015; Lau et al., 2014; Lau and Yip, 2018) have mainly highlighted that the development of the cruise industry has generated a significant economic and social development. That the number of tourists and cruise liners creates negative impacts on local communities seem seriously overlooked. In terms of Chinese literature, we manually searched the key words from the CSSCI or CSSCD journals containing "cruise + impact," "cruise + environment," "cruise + pollution," "cruise + community," "cruise + society," "cruise + residents," "cruise + sustainability," "cruise + responsibility," "cruise + employee," and "cruise + conflict," to name but a few. All these key words are highly relevant with cruise tourism studies. Although the research on cruise tourism has emerged dramatically in the last decade, only 11 articles were relevant with the sustainability, accountability, and the negative impacts of cruise tourism. For instance, Xie et al. (2010) investigated the different aspects of environmental impact pertaining to cruise construction, facility operation, transportation and distribution, consumption utilization, and waste disposal by using a life cycle theory so as to generate the ideas of environmental pollution control. Ji (2015) used the stakeholder theory to give a comprehensive discussion of the potential negative impacts of cruise tourism. Du et al. (2016) investigated the green shore power experience in Hamburg Ferry Terminal, including engineering design, regulations and policies, financing channels, and social participation. The study has given a valuable insight on China's cruise port shore power projects implementation. In terms of English literature, we also manually searched keywords closely associated with cruise tourism studies, including "cruise + environment," "cruise + polluting or pollution," "cruise + community," "cruise + society or social," "cruise + resident," "cruise + sustainable or sustainability," "cruise + responsible

or responsibility," "cruise + crew or worker," and "cruise + impacts or negative impacts," to name but a few. We found that different scholars began to explore the negative impacts, the sustainability, and liability issues of cruise tourism, which has created a research hotspot since 2010. The negative impacts of the cruise industry has been a hot topic in the international academic community and provided significant research results. However, the analysis and discussion provided small numbers of case studies in China.

2 Negative effects of cruise tourism

The booming of cruise tourism stimulates negative impact on environmental resources, marine ecosystems, and marine environment (Tang et al., 2013; Carić et al., 2016; Xu and He, 2016). The different stakeholders design the cross-regional cruise routes together with the trend of larger sizes of cruise ships speeds up the negative environmental impacts of cruise tourism. To this end, depletion of natural resources, excessive demand for energy and water in destinations, and climate change will occur (Kaldy, 2011). In addition, cruise ships not only generate air pollutants, but also release large amounts of waste and waste water that damages the marine environment, including miscellaneous drainage (i.e., gray water), sewage, hazardous wastes, oily sewage (i.e., oily bilge water), solid waste, and ballast water (Lester et al., 2016). The details are given in Table 2.

TABLE 2 Key sources of waste generated by cruise ships

Source of pollution	Description
Black water	Refers to domestic sewage. Each passenger produces 10 gallons of sewage per day
Gray water	Contains sinks and shower waste. Each passenger produces 90 gallons of gray water per day
Garbage and solid waste	A cruise ship produces 3.5 kg of solid waste per day
Hazardous waste	Generated from dry cleaning materials, the printing shop, chemical cleaning, and batteries. A cruise ship produces 15 gallons of toxic waste per day
Oily bilge water	The contaminants collected from the ship's hull, including fuel, oil, and wastewater. A cruise ship produces 7000 gallons of toxic waste per day
Ballast water	The exchange of ballast water causes local species exchange
Diesel exhaust emissions	A cruise ship generates emissions equivalent to 12,000 vehicles

(*Based on* Lester, S.E., White, C., Mayall, K., 2016. Environmental and economic implications of alternative cruise ship pathways in Bermuda. Ocean Coast. Manag. 132, 70–79.)

