THE CRUISE SHIP INDUSTRY: THE SILENT GIANT

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By

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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Pollution is a byproduct of almost any technology that requires energy in order to function. Historically, pollution has been largely ignored so that the company or technology can reap the economic benefits. The marine field has experienced adverse effects of pollution including waste and even forms of noise pollution from large boats (Maxwell et al., 2018). According to the Environmental Protection Agency (EPA), recreational boating is increasing in popularity along with the awareness of the environmental quality of sources of water occupied by these boats (EPA, 2016). Activities like refueling or cleaning recreational boats create waste that cause harmful impacts on the marine environment. The waste created by recreational boats is not as large as other boats but still contributes to the overall pollution problem.

The EPA notes that the increase in recreational boating could lead to increased amounts of spills from boats during maintenance. Regionally, the South Fork Rivanna has restrictions in place to limit the amount of pollution caused by recreational boating. The South Fork Rivanna restricts the use of gas-powered vehicles and only permits the use of kayaking and canoeing (Rivanna Authorities, 2019). This policy is environmentally conscious; however, it limits the user's ease of travel in and around the reservoir area as kayaks and canoes are physically demanding. With the instruction of Mechanical Engineering Professor Gavin Garner and the assistance of Mechanical Engineers Justin Allen, Julianna Chaput, Miles Coe, David Gordon, Brian Lithen, Troy Meurer, Jonathan Ramirez, and Bryce Shelton, the body of a kayak was used to was considered to create a more efficient, environmentally conscious mode of transportation. This technical project implemented a water jet driven propulsion system similar to that of a jet ski attached to a kayak so that it could be used with ease and acted as an efficient vehicle (Watson, 1998). The technical project is loosely coupled with the STS topic as they share a common interest in exploring the impact of pollution in a marine setting.

THE SILENT GIANT

The commercial industry is often blamed for the majority of marine pollution as they are transporting thousands of products across the world's oceans every day. This is a common misconception as the cruise ship industry contributes more waste to the overall pollution problem (Butt, 2007). The luxury liner business does not only pollute directly to the ocean's waters, it also contributes pollution through mediums such as air pollution. The cruise ship industry resulting environmental effects add to the deterioration of the global climate and the health of marine ecosystems. The issue of pollution seems to go mainly unnoticed as the public has not been properly educated on the wide scope of the problem. Although concerns of the cruise ship industry's impact on the environment have been gradually increasing, the organization shows no signs of slowing down as it transported over 26 million customers in 2018 (Ellsmoor, 2019). The immense size of the cruise ship industry poses as a scaling threat to the marine environment, surrounding ports' environments, and other noticeable affected areas.

FRAMING THE CRUISE SHIP INDUSTRY

In order to assess the widespread effects of the luxury liner ship industry, a visual aid is necessary to fully explain the dynamic system in which the cruise ship industry interacts with its stakeholders. The cruise ship industry is modeled in Figure 1 below on page 3 using the Social

Construction framework to display how the cruise ship industry affects certain stakeholders and how they interact with the acting technology

