

Research Article

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The Cruise Industry and Environmental Sustainability: Focus on the Falmouth Pier, Jamaica

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ABSTRACT

The cruise industry has grown exponentially during recent times. The modern cruise industry is also one of the most outstanding examples of globalization, with an increasing number of ports of call and destinations around the globe. Along with economic, social and financial benefits, are environmental issues that have had negative impact on countries. The environmental sustainability of the cruise line industry, as seen through the lenses of Falmouth Pier port of call is the interest of this study.

Using qualitative case studies, a semi-structured interview was administered to an excess of thirty respondents from the Falmouth Pier. Along with a comprehensive review of extant literature, the findings revealed that substantial measures are taken against the destruction of the marine environment, however, more can be done to ensure greater efficiency. It is recommended that the industry adopts a go-green policy and an eco-friendlier approach to its operation.

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The Problem

Indubitably, for the cruise industry to survive, the natural environment and the socio-cultural heritage of the area of destination should be of high standard. If not properly managed, the industry has the potential of degrading these same assets. In this regard, despite the industry being beneficial to the region's economy, and the world in general, it can be detrimental. The activities of the shipping industry ranging from the development of port facilities (dredging of channels) to the operations of these vessels have all contributed to the detriment on the environment that it operates [1].

Because the cruise ships are getting larger, the ports often outlive their usefulness. Hence, countries consider improving their status by aligning with the trend to enlarge floating hotels. This results in a call for dredging deepen the drafts in order to accommodate mega size vessels. This is irrefutably evident in the presence of Royal Caribbean's new mega-ships in the Falmouth Cruise Ship Port. According to the, despite the coral reef and mangroves being critical to numerous economies around the world and serve as harbour to diverse marine species that protect otherwise fragile coastal areas, they are being severely destroyed in order to facilitate these vessels [2]. The decline is because of sedimentation, excess nutrient loads, warming temperatures; all of which are consequences of the shipping industry.

During operation of the vessels, invasive species are often transferred from one geographic location to another through

ballast water discharges, hull fouling, or through the movement of products and their packaging. The highlighted that Jamaica has seen the effects of ballast water with the pollution of the Kingston Harbour from the green mussel [3]. "The green mussel has ecological implications as it competes with native species for food and space, leading to a reduction in biodiversity; there are also public health effects due to the accumulation of harmful constituents inside the tissue of the mussel which when consumed causes illness among humans [4]. This therefore substantiate that our marine environment is at much risk, and the impact can, in one way or the other, affects citizens and other stakeholders.

Indeed, the shipping industry is very beneficial to a country's economy, but steps should be taken to effectively halt its negative impact on the environment.

Objective of research

The objective of this research on the cruise industry and environmental sustainability are as follows

- Examine the cruise shipping industry and its impact on the Marine environment.
- Explores the principles of environmentally sustainable development.
- Investigate how sustainability can co-exist with the cruise shipping industry.
- How effective are the current sustainable practices implemented by the major cruise line?
- Identify the International Maritime Conventions that help to mitigate the negative impacts of cruise shipping while obtaining sustainability.

Research Question

How has the cruise industry utilized sustainable practices to preserve the marine environment?

Sub-Questions

How has the Cruise Industry impacted the marine environment?
What are the key sustainable initiatives employed by the industry to preserve the marine environment?

Significance of the Study

This research is of paramount importance because both the cruise shipping industry and the marine environment are vital entities that make tremendous contribution to the country's economy. However, within the shipping industry are weaknesses regarding the sustainable development practices. In other words, harm is being inflicted to the marine environment. This study, therefore, aims at highlighting the impact that the shipping industry has imposed on the marine environment. It is also the researchers' intention to use the information gathered as avenue to enlighten the industry of any damaging actions on our vulnerable marine environment.