In addition, cruise ships create bacteria and toxic substances that affect the ecology and the health of residents. For example, in response to residents' concerns about the ecological and health impacts of cruise tourism, in 2000, the US Department of Environmental Conservation carried out a research study of the cruise ship activity area. It found that the waste water did not meet the sanitary conditions. The black and gray water contained toxic levels also exceeding national standards (Loehr et al., 2006). Kaldy (2011) established an initial dilution equation model including key elements like the ship width, cruise draft, navigation speed, and sewage discharge rate. The study pointed out that adjusting the size of the cruise ship and the speed of navigation, the effect of decreasing the discharge of cruise wastewater can be achieved. When the speed of the cruise ship is greater than or equal to 6 nautical miles/hour and the offshore is greater than or equal to 1 nautical mile, the sewage discharge from the cruise will not create water pollution.

In addition, the researchers explored that the environmental impact of cruise tourism is much larger than general types of tourism. Toh et al. (2005) addressed that the energy demand for hotel functions by a cruise ship is five times higher than that of ordinary high-end hotels. Moreover, Klein's (2009) study indicated that cruise ships produced an average carbon footprint over three times that of trains, airplanes, and ferries. Furthermore, Howitt et al. (2010) assessed the carbon dioxide emissions from cruise ships after considering the key factors of cruise ship size, engine life, engine size, onboard facilities, crew number, and cruise ship frequency. The carbon emissions of cruise ships were significantly higher than those of passenger aircraft.

In addition, Zhong et al. (2016) identified that providing ecotourism products to cruisers at cruise destinations will further reduce the negative environmental impacts of cruise tourism. The two main features of ecotourism are to protect nature and sustain community benefit. Most onshore activities still failed to perform with ecotourism characteristics. The common onshore activities like forest trips, all-terrain vehicle (ATV) expeditions, jet boats, and a lack of guided diving leads to physical damage to the natural environment (Johnson, 2006). Up to now, the international organizations, cruise associations, government bodies, policymakers, cruise operators, cruise terminals, and industry practitioners have coordinated together in order to strive to respond to the sustainability and responsibility of cruise tourism through setting up a unified management organization and drafting waste management plans and site policies. Nevertheless, the notion of responsibility and sustainability of cruise tourism remains unpopular, notably in China. In the next section, we adopt the representative example on how the shore power can be applied in China cruise ports in order to foster cruise industry sustainability.

3 The use of shore power in China's cruise ports

With the rapid development of the cruise industry in China, the cruise ports induce various environmental problems. When a cruise ship is berthed, it uses a large

amount of heavy oil and diesel oil to generate a large electricity demand. Heavy oil and diesel oil not only produce a large amount of toxic gasses like carbon dioxide, sulfide, and nitride, but also create noise pollution. This affects a quality of life and atmosphere environment adversely. Furthermore, cruise tourism brings other aspects of environmental problems, for examples, climate change, depletion of natural resources, and excessive demand for water and energy.

The cruise tourism effect on the port environment has received notable attention. Establishing a green cruise port is a "must" to become an inevitable trend and common pursuit in the cruise industry. The use of shore power for cruise ships has become a common practice in different cruise home ports worldwide. As an alternative power source, the adoption of shore power technology has a remarkable effect on reducing the emission of harmful substances like NOX, SOX, and PM10. Shore-based power supply refers to cruise ships using shore-based power supply instead of using marine generators during berthing period. Shore-based power is also known as shore power or alternative maritime power (AMP). Shore power can significantly reduce the emission of toxic substances and air pollution to meet environmental protection requirements (Shanghai Observer, 2016).

In accordance with the *Enhancement of China's Cruise Industry Sustainable Development* in March 2014, enterprises should give priority to using advanced technologies, low energy consumption, and safety environment facilities. In addition, the Chinese government encourages using cleaner fuels such as gas, liquefied petroleum gas, and natural gas. The new established cruise terminals are preferred to employ shore power systems. In order to promote the construction of a green cruise port, Shanghai has implemented the *Three Years Action Plan for Green Cruise Port (2015–2017).* This clearly defines the overall objectives, key tasks, and protection measures. In order to build the concept of green shipping process, the idea of shore power has been launched in Shanghai. Wusongkou International Cruise Terminal—Berth One was considered as one of seven shore power demonstration projects in 2016.

