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Sustainability in the Industry Example

Industries make up a significant part of the world. The industry is essentially a firm that produces goods or services for the purpose of selling. Industries include but are not limited to healthcare, retail, manufacturing, technology, insurance, construction, agriculture, hospitality and more. The food industry is the largest industry on planet earth. With that, agriculture makes up 10% of the natural resources used in the entire world. Food and food products sold, traded, imported, and exported exceed any other firm in the world.

According to a recent study, China is the world's largest producer and exporter of the earth's natural resources [1]. Yet China opts out of sustainable practices within the industry [1]. For example, industries in China have low efficiency, overexploit and struggle heavily with environmental pollution [1]. With there being so many industries in the world taking earth's natural resources, there needs to be a greater focus on the abuse of sustainable resources in all areas of industries. This article will communicate areas in the industry that have dedicated time and effort in transforming and transitioning their industries into more sustainable firms. Although industries negatively impact the earth and the environment and are unable to undo the damage that has been done, all industries have the ability to change and make a positive impact through sustainability.

1. Introduction

According to the National Science Foundation, plastics and synthetic foams can live in landfills beyond an average lifespan. Products such as plastic, Styrofoam, and disposal packaging have become more popular over the years due to the shift in consumers wanting convenient one-time-use packaging. However, such packaging has detrimental impacts on the environment's natural resources, air pollution, and waste management [2]. The positive news is that there is hope for the preservation of the earth and its resources due to their being more sustainable practices available to limit such effects within the industry.

Industries are large fast-growing organizations established in both developed and undeveloped countries. The impact the industry has on the earth and the environment is costly and currently highly unsustainable. One way industries are destroying the earth is by taking the earth's natural resources. According to Public Radio International, the Nestle Swiss Company is in cahoots with Osceola Township, Michigan, as a result of its water extraction techniques. Many of the local townsmen have documented the Nestle trucks before and after a water extraction and have noted the differences in the road conditions as well as the lake conditions. The water has become warmer losing its crisp coolness due to the water extractions causing the lake to become more narrow and deep. As a result, the wildlife that once lived in this lake can no longer survive under these conditions and are therefore dying. Although the town's government is pushing for change, Nestle is part of the industry that contributes to the problem of sustainability within the industry [3]. If one large company can commit to sustainable practices in even just some areas of their operation, the impact would be significant on the earth and environment. Sustainability is a growing issue and has become most prevalent in recent years within the industry. Many companies are finding ways to make their organization more sustainable and earth-conscious.

This review will discuss sustainability efforts made in various industries across the world including developed and non-developed countries and the impact the changes have made on the environment in either a small or significant way. The review will include obstacles for industries adopting sustainable practices and include ways to work around these barriers.

2. Results

2.1. Ecological Footprint

Industrial Ecology

Ecological Modernization

According to the Global Footprint Network, ecological footprint is a way of measuring the amount of natural resources needed to supply a given population [4]. Ecological footprint is also known as the carbon footprint which refers to the amount of carbon emissions (CO₂) released into the air and environment due to the actions of consumers (humans). Carbon is not the only gas contributing to the greenhouse gases or what is more commonly known as global warming. Methane and ozone gases also contribute to carbon footprint [5]. Natural resources that are measurable by footprint are cropland, grazing land, fishing grounds, infrastructure, forest area, and carbon demand on land. Plant-based food and fiber products, livestock and fish products, timber and other forest products should also be calculated in the ecological footprint [5]. All human activity that result in the production of carbon emission or greenhouse gases contribute to the ecological footprint.

Essentially, the ecological footprint measures the demand of and supply of natural resources needed to produce the resources needed by a consumer. The industry plays a pertinent role in greenhouse gas emissions as they are largely responsible for using the earth and environments natural resources to produce products and services for consumers. The travel, construction, agricultural, food, plastics, synthetic styrofoams, and fashion industries all use natural resources to produce products and services required to satisfy consumers. The ecological resources needed and used to produce a McDonalds cheese burger contributes to carbon and CO₂ expression and the overall ecological footprint.

The goal of sustainability is not to rid the world of technology and 1st world advancements, but to lessen and

reduce the negative impacts of these technological advancements and ultimately reduce the global footprint. 40% of the total energy used in the construction industry accounts for up to 30% of the total annual greenhouse gas emissions at the global level [6]. The world has evolved into a consumer focused world meaning the industries have adapted to using the environment to best suit consumer needs. Essentially, industries are striving to give the people what they want. Unfortunately, what consumers want are not beneficial to the environment, depleting the earth's resources, and is slowly destroying the world. Sustainability initiatives aim to improve the negative effects consumers have on the world.

4. Discussion

Ways to counteract this give-take relationship between industries and consumers respectively is to shift industries from an industrial modernization and promote ecological modernization and industrial ecology. The article discussing how cooperation and trust in shipper-shipping relationships enhance sustainability is a great example of a barrier an industry might face when going green or implementing sustainable business practices [7]. For example, the construction industry has significant environmental, social and economic impacts on the society in which it has constructed building projects that are more sustainable for the environment such as green buildings and green building technology (GBT). Although building infrastructure and using land to build upon is a use of natural resources and thus contributes to the ecological footprint, green buildings have been shown to diminish the negative impacts associated with construction related activities [8].