Literature Review

Overview of the Cruise Industry

The Cruise Industry has gone through many significant changes over the past three decades. From the era of transoceanic transportation and tropical vacations (available to the wealthy, privileged elites of society), to what it is known today as the multimillion tourism and leisure industry offering affordable vacation options and comfort to match the average citizen [5]. With the increasing growth of the cruise industry comes the expansion in ship sizes and the variety of destinations to meet the demand of customers. As such, the grandeur of the destinations, and their natural beauty are critical to the increasing demand. With that being said, the cruise industry is linked to environmental performance and compliance. However, studies show that the cruise line industry generates significantly more volume of waste and pollutants than any other maritime industry sector [5]. With the high level of waste and pollution that is produced, comes the need to implement ways of sustaining the industry's environment. The central notion of sustainability is that the goals of environmental preservation and the goals of business need not be disparate and conflicting.

Shipping is the most significant international transport substructure in the world. It fuels the global economy and helps in countries' development. Cruise ships comprise two main industries: tourism industry and shipping industry. Additionally, they provide accommodation and entertainment venues for the tourism industry, and they have mobility. The cruise lines carry thousands of people around the world in just a single voyage and these people generate a lot of waste - sewage, grey water, oily bilge water, solid and hazardous waste which are adversely impacting fragile marine environment.

The International Maritime Organization (IMO) is noted as an influential international organization which deals with the prevention and control of marine pollution by adopting international conventions, protocols, guidelines, and recommendations. It adopted conventions such as the International Convention for the Prevention of Pollution from Ships (MARPOL), and its annexes. However, the main convention that deals with prevention of marine pollutions from the operation of ship is MARPOL.

The International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978 (MARPOL 73/78),

regulates, and prevents pollutions arising from the operations of vessels. Its main concern is that of mitigating oil spills whether it is operationally or accidentally caused. MARPOL 73/78 comprises of six annexes which are used to prevent all possible forms of pollutions from vessels [6].

- Annex I prevention of pollution by oil & oily water.
- Annex II control of pollution by noxious liquid substances in bulk.
- Annex III prevention of pollution by harmful substances carried by sea in packaged form.
- Annex IV pollution by sewage from ships.
- Annex V pollution by garbage from ships.
- Annex VI Prevention of air pollution from ships.

MARPOL 73/78 defines sewages as any drainage and other wastes from any form of toilets and urinals, drainage from medical premises (dispensary, sick bay, etc.) via wash basins, wash tubs and scuppers located in such premises. Sewage is known to contain harmful viruses, bacteria and pathogens which are harmful to the well-being of human beings. In addition, sewage is rich in nutrients such as nitrogen and phosphorus which helps algal to grow faster. The growth in algal reduces oxygen in the water and cause eutrophication which kills fishes and destroys the aquatic life at sea. According to in most cases of enclosed or semi-enclosed seas where the water exchange rate is slow and the discharge amount of sewage is high, the eutrophication is faster and harmful to the marine life [7]. MARPOL Annex IV regulates the discharge of sewage. Except in situations where the ship is at a minimum distance from the nearest land. Furthermore, the discharge rule does not apply when ships are under the jurisdiction of a state which has less stringent discharge requirements [6].

Another pollution issue regarding the cruise line industry is that of 'Grey Water'. As noted by, grey water contains different elements because of its mixed composition [8]. detergents, oil and grease, metals, organics, petroleum hydrocarbons, food waste, nutrients, faecal coliform bacteria, and medical, dental waste. It is the largest source of liquid waste that is generated by cruise ships - 90 per cent of the total liquid waste. Because of its high level of faecal coliform bacteria, and the oxygen-demanding materials, grey water is dangerous for human and marine life. It can cause loss of marine organisms [8]. further postulated that MARPOL Annex V regulates the discharge of grey water and provides separate provisions for 'Special Areas'.

