Sustainability in the Supply Chain

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Questions for Consideration

How can we maintain our standard of living while improving sustainable practices? How do companies meet the needs of consumers today without compromising the needs of consumers in the future? How do companies change their operations to positively impact people, planet, and profit? How do we achieve more efficient consumption?

Introduction

The global supply chain is the worldwide system businesses use to produce goods and services, and it is growing more and more interconnected every day. Demand is increasing as consumers want a greater variety of products as quickly as possible. To supply this consumer-driven economy, companies are extracting raw materials, manufacturing, and shipping goods faster than ever before. However, this rapidly growing global supply chain has sacrificed the health of people and the planet.

Sustainability does not sacrifice the quality of the product or amount of profits. Rather, it is the answer to one question: How do companies meet the needs of consumers today without compromising the needs of future generations?

Due to the recent exposure of workers' rights violations and an increasing emphasis on climate change, companies are beginning to focus on more than just financial profit. Many organizations are creating sustainable initiatives through their production processes in order to improve their brand's reputation. However, these companies cannot come out with a statement saying they will be more sustainable without substantiating it. They must create attainable and measurable goals that work towards creating sustainable solutions through the Triple Bottom Line of people, planet, and profit.

This project looks into current economic, environmental, and equitable challenges in the global supply chain and examines the partnerships businesses can make to create measurable improvements in their operations as well as the role of the Center for Sustainable Enterprise in moving towards a more sustainable future.

Raw Materials

The Earth's resources are finite. However, we currently source materials as if we have an infinite supply. As shown in Figure 1, from 1910 to 2014, the United States consumption of non-fuel raw materials rose 3.15 times greater than the population ("US Material Use Factsheet").

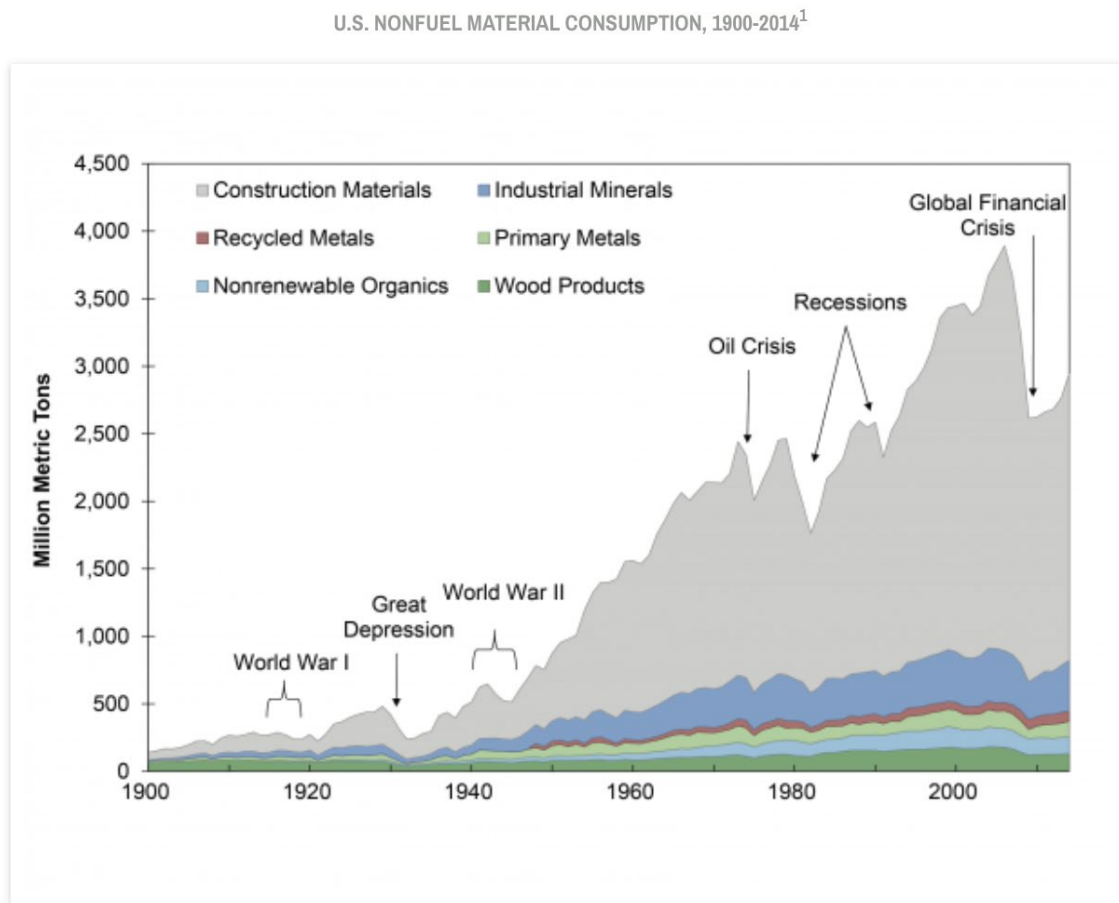U.S. NONFUEL MATERIAL CONSUMPTION, 1900-2014[1]