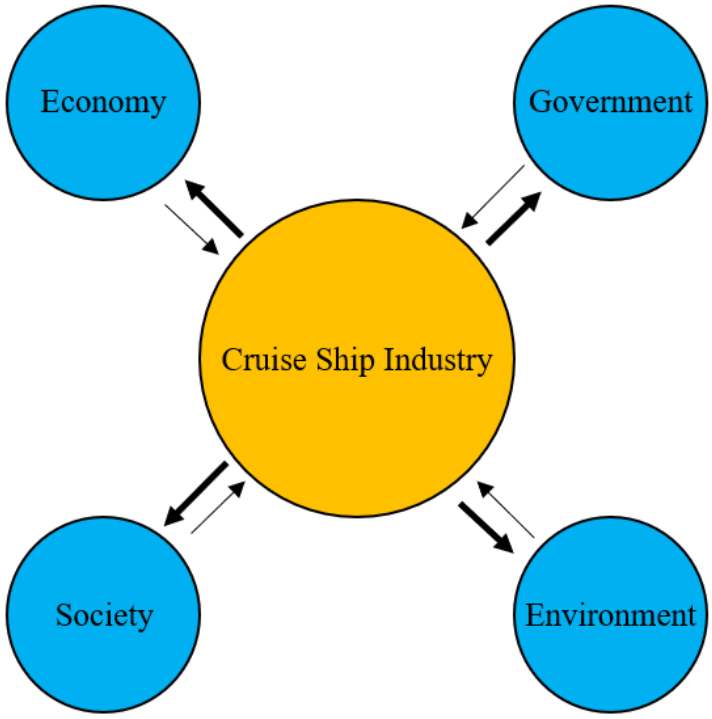

Figure 1: Cruise ship social technology concept framework model: Depicts the cruise ship industry as the acting technology and shows the relationship between the technology and stakeholders (Adapted by Colin Allison from W. B. Carlson, 2020).

As the acting technology, the cruise ship industry holds influence on all the surrounding groups. The Social Construction conceptual framework denotes that the relationships between the technology and the surrounding stakeholders is a two-way relationship where the technology shapes the outer groups and the groups also shape the technology. Although the arrows depict a two-way relationship, the cruise ship's impact on the surrounding groups dominates the relationship. To exemplify this relationship, the arrows emitting from the cruise ship industry have been bolded to illustrate the unfair tradeoff. In the relationship between business and society, the industry provides a great amount of pleasure to the user but cruelly exchanges a negative impact on the environment.

Cruise ships have been proven to create a disproportionate amount of waste while analyzing the scope of pollution created by manned boats and have "been found dumping illegally even with lenient ruling surrounding waste removal (Moscovici, 2017, para. 6). Luxury liners blatantly work around the rules as long as they do not get caught. According to Butt, "cruise ships represent less than 1% of the global merchant fleet yet it has been estimated that they are responsible for 25% of all waste generated by merchant vessels" (Butt, 2007, para. 1). Along with waste creation in marine environments, the cruise ship industry also creates a substantial amount of air pollution along popular cruise routes. The fuel consumption of cruise ships has been proven to be very inefficient and releases numerous toxins into the atmosphere. For example, the Sapphire Princess, a popular Alaskan liner, was estimated to "emit the same amount of sulfur dioxide as 13.1 million cars" (Eilperin, 2012, para. 1). This amount of sulfur dioxide is extremely dangerous as it can cause serious health problems and harm the environment. Sulfur dioxide can harm human's respiratory system, making it difficult to breathe while also destroying foliage and contributing to acid rain (EPA, 2019). Ironically the same liner advertises to the public to use their liner "to see Alaska's pristine landscapes" while contributing to the destruction of these landscapes along the trip (Eilperin, 2012, para. 1). While cruise ships have gotten away with the unfair trade of pollution for profit, some people are beginning to become wise about the situation.

The government has not needed to monitor the cruise ship industry in the past, but with findings of increased amounts of pollution, governments are starting to have to take action. In a case study examining the city of Venice, there is a growing concern with pollution caused by cruise ships along popular water routes to the city (Pesce et al., 2018). Within this case study, the relationship between the cruise ship industry and Venice is outlined, where the business and the

city both positively impact each other. Although this tradeoff has worked for a while, recent pollution caused by cruise ships traveling through surrounding ports of Venice has opened the conversation for alternative routes to be used. Venice holds historical significance with areas that are certified as historical centers and ecologically sensitive areas by the United Nations Educations, Scientific and Cultural Organization (UNESCO). The government aims to keep this certification as it is a large draw to many of the tourists that choose to visit Venice. With its UNESCO certification, Venice has some say in what cruise ships and other boats can do in terms of using their waterways, however, there are some countries that do not have the same luxury.