Solid waste disposal by cruise vessels has also been an issue, one that needs to be properly censored. Solid waste is identified as garbage. The new amendment to this particular annex prohibits the disposal of almost all kinds of garbage at sea with the exemption of those that fall under specific requirements of food waste, animal carcasses, cargo residues contained in wash water and environmentally friendly cleaning agents [8]. Annex V of MARPOL classifies garbage as all kinds of victual, domestic and operational waste, excluding fresh fish and parts thereof, generated during the normal operation of the ship and liable to be disposed of continuously or periodically. This exclude those substances which are defined or listed in other Annexes to the present convention. Daily operations of the cruise ship generate solid waste in the form of packaging materials, food waste, transportation, and storage products. Some solid waste can be recycled while others are non-recyclable. These can hold hazardous substances which constitute the hazardous waste in the cruise ship that requires separate disposal mechanism. Solid wastes can be dangerous

to marine life if they become marine debris. This can affect the marine environment as it causes alterations in the composition of ecosystems, interference to gas exchange between overlying waters and benthos, degradation of quality at surface waters and beaches, physical injuries to humans and the ingestion of particles by marine animals [9].

The importance of the cruise industry to the local economy

As mentioned earlier, the cruise line industry has evolved from being service to the elite to the modern multimillion tourism and leisure industry for the average citizen. Today the number of people cruising globally, seems to grow steadily every year [5]. The cruise industry has the potential to provide many benefits to the port's state:

- i. spending by cruise passengers and crew;
- ii. the shore side staffing by the cruise lines for their headquarters, marketing, and tour operations;
- iii. expenditures by the cruise lines for goods and services necessary for cruise operations;
- iv. spending by the cruise lines for port services; and
- v. expenditures by cruise lines for maintenance [10].

Negative Impacts of the Cruise Industry on the Environment

Although earlier comments refer to the harmless effects of the cruise lines on the environment, it is worth reiterating that literature documents that some of the most damaging is its effect on the marine environment. Environmental impacts ranges from the construction of the port infrastructure to the operation of such [11]. The shipping operations and associated port activities that have been identified as having the greatest potential impact on the marine environment are: dredging and the disposal of dredged waste (spoil); discharge of ballast water; use of antifouling paints; disposal of waste materials and sewage; oil spills from routine activities or accidental incidents; physical damage to marine habitats by ships' hulls (e.g. grounding); noise emissions amongst others [12]. And explained that to facilitate the Royal Caribbean's new mega-ships in Falmouth Cruise Ship Pier the destruction of some 35,000,000 cubic feet of coral reef, and the destruction of two square miles of mangroves was buried under the now pulverized reef material [1-11]. Additionally of the On Earth Magazine, pointed out that in accommodating these vessels, wrecking crews had to smash a quarter mile wide opening in an offshore barrier reef [13]. They dredged coral, both living and dead, as well as the rock substrate, and trucked it inland to a two-square-mile dump site; a clear-cut area on the outskirts of town that was once a thriving red mangrove swamp, much to the demise of marine life.

Interestingly, it is said that even the enduring boom of the industry has a negative impact on the environment of the cruises themselves. The more people go on a cruise, the more ships will be sailing on the seven seas, thus generating even more waste, and causing more damage. The cruise ships carry large numbers of humans, and this generates significant piles of waste for which there is not much space. The regulation of waste disposal at sea is limited, partly because the cruise industry is not subject to the same environmental standards as land-based industries and because it is hard to control or enforce [1].

In addition to the highlighted that these impacts need to be properly managed so as to protect our marine environment [14]. One simple illustration of the pervasive nature of this pollution is that a plastic bottle thrown overboard may take up to 400 years to break down, and during that time such pollution can move great distances and cause negative impact to marine life.

Moreover stipulates that the cruise ships may have nearly perfect noise and vibration insulation to the inside, but not to the outside, thus disrupting communication and sonar of sea mammals [8]. further highlighted that the noise produced by ships can travel long distances, and marine species who may rely on sound for their orientation, communication, and feeding can be harmed by this sound pollution [11]. Furthermore, wildlife collisions marine mammals, such as whales and manatees, risk being struck by ships, causing injury and death. For example, if a ship is travelling at a speed of only 15 knots, there is a 79% chance of a collision being lethal to a whale.