Figure 1.   Source: University of Michigan, Center for Sustainable Systems

This rapid rate of extraction and consumption of raw materials continues to grow exponentially. According to The Organization for Economic Development and Cooperation, by 2060 the world's consumption of raw materials will double.

Figure 2 depicts the impact of this increase on the materials used in the construction industry (Organization for Economic Co-operation and Development).

Construction materials dominate resource consumption
Consumption in gigatonnes

Legend: 2017, 2060 projection

Material	
Sand, gravel & crushed rock	
Metals	
Coal	
Limestone	
Wood	
Crude oil	
Cereals	
Fruits & vegetables	

Source: OECD Global Material Resources Outlook to 2060
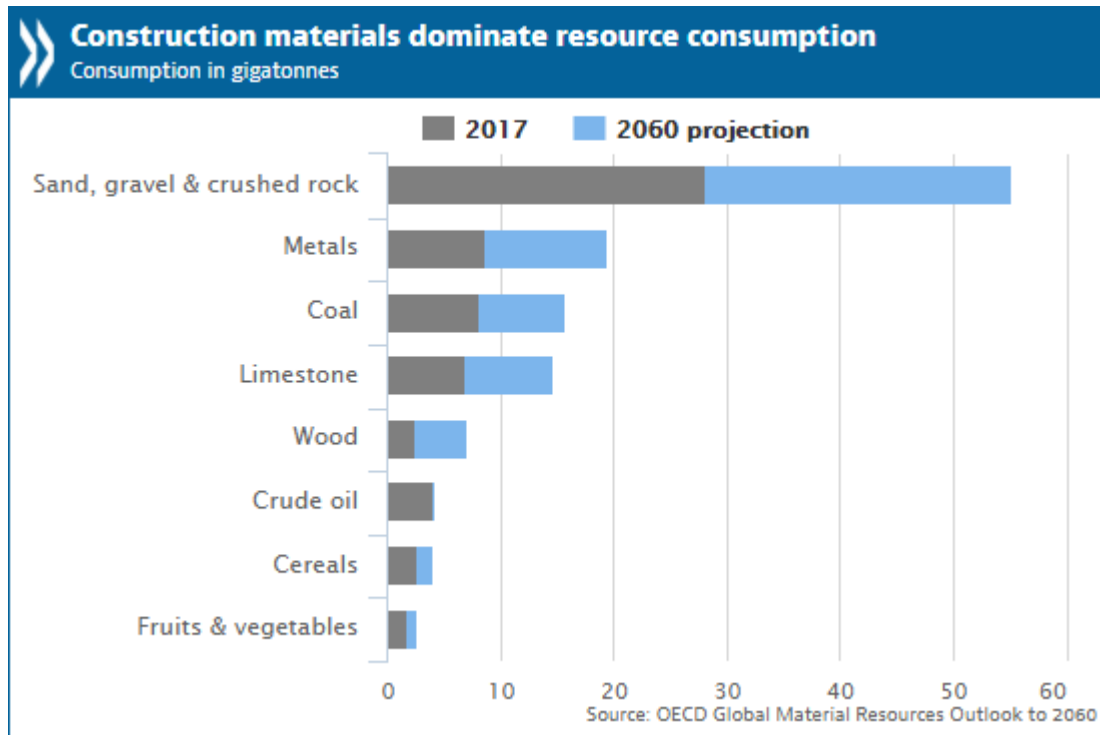
Figure 2.   Source: OECD