Within the cruise industry lie other smaller players such as nations that solely depend on tourism brought by luxury liners. The cruise ship industry has a much larger impact on small nations than expected as the cruise ship industry is larger than ever before (Eilperin, 2012). These small nations are chosen because they are desirable destinations, but are then robbed of their biodiversity due to the parasitic relationship between the cruise ship business and the nation. The toxic relationship allows the luxury liners to "extract the good they came for and leave behind little more than waste" (Moscovici, 2017, para. 6). As the cruise ship industry continues to grow, so does the environmental impact of the liners (Eilperin, 2012). The small nations have little power in the relationship since they are reliant on the business that the cruise industry brings. The nations affected by the pollution could attempt to enact pollution bans or regulatory fees to work toward environmental reparations, however, the nations must be careful with this as the cruise ship industry still holds the power in this relationship and could just choose to avoid the island asking for money or reparations.

ACTION TO LIMIT CRUISE SHIPS' IMPACT

In the present day there is not an immediate change that can reverse the negative impacts of the cruise ship industry. The lack of immediate fixes introduces the discussion of alternative options that can possibly limit the current output of adverse impacts on the environment. One proposed fix by environmental specialists and the public is enacting certain regulations to limit the cruise ship industry's impact on the environment and other effected stakeholders. Regulations can be enacted by local, national, and global regulatory bodies to help correct the problem. Amounting outside pressure is forcing cruise ships to move toward environmentally friendly ships by going green. The vice president of maritime policy at Cruise Lines International Association (CLIA), Brian Salerno, said the industry is taking appropriate steps toward going green (Hines, 2020). Along with the green movement, the CLIA is following the International Maritime Organizations (IMO) set of rules which is governed by the United Nations (UN). Initiatives outlined by the CLIA members include certain goals including "reducing carbon emissions by 40% by 2030" (Hines, 2020, para. 2). Under newly enforced regulations, cruise ships are being forced to limit air pollution by using cleaner burning fuel sources with lower sulfur and nitrogen levels (Hines, 2020). Along with cleaner burning fuel, cruise ships are also designing new engines so that there can be better fuel efficiency and less pollutants being put into the air (Hines, 2020). The CLIA also outlines regulated relating to illegal dumping. The Waste Management Policy outlines that the discharge of any untreated sewage is illegal anywhere in the world (Hines, 2020). Cruises have also started to limit passenger's usage of plastics by reducing the amount of single-use plastics that are allowed on their large-scale ships (Hines, 2020).

Although these new regulations implemented are a step in the right direction, the cruise ship industry has already been known to dance around regulations and eat the bill when necessary. There needs to be a larger movement to make an actual impact on the problem. In order to fully grasp the problem, the public needs to become educated on the impact that they have on the environment when they are on cruise ships. Researchers have estimated that "the most efficient cruise ships emit 3 to 4 times more carbon dioxide per passenger-mile than a jet" (Newman, 2019, para. 23). Newman notes that "personal decisions alone won't stop global warming - that will take policy changes by governments on a worldwide scale" (Newman, 2019, para. 29). Similar to the topic of global warming, the cruise industry will continue to pollute the environment if there is not a worldwide intervention. Some people have already begun to implement forms of going green such as carbon offsetting to justify using an environmentally harmful form of traveling. Carbon offsets include giving money to an organization to plant trees, mitigate methane outputs, or even to help build a wind farm (Newman, 2019). Although carbon offsetting can help combat the harmful environmental impacts of luxury liners, more reform is to fully change the cruise ship industry.