Obstacles the construction industry may endure in the U.S. are upfront costs that are relatively high in comparison to the traditional building sector, long payback periods, tendency to maintain current practices, lack of knowledge and awareness, limited subcontractors' skill and knowledge, and higher costs of green products and materials [9]. According to a critical analysis of green building projects authored by Qian Shi, Yu Yan, Jian Zuo, & Tao Yu, green buildings consume 26% less energy. A report was made that discussed the benefits of having green buildings in China rather than conventional buildings. Unfortunately a barrier for the green building sector in China are the incremental cost posing a large threat to industry practitioners as they are also facing extra

demands related to sustainability. Industries worldwide are resistant to the green building model due to the conflicts of green buildings at each stage in the building process. Specifically, there is a uphill battle with the incremental costs at each stage vs. long term savings [8].

Another obstacle in the green building sector is the adoption of green building technology (GBT) in developing countries as opposed to developed countries such as Ghana [10]. The United States and China are large mass producers whose industries can manage the costs of enhancing sustainability practices. This cannot be said for developing countries such as Ghana. Several GBTs, such as green roof technology, solar technology, and prefabricated concrete technology, have been introduced for developing green projects but the barriers that hinder developing countries from this sustainable construction practice include lack of knowledge and expertise, lack of market demand, lack of green building codes and regulations, lack of government incentives, and lack of databases and information [8].

Despite the slow adoption of GBTs in Ghana, Ghana is one of the few developing countries that are making strides to achieve major progress in the implementation of GBTs. According to the Ghanaian Case study, Ghana has successfully launched Africa's first LEED-certified green hospital located in Ridge Hospital [10]. The One Airport Square located in West Africa released the first green commercial office building. Both of these green projects consisted of various GBTs such as solar water heating technology, rainwater harvesting technology, and natural ventilation technology. These sustainable construction practices performed in these projects demonstrate typical GBTs adoption issues within a typical developing country [10].

According to a study consisting of 100 resorts located across the United States, sustainability practices such as water conserving fixtures and linen-reuse programs are the most common green practices in the hospitality industry [11]. There is a spike in the rate of participation when hotels offer incentives such as loyalty program points every time a customer participates in environmental programs. However, the study revealed that hotel customers care more about the price and convenience when selecting a hotel for stays rather than the company's sustainability practices. If a hotel practices sustainable practices, hotel customers will participate and contribute

their part to the sustainable efforts however, sustainability is not considered in the selection criteria within the lodging industry.

Selection criteria include facilities, room, food, and beverage quality. As with all other industries, hotels are increasingly expected to maintain sustainability programs as a regular feature of their business [11]. Similar to the construction industry, the hospitality industry has a significant negative impact on the earth and a huge ecological footprint. The hotel industry has also made strides in continuous effort to control costs and ecological footprint through sustainable practices. For example, hotels reduce their resource consumption and address their impact on the environment through limiting water and energy usage. Despite the ongoing years of conservation efforts made by hotels in the form of its energy and resource usage, ways to further sustainability efforts leading to the double benefit of saving money and benefiting the environment is on the rise[12].

Efforts to conserve water within the hospitality industry include the reduction in water pressure and recycled water waste [12]. There are several ways the hospitality industry has tackled this issue. One is by replacing current appliances with water-efficient ones, hotels have reduced water use and water waste. The replacement of appliances such as laundry facilities, toilets, showers, and faucets all contribute to the hospitality industry's ability to conserve. Other hospitality conservation practices include solar energy. With the adoption of solar energy, hotels have been able to cut costs while utilizing green energy. Solar energy refers to solar panels which can generate around 25 percent of the energy that a hotel needs to operate.

The polyester layer used to coat windows can be retrofitted into existing hotels at a low cost and has been shown to save hotels 155kWh of electricity per year. Additionally, updating the heating system used in hotel swimming pools can also save money and conserve ecological resources. 50 percent of the energy used to pump a conventional heating system could be conserved by switching to an air-to-water heat pump and aid in the reduction of greenhouse gas emissions by 12,000 kg. The replacement of electricity with gas as a source of energy for the laundry and catering services would lead to the reduction of the hotel's ecological footprint by nearly 40 percent if the findings show that laundry and catering services constitute 30 to 40 percent of hotels' energy

consumption [12].

Natural gas (NG) is an important input used in industrial production. A study conducted in Korea investigates the benefits of using gas in the industry as opposed to electricity [13]. Although the study was inconclusive in its findings of whether natural gas should be used instead of electricity industrially, the authors concluded that they did in fact find statistical data that supports the notion. The research obtained an overall value for the manufacturing industry, but the economic benefits of natural gas use for each sector of the manufacturing industry need to be investigated by gathering and analyzing more data. More data is recommended and suggested for a more concise conclusion because the economic benefits of natural gas use for the steel industry may be significantly different from that of the semiconductor industry [13].

5. Conclusions

To conclude, efforts in sustainability advancement and the adoption of sustainable practices within the industry is in progress. The efforts being made in construction and within hospitality has been ongoing for years and will continue to grow. The United States is not the only developed country that has adopted these sustainability principles either. Many parts of China, one of the largest producers in the world, also utilize some sustainability practices although their adoption is much slower and their industries are more resistant to the idea. Developing countries in some parts of Africa such as Ghana have many strides toward being more sustainable and conservative. New companies are creating and inventing more ways to become sustainable in the everyday life of consumers as well as for industries. Products such as reusable menstrual products have become much more popular and widely used in the recent years (approximately 5 years). Biodegradable packing peanuts made from natural, nontoxic sources, such as wheat and corn starch [13]. All of these innovations contribute to the overall reduction of economic footprint, promote industrial ecology, and ecological modernization.

Supplementary Materials: The following are available online at www.youtube.com/watch?v=6g49bLf7mU, Video S1: Ecological Footprint of Countries: Deficit or Reserve?

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