Additionally, technology continues to advance at unprecedented rates, increasing the demand for precious metals. However, as shown in Figure 3, the spike in production of electronic devices has also created a large waste of raw materials as consumers discard their old devices for updated technology (The Global E-Waste Statistics Partnership, 2018).
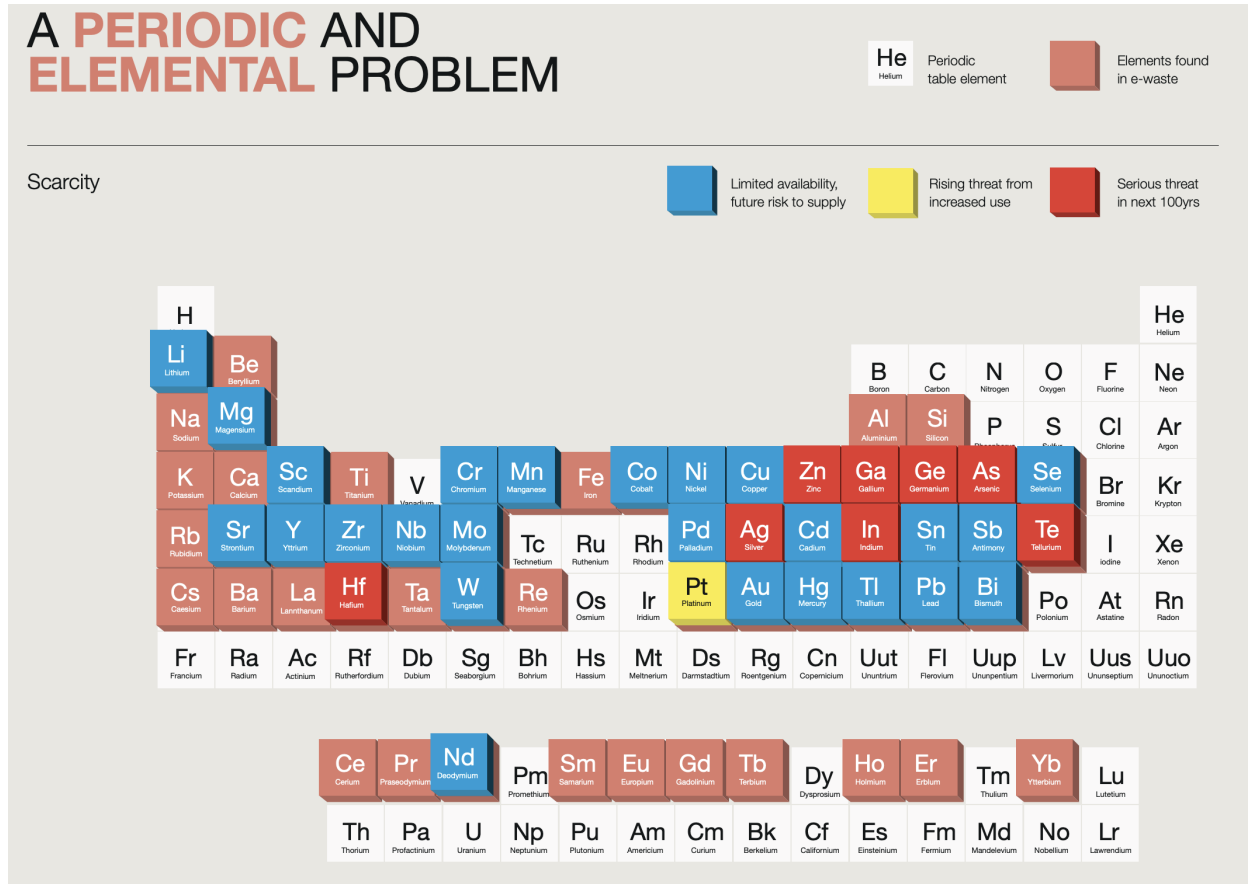

Figure 3.   Source: The Global E-Waste Statistics Partnership, 2018

In order to create sustainable solutions in materials use, companies must evaluate three components: ("US Material Use Factsheet")

1. The relationship between the rate of consumption and the amount of the resources readily available

2. The efficiency in the use of these materials

3. The amount of materials leaving the industry and negatively impacting the environment

4. Organizations such as the High Conservation Value Resource Network work with companies to execute these three steps and ensure they are using sustainably sourced materials.