Sustainable Practices Employed by the Industry and its Major Cruise Lines

Sustainability in the cruise industry alludes to making optimal use of environmental resources that constitute a key element in tourism development, maintaining essential ecological processes and helping to conserve natural heritage and biodiversity [15]. It is posited in the that sustainable transport is recognised as one of the biggest challenges of the 21st century [16]. It is accepted that whilst shipping is relatively safe and clean, compared with other transport modes, the industry does have a significant impact on the environment. Within the last decade several proactive efforts to encourage environmental management improvements within the shipping industry have emerged. These have been referred to as sustainable or green shipping initiatives. Efforts such as retrofitted onto older vessels (solar panels, exhaust scrubber systems that help minimize emissions, advances in hull design that let ships cut through the water more efficiently, cooking oil conversion systems and energy efficient appliances). It is further explained that some cruise lines also collaborate with nonprofit organizations and government agencies to collect data about the ocean's health and climate changes [17]. Have declared that the cruise lines continue to make important strides to improve their environmental policies, al beit, some lines do so more extensively than others [11,17-19]. Whereas recycling, incinerating and waste-processing were cutting edge on cruise ships just over a decade ago, such processes today are basic and expected. The Carnival Cruise Line, Disney Cruise Line, and Royal Caribbean, for example, are some of the most popular lines that make attempts in achieving sustainability.

Theoretical framework on sustainability

The theoretical framework employed in the proposed research is informed by the Sustainability Theory. According to the, sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs [6]. It is further stated that, it contains within it two key concepts: the concept of needs, in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs.

Theories of sustainability attempt to prioritize and integrate social responses to environmental and cultural problems. The theories have become too complex to be dualistically organized. Therefore, there are different models of sustainability, each prioritizing its own component of what must be sustained. The ecological model of the sustainability framework is essential to this literature, henceforth, this model alludes to biological diversity and ecological integrity. Sustainability, according to may then be defined as maintaining well-being over a long, perhaps even an indefinite period. This covers largely the environmental dimension of the triple bottom line. On the one hand, some forms of environmental degradation are both relatively easily reversed and highly noxious in the present

- many forms of air and water pollution [20].

Ecological models propose means to sustain biological diversity and ecological integrity. That is, rather than focusing on opportunity or capital as the key unit of sustainability, they focus directly on the health of the living world. Within this model, there are two major ways of deciding which ecological goods to sustain. From an anthropocentric point of view essential natural resources should be sustained, as should those ecological systems and regenerative processes on which human systems rely. From an eccentric point of view, species should be sustained for their intrinsic value, as should ecological systems as generators of creatures with intrinsic value [21].

Marine Environment: International Laws and Conventions that Governs its Protection

Shipping is the most significant international transport substructure in the world that fuels the global economy and helps countries' development. Cruise ships interest is in two main industries: tourism industry and shipping industry. Cruise ships provide accommodation and entertainment venues for tourism industry, and they have mobility.

Sustainability according to may then be defined as maintaining well-being over a long, perhaps even an indefinite period [20]. This covers largely the environmental dimension of the triple bottom line. On the one hand, some forms of environmental degradation are both relatively easily reversed and highly noxious in the present—many forms of air and water pollution, for instance added [20]. Another scholar, noted sustainability to be a process that helps create a vibrant economy and a high quality of life, while respecting the need to sustain natural resources and protect the environment [22]. It expresses the principle that future generations should live in a world that the present generation has enjoyed but not diminished.

Cruise lines carry thousands of people around the world in just a single voyage and these people generate a lot of waste. The main wastes are sewage, greywater, oily bilge water, solid and hazardous waste. The marine environment is one of such fragility that even the least harmful substance can damage the flora and fauna in its surrounding. The growth in Marine activities has led to the introduction of International Conventions to provide uniform laws and regulations of which all vessels should abide. According to an International Conventions is an international agreement between States that can be bilateral or multilateral and is binding by International Law [9]. Marine activities require a special set of Law, otherwise known as Maritime Law. Where the environment is concerned, International Conventions such as: UNCLOS, MARPOL73/78 AND IMO are used to regulate the operations of vessels and ensure environmental sustainability is kept.