China has actively promoted the construction of green cruise ports. More and more cruise ports have launched a series of green port development plans including the enlargement of cruise shore power projects, as cruise green energy is an important aspect of a green cruise port concept. The cruise fuel produces large emissions of pollutants and thus, we need actively to promote the installation of cruise shore power equipment to align with creating green cruise ports.

Shanghai Wusongkou International Cruise Port not only received the largest number of cruisers in China, but also provided the earliest start of shore power facilities for cruise ships. The first phase of shore-based power supply project was officially put into operation on July 13, 2016. Until now, this has been the world's largest cruise frequency conversion shore power system as well as the first set of cruise shore power system in Asia (Shanghai Observer, 2016).

In general, the construction of the shore-based power supply project in Shanghai Wusong International Cruise Port is divided into two main phases. It

will cover four berths after completion. Currently, the first phase of the project can provide a total capacity of 16,000 kVA with the coverage of two berths. SkySea Cruise Company has taken the lead in using shore power facilities. In addition, the cruise ship "Majestic Princess" successfully completed adoption of shore power on November 20, 2017. In 2016, Shanghai Wusong International Cruise Port planned to arrange 488 voyages to dock at the port; the docking cruise would use 36.6 million kWh of alternative electricity to achieve zero emissions. In 2017, the annual cruise berthing number in Shanghai Wusong International Cruise Port would exceed 1200. We expected that the emission reduction effect was to be more obvious when the replacement power was 87.8 million kWh. Based on the average 150,000 cruise tonnage, carbon dioxide can be further reduced by 36,000 tons, sulfur dioxide by 750 tons, and nitrogen oxide by 65 tons, annually.

Shanghai has tried to establish an international shipping center and a world-famous tourist city in response to the direction of the Belt and Road Initiative. In addition, it has realized the cruise economy has been evolved from a small to large scale. In October 2018, the General Office of the Shanghai Municipal Government issued a full text of *Intensifying the Shanghai Cruise Economy Development*. It indicates Shanghai cruise ports should continue to upgrade the cruise waste disposal support capacity, improve the shore power system utilization, and improve the standard of health management of the cruise port. Eventually, all cruise ships are required to use shore power by January 1, 2021.

However, the use of shore power systems in cruise ports is now facing unfolding challenges. First of all, the cruise ports lack clear guidance, mechanism, and systems to construct the cruise port and create effective monitoring and tracing of green indicators. Also, the cruise port operators and public have demonstrated a lack of environmental protection awareness. In addition, the huge construction and associated facilities costs pose a restriction to the use of shore power. In terms of electricity use, Shanghai Coastal Power charges electricity according to the general commercial electricity use with the basic monthly electricity charges on the basis of the power access capacity. Taking Wusong cruise port as an example, the actual shore power consumption was about 470,000 kWh in 2016, generating about 350,000 yuan of electricity charge. It is equivalent to the average electricity consumption of 0.75 yuan/kWh. Wusong Cruise Port has set up a shore power technology company to provide shore power services. Based on the annual 10% utilization rate of shore power facilities, the annual expenditure on human resources costs, equipment depreciation costs, and equipment maintenance fees is about 5.75 million yuan (Shanghai China, 2018).

4 Responsible cruise tourism

With the rise of an increasing trend in scrutiny and criticism of industry practitioners and researchers on the negative impacts of cruise tourism activities, the notion of responsible cruise tourism has become a hot issue of tourism research

and practice. Initially, responsible cruise tourism concentrated on participants like tourists and travel agents understand a wide range of tourist interactions can minimize negative effects of environmental and social impacts and maximize the local communities benefit (Frey and George, 2010). Now, we need to consider stakeholder theory to extend it to cruise tourism activities in different regions, different areas, different levels, and different linkages. Also, we need to create a framework of action including cruise liners, cruise ports, travel agencies, onshore service providers, organizations (i.e., government bodies, cruise associations, nonprofit organizations, and industry alliances), and individuals (i.e., local residents, crews, and cruisers). As shown in Fig. 1, all stakeholders require improved involvement through drafting a master plan, formulating activities, and providing clear guidelines so as to make cruise tourism into a sustainable and responsible industry.