HOW THE CRUISE SHIP INDUSTRY WILL CHANGE

The cruise ship industry continues to grow as does the need for limitation of the luxury liner's impact on the environment and other stakeholders. Even though the cruise ship industry has become increasingly more regulated in the past couple of years, the business continues to disregard regulations. Many liners including the Princess Cruise lines, have been caught red handed for illegally dumping untreated wastes (Mervosh, 2016). The subsidiary of Carnival was charged a $40 million penalty for this incursion, showing that regulatory bodies are serious about limiting the amount of damage the cruise ship industry can do to the marine environment. The

cruise ship industry will continue to shirk responsibility as long as people continue to use the companies that provide the luxury liners. In order to understand a system in which the cruise ship industry could limit its impacts on surrounding stakeholders, Figure 2 has been modeled below using a combination of Social Construction framework and the Social Context framework.

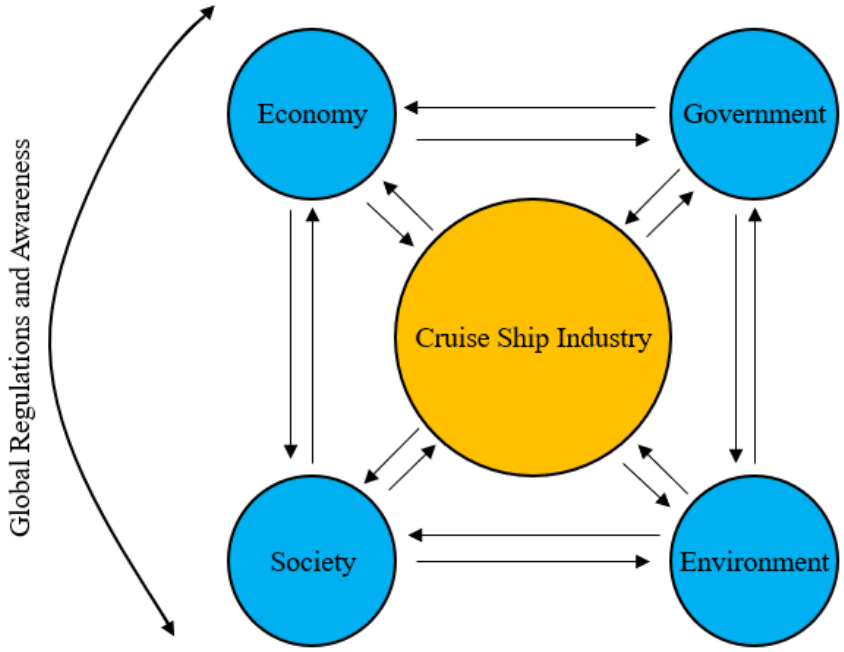

Figure 2: Wholistic framework of the cruise ship industry: Depicts the cruise ship industry in a system in which global regulations and awareness are the social context (Adapted by Colin Allison from W. B. Carlson, 2020).

The updated figure is similar to Figure 1 displayed on page 3 but Figure 2 implements social context of global relations to pressure the cruise ship industry and the surrounding stakeholders to take actions about the relationships within the system. For example, the outside pressure of global relations could force the cruise ship industry to use fuels with lower sulfur content, while at the same time educating the public about the dangers of the luxury liner industry. Similarly to Figure 1, the outside stakeholders influence the technology, the cruise ship

industry, while the cruise ship industry also holds influence on the stakeholders. Figure 2 implements new arrows to note new connections between the outside stakeholders as well. These new arrows are no longer bolded showing an even connection where the technology and the stakeholders evenly hold power. Figure 2 offers a more wholistic approach to the cruise ship industry and all the involved parties and factors within the system.

Using Figure 2 as a guide, it is apparent that the stakeholders can not directly fix the problem of pollution in marine environments, air pollution, and unfair treatment of tourism routes. In order to fully grasp the cruise ship industry, local laws will not work as cruise ships can often afford to pay the fines instead of abiding by the laws. A global effort is necessary to enact worldwide bans against unlawful pollution and at the same time limit the pollution causing the problem. The public must become educated on the topic and choose more environmentally conscious modes of transportation in order to send a message to the cruise ship industry. There will be no change with the luxury liner business if the world does not make a drastic change.

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