Methodology

Research Design

The Cruise Ship Pier in Falmouth, Trelawny serves as the context and site for this study. Approximately more than seven years ago this historic pier was created. It is believed that this port is well positioned since it lies between two popular ports – Ocho Rios and Montego Bay, The Falmouth's two-berth port is also custom built in a triangular peninsula that can accommodate the largest cruise ships in the world. Of importance is its proximity to the town's historic Georgian sights (Jamaica Journal, n. d.). However, like other ports, the environmental sustainability is of concern.

Through purposive sampling, ten participants from the elite personnel group, and twenty-five lower-level employees at the cruise ship pier in Trelawny formed the primary data source. Their views regarding the cruise ship industry, but more specifically, environmental sustainability is considered paramount and credible. The participants were selected on the premise that they fit the criterion of being knowledgeable about cruise lines and sustainability practices and has direct contact with or influence over the sustainability operations of the cruise lines. In other words, they are typical representation of the phenomenon being studied.

Data Collection Techniques

In this study, data collected and compiled from the use of both primary and secondary sources. The primary data sources are elite, face-to-face interview that consist of open-ended, semi-structured questions. Online books, journals, newspapers articles and case studies were used as secondary sources of information that support the literature review, as well as the data from the interview.

Presentation of findings and Discussion

This study seeks to uncover how and in what ways has the cruise industry utilize sustainable practices to preserve the marine environment. In order to learn more about the research problem, interviews questionnaires were administered to employees at the Falmouth Cruise Shipping Pier port during the month of July 2021. The findings extrapolated were based on the two sub-research questions:

1. How has the Cruise Industry impacted the marine environment?
2. What are the key sustainable initiatives employed by the industry to preserve the marine environment?
3. Findings revealed that the cruise line industry in Jamaica takes special precautions to minimize or eliminate any adverse effect to the marine environment.

There's no impact on the sea, sea creature, and sea life in and around the pier as no dumping in the sea takes place. An effective treatment system is used which result in the absence of any form of pollution. Any offloading of ballast water is done the farthest that is possible from the land. Whatever intake of water there was, the same water is offer out so there's no impact on the sea, sea creature, sea life and the water that is used is one hundred per cent filtrated. In essence, the study revealed that the cruise lines have recognized and adhered to the 'Special Areas' regulations and policy, and therefore, do not discharge waste near land or in these areas.

The cruise lines visiting the Falmouth Pier are equipped with modern waste recycling system, which also reduced the operation costs of the vessels.

Another important result emanating from the study is that officers, provide regular training to the crew about ship's policies that must be undertaken in ports and on high seas. This plays a critical role in maintaining and encouraging sustainable practices.

This finding is supported by literature that stated that employees of the Carnival Cruise Line attend training courses on waste management while on board [17].

Despite the significant effort of the cruise liners, improvement is still a requirement. There need to be a greater level of cooperation among all the relevant stakeholders such as port employees, the

Jamaican Government, ship captains and crews. Government needs to be more forceful in policy creation, enforcement, and monitoring. Government needs to communicate more by way of the different media platforms importance and how to protect the environment. Monitor construction projects to ensure that they are operating in an environmentally friendly manner and not put the environment at risk due to monetary benefits.

Members of the communities around the Town of Falmouth are very strong supporter of the view that they too have a large part to play in the marine environmental sustainability. There are qualitative variations in how the participants view their role as citizens. However, in most instances, they agreed that their role in the sustainability of the environment should include: recycle and dispose of waste properly; constantly educating their children to the need for proper garbage disposal; avoid purchasing items that are dangerous the environment; work together in order to make sure the streets are always clean up our streets.

Discussion

In this section broad themes are identified that reveal the findings. Findings from the literature, the interview and the questionnaires are corroborated.

Earth-Friendly Initiatives: There seem to be consensus that cruise liners have realized the importance of formulating and implementing practices or initiatives that are considered earth-friendly. According to reports from, “the cruise industry recognizes the importance of taking active measures to preserve our environment and we are constantly striving to develop eco-friendlier practices that enable travellers to stay ‘green’ while traveling [23-24]. This argument corroborates with the themes that extrapolated from the interview.