Responsible cruise tourism systems include various stakeholders and effective implementation of responsible cruise tourism is largely determined by the attitudes and behaviors of government departments, organizations, enterprises, and associations toward the idea of cruise tourism. Firstly, government departments, industrial organizations, and industry associations are responsible for drafting and supervising the laws, policies, and industry standards to improve the tourists travel experience and the well-being of residents (Klein, 2009). How to align between the international standard and local government practice is of significant importance. Secondly, industry associations and industry organizations play a leading role in maintaining the industry standards, and

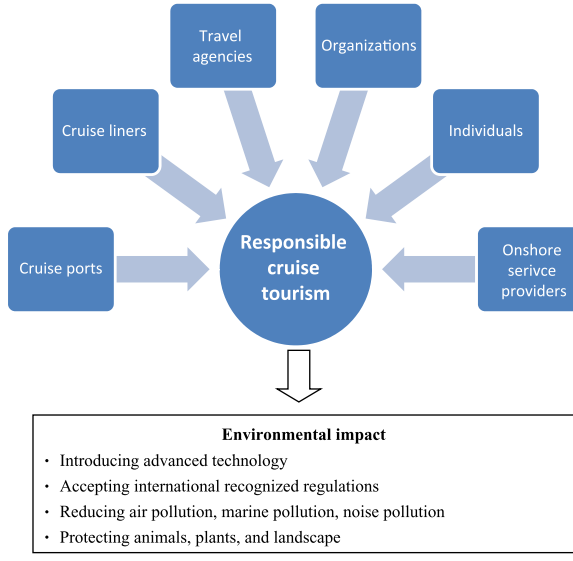

FIG. 1 A framework for responsible cruise tourism.

provide professional advice on responsible travel; for example (1) protecting the environment, including animals, plants, and landscapes; (2) minimizing pollution consisting of noise, waste disposal, and congestion (Goodwin and Francis, 2003). In addition, cruise liners, travel agencies, cruise ports, industry associations, and other organizations must jointly create a responsible cruise culture to increase the cruise visitors' sense of responsibility for the natural environment, marine ecology, and community culture through publicity and education.

5 Conclusion

This chapter provides an insight into preventing problems before they happen. This is the time for all stakeholders to take responsibility at the time of the development of cruise tourism. Although the international organizations and associations highlighted the negative effect of the cruise tourism, and various industry management practices have been raised, the local countries or cities still do not deeply recognize the negative externalities of the cruise industry in terms of environmental impacts, notably in China. To this end, we identify different aspects in terms of responsibility and sustainability of China's cruise tourism that should be investigated in the forthcoming years:

- The environmental impact of cruise tourism on China's coastal port areas is a hot topic and contains a large number of research results. With the increasing ecological impacts of tourism development, achieving the dual goals of minimizing environmental impact and maximizing economic benefits should be addressed (Yao and Chen, 2015). Thus, we can use the carbon emissions and carbon footprint during the cruise stops to explore the impact of cruise tourism on air quality and marine ecology.
- The research study explored that the influx of a large number of cruisers will occupy the living space and resources of local residents. As a result, rising local community prices, traffic jams, and even garbage mountains will reduce the residents' quality of life and cruiser travel experience. In the future research, we can carry out research focusing on local residents' attitudes toward cruise port infrastructure construction and risk perception of cruise tourism development. This can truly reflect how cruise tourism can bring substantial benefits to local residents.
- From the perspective of economic impact, the negative effects of cruise tourism are mainly reflected in the uncertainty of regional economy. Currently, China's cruise industry development is at the initial stage. The economic benefits of cruise tourism are mainly generated from the income sources such as port fees, shipping agency fees, and ticket sales commissions. The indirect economic benefits of cruise tourism are difficult to evaluate. Thus, we need to take into account cruise economic indicators including the indicator system, the cruise economy climate index, and the economic risk assessment in the future research.

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Further reading

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