Another challenge in the extraction of raw materials is the use of child labor. Two-thirds of the world's cobalt comes from the Democratic Republic of the Congo (DRC). However, Amnesty International reports that child labor is being used in the extraction of cobalt in the DRC in small scale mining which accounts for 10% of the country's production (Amnesty International). The government does not enforce regulation of cobalt extraction. Therefore, the responsibility of regulating these challenges is left to the businesses. Organizations such as The World Resource Institute are helping companies ensure there are no human rights violations in the businesses from whom they buy raw materials.

Another challenge in the extraction of raw materials is the production of palm oil. Palm oil is one of the most widely used products in processed foods. Demand for palm oil continues to increase because this material is extremely cheap. However, in order to create more palm oil farms, people are burning forests, emitting tons of CO_2 into the environment ("Global Reporting Initiative"). At the beginning of 2020, the Stockholm Environment Institute and Global Canopy partnered together to create the Trase Yearbook to evaluate the damage to the environment of highly demanded natural resources such as palm oil, soy, and coffee beans.

Manufacturing

People:

In 2013, Rana Plaza in Bangladesh collapsed due to structural failure, killing 1,134 factory workers and injuring over 2,500. This tragedy showed the effect of increased consumer demand on workers' safety in the global supply chain. As a result, European companies created the Accord on Fire and Building Safety in Bangladesh, and North American companies created the Alliance for Bangladesh Worker Safety. These agreements required factories to meet the safety requirements. However, many Tier 2 and 3 factories did not have the money to make the necessary changes, so they went out of business. Many factories that did make the changes cut the already low wages of their floor workers. While these organizations created safer conditions, since 2013, factory workers' wages have dropped 6%, less than a living wage.

European and North American companies have taken advantage of the cheap labor in Southeast Asia. However, they have not made considerable efforts to improve the lives of the people creating their products. One possible area of collaboration is to create a grant that factories can apply for that is used to create the safest work environment. However, this presents challenges as companies must be able to see where the money is allocated in the factories. In foreign manufacturing, many factories used forced or cheap labor, paying unfair wages. Large companies, including Nike and Adidas say they are committed to eliminating any factories with forced labor and unsafe conditions. Private factories in foreign countries are seldom regulated by their governments, so the business model is responsible for fair treatment of their workers.

Due to COVID-19, the garment manufacturing industry is facing new challenges. Major companies cancelled or refused to pay for orders that the factories had already produced. In turn, the factories did not pay their workers and 2.7 million factory workers were fired in April alone. With their already unlivable wages, it is impossible for these workers to have savings to rely on during this economic downturn. Additionally, workers who still have a job must decide if they go in to work and risk exposure to the virus or stay home and lose their job (Daily Mirror).

Carbon Emissions:

In Figure 4, RunRepeat demonstrates how manufacturing accounts for the largest carbon footprint in the global supply chain for performance shoes.

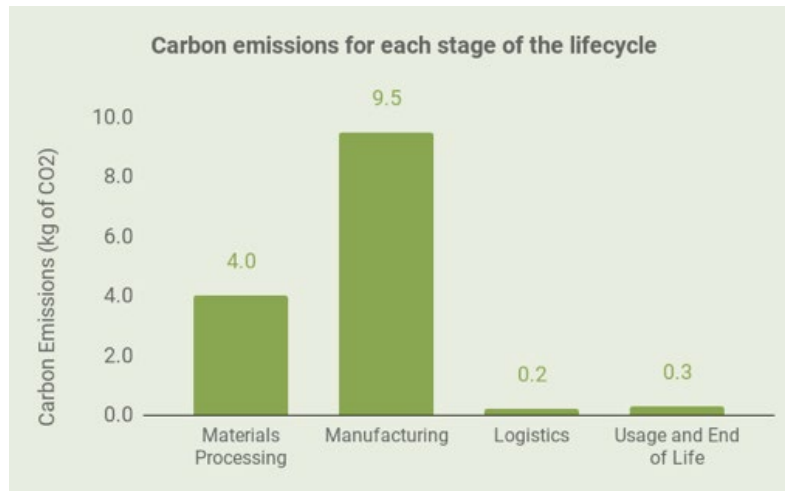
Figure 4.   Source: RunRepeat

In order to reduce their carbon footprints, companies must first identify exactly where they are emitting carbon, beginning with the raw materials and ending with the final consumer. They must then reduce their impact by implementing sustainable techniques such as the use of renewable materials. Organizations such as The Nature Conservancy and the Organization for Economic Development and Cooperation work with companies to measure their carbon footprint and develop practical solutions to eliminate harmful greenhouse gases.