In 2017, at the celebration of World Environment Day, CLIA highlighted some of their best eco-friendly practices. They proactively instituted measures that will preserve ocean life “while offering once-in-a-lifetime travel experiences for cruisers worldwide [24]. Some of the earth-friendly initiatives highlighted included green policies, dedicated officers, sustainable practices, smart ships, waste minimization & creative composting, solar sailing, cruise for the earth, wildlife conservation, and proper disposal practices. Participants also made recommendations for some of these initiatives to be implemented at the community level or by the government.

Training

Training is an integral part of the sustainability of the environment. This is carried out at various levels. For instance, officers are equipped with the skills and knowledge necessary for “compliance, monitoring, and enforcement of the Convention, an instrument of the International Maritime Organization (IMO) aimed at controlling the transportation of organisms in ships’ ballast water [4]. Its importance is also evidenced in the fact that there are in some instances staff whose designated role is that of training for sustainability and compliance with the convention. In addition, workshops and other training sessions are held by the Maritime Association of Jamaica.

Efficiency is the hallmark of successful sustainable initiatives. It is about saving time and energy. According to Interviewer1 – time is saved, *and you’ll make your job more prominent, and efficient.*

Sustainability is Everybody’s Business

Environmental sustainability is everybody’s business. This point was coming across strongly. As was supported by majority of

the respondents, the government should ensure the importance of and how to protect the environment is brought across through the different communication platforms.

Conclusion, Implications and Recommendations Conclusion

While it might be impossible to evade all the possible detriments to the marine environment, it is prudent to ensure that adequate measures are in place to minimize any possible harm. It is commendable that guidelines and practices are being implemented and followed. However, with the findings revealing that there is room for improvement, alternatives such as the eco-friendly, or green initiatives espoused a more holistic approach. As demonstrated, the latest models of cruise liners are built or retrofitted with the necessary equipment for a more environmentally friendly ship, and these should be considered going forward.

Significantly, there is the need for continuous training, monitoring and re-enforcement of laws and policies. Efficiency can only be realized if personnel are trained and re-tooled for the changes in the dynamic society of the 21st century. Opportunities should be provided for the face-to-face and virtual training sessions in all forms exposing staff to the latest trends. Not only should there be training, but staff should be committed to enforcing high quality standards in environmental sustainability. And there should be the use of emerging technology is an imperative for the management, and control of certain operations and procedures.

Whilst the country relies heavily on the revenue from tourism and the cruise shipping industry and would not desire a slowing down of the industry, it is also imperative that the environment (marine and otherwise) be preserved and sustained. Therefore, care should be taken to acquire a balance so that one does not suffer at the expense of the other [25].

Implications

Evidently, this study suggests that there is the need for increased awareness of the cruise shipping industry and its impact (negatively and positively) on marine life and other environmental sustainability matters. Knowing what constitutes sustainability in ports will leverage the staff ability to look for strengths and weaknesses and improve the system. The government has a fundamental role to play in any awareness drive. This can be pursued from an organizational or national perspective.

Since no formal way of evaluating the impact of the cruise ship industry on the environment, investments, and efforts in formulating standardized assessment or evaluation protocol should be considered by each state or country. Being able to assess the state of a port’s sustainability efforts in the shortest possible time and through the most cost-effective means is of high priority. Not only should these be on the books but those involved should be cognizant of their presence and be able to use; this brings to the fore the need for continuous training.

Recommendation for future Work

This is small scale study that points to a larger national issue. It takes the united efforts of all to address the issue. In effect, this study might be considered a ground-breaking study or an inroad into a path that not many, if any, study/ies have explored. It would be equally valuable and fruitful to conduct a similar study with a wider cross-section of employees, monitoring agencies, and general citizens. It might also be worthwhile comparing two or more ports to determine if sustainability criteria are the same, the factors, if any, and the effect on environmental sustainability.

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