The Built Environment and the Circular Economy:

Currently, factories and other buildings involved in the manufacturing process are not designed for reuse. Companies need to strive towards creating a circular economy, not only with their products, but with all other assets. This includes the built environment. When companies are building stores, warehouses, factories, and other structures involved in the supply chain, they must consider the materials they are using. They should aim to use fully recycled materials as well as materials that can be easily taken apart and repurposed when the building is no longer being used.

Transporting and Storing

According to the U.S. Energy Information Administration, the transportation industry accounts for 25% of the world's energy consumption with the U.S. consuming more energy than any other country. Green transportation systems as well as low emission technology are necessary to produce a more resilient global supply chain. By creating a more sustainable transportation system, we can eliminate harmful greenhouse gases produced by vehicles moving goods and people around the country.

Another pressing issue is the growing demand for faster transportation. Consumers want their product faster and faster. In the past, it took 5-7 business days to ship a product to the final consumer. Now, Amazon Prime has free two day delivery, which is still not fast enough for many customers. In certain cities, customers can have their purchases delivered in one hour. While an increase in the speed of shipping benefits consumers, it limits transportation options for producers. This often leads producers to ship products in a way that emits a greater amount of CO2 than if they were delivering the product with standard shipping time.

The International Energy Agency partners with the manufacturing and transportation industries to implement clean energy into every aspect of the global supply chain, without sacrificing the speed at which consumers receive their products.

Post-purchase

On July 21, 2020, Apple announced it would be carbon neutral by 2030. While this pushes the technology sector towards seeking sustainable solutions, it does not address the industry's biggest issue: e-waste.

In 2019 alone, over 50 million tons of e-waste, or used devices with a plug, cord, or battery such as phones, toasters, or computers, were generated worldwide. This number has increased 21% over the last 5 years. Much of this waste is due to buying cheaper products such as a $5 iPhone charger from Amazon that does not last. However, this growing problem is exacerbated due to planned obsolescence. Companies are not creating products with the intention of them lasting forever, but instead they plan for them to break in order for the customer to spend more money by buying a replacement. For example, if a company sells a customer a refrigerator that lasts forever, then that company will only generate a one-time profit from that consumer. However, if the company sells a product to a customer and a part breaks every few years, then the company generates a greater profit from each individual customer. While the company generates a greater profit, they are wasting materials.

As planned obsolescence is being exposed by consumers, many technology companies are now operating with perceived obsolescence in mind. For example, Apple claims to create durable, long-lasting products. While this may be true, they go out of style faster than a planned obsolescence product breaks. This idea is known as perceived obsolescence. The iPhone 7 has the same basic functions as the iPhone X, but society views the iPhone 7 as having significantly less value and utility because it is not the newest model. Additionally, Apple created a new charging port for their products. While the old chargers still work, they do not fit with the new products, so they become obsolete and thus are discarded as e-waste.

Electronics are the foundation of work and social life in the western world. If we are able to create a circular economy in this industry, we can save 54 million tons of waste each year. In 2019, only 20% of used electronics were formally recycled. Not only is this waste bad for the environment, but it is also dangerous to the communities in which these gadgets are left as they contain harmful materials such as mercury, lead, and cadmium (UN E-Waste Report 2019). This contaminates the soil and water, damaging the health of the local people.

Agbogbloshie, located in Accra, Ghana, is considered to be the largest e-waste landfill in the world. The United Nations estimates that western European countries as well as the United States ship 50 million tons of used electronics to this region every year. The 1.7 million people in Accra suffer from several skin diseases and ailments due to the contamination from the e-waste. However, the most widespread problem is respiratory illness because the air is densely polluted with hazardous chemicals. People remain working in Agbogbloshie because they have no other options for work. They suffer damages to their health, but they consider this a better option than dying of starvation ("The Toxic Effects of Electronic Waste in Accra, Ghana"). The crisis in Ghana is growing exponentially, and every individual with an electronic device plays a part in this landfill. This information must be made readily available so consumers are able to properly dispose of their devices.

The E-Waste Coalition is a group of seven UN entities including the International Labour Organization (ILO), the International Telecommunication Union (ITU), the United Nations Environment Programme (UNEP), the United Nations Industrial Development Organization (UNIDO), the United Nations Institute for Training and Research (UNITAR), the United Nations University (UNU), and the Secretariat of the Basel and Stockholm Conventions. These groups have come together to increase cooperation and more efficiently provide support to member states and parties to address the e-waste challenge. They are

supported by the World Business Council for Sustainable Development, the World Health Organization and the World Economic Forum and coordinated by the Secretariat of the Environment Management Group (EMG).

While e-waste presents itself as a challenge, it is also a massive opportunity. The e-waste generated in 2019 was valued at $62.5 billion. Technology is not a bad thing. In order to achieve all 17 of the Sustainable Development Goals, technology is necessary. However, wasting technology is a very bad thing.

Figure 5 shows the low recycling rates for the valuable elements used in technology (The Global E-Waste Statistics Partnership). We are throwing away valuable raw materials every day because there is a lack of awareness with how to deal with e-waste.
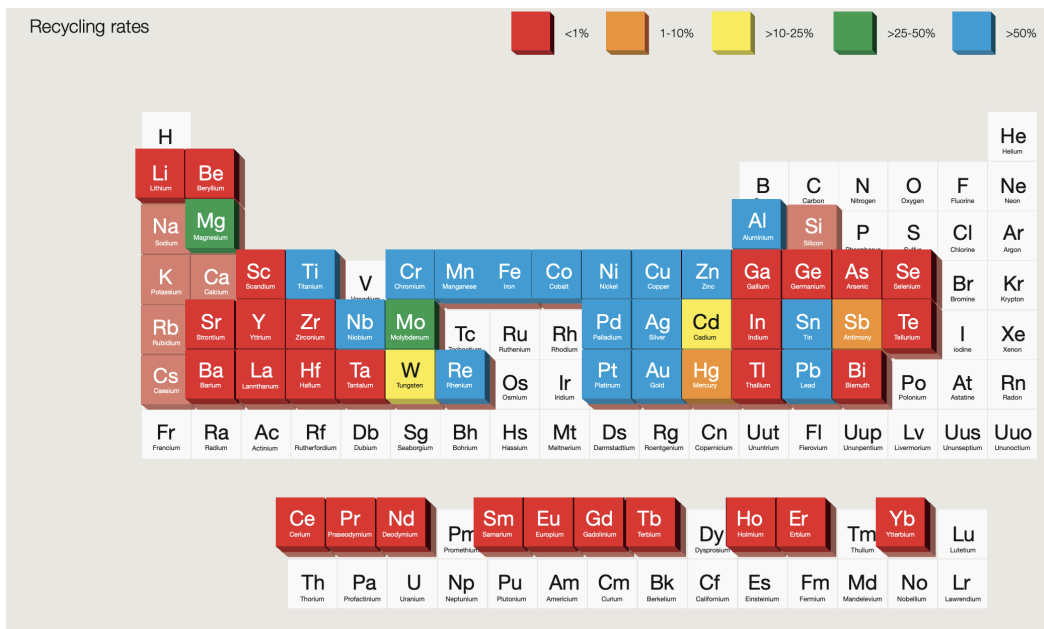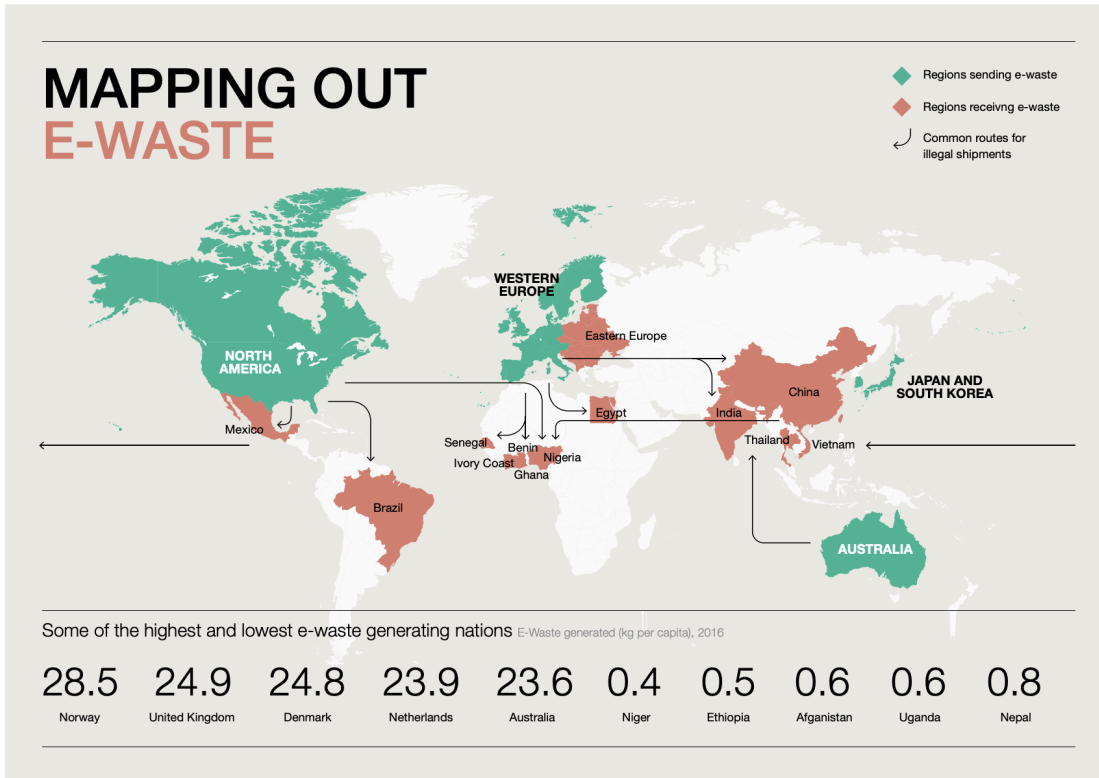

Figure 5.   Source: The Global E-Waste Statistics Partnership, 2018

Many of the current products that result in e-waste are made in south-east Asian countries. As shown in Figure 6, when consumers are finished with these products, they are shipped back to the countries in which they were produced.

MAPPING OUT
E-WASTE

◆ Regions sending e-waste
◆ Regions receivng e-waste
Common routes for illegal shipments

WESTERN EUROPE
Eastern Europe
NORTH AMERICA
JAPAN AND SOUTH KOREA
China
Mexico
Egypt
India
Senegal
Benin
Nigeria
Thailand
Vietnam
Ivory Coast
Ghana
Brazil
AUSTRALIA

Some of the highest and lowest e-waste generating nations E-Waste generated (kg per capita), 2016

28.5	24.9	24.8	23.9	23.6	0.4	0.5	0.6	0.6	0.8
Norway	United Kingdom	Denmark	Netherlands	Australia	Niger	Ethiopia	Afganistan	Uganda	Nepal

Source: Lewis 2011, The Global E-waste Statistics Partnership, 2018

Figure 6.   Source: The Global E-waste Statistics Partnership

If e-waste is dealt with in the country that throws it away, then companies save the money, energy, and fuel used in moving the products across borders multiple times.

Governments have proposed Extended Producer Responsibility, a policy that places significant responsibility on the producer to monitor the disposal of their products. While this policy forces suppliers to be involved in the post-purchase phase of the product, the only way to solve the e-waste problem is to educate consumers on the impacts of their actions.

Conclusion

Ultimately, the way to improve the global supply chain begins with transparency. Companies must know their exact impact on the environment and their impact on the communities they work in and around. This information must be readily available so consumers can make an informed purchasing decision.

Connectivity continues to increase rapidly in our world. With the technology and resources we now have, people are more connected than ever. Connectivity is the answer to the many challenges present in the global supply chain. There are so many organizations ready with resources and time to create sustainable solutions involving people, planet, and profit. However, they must be connected with the groups that need their expertise. The Center for Sustainable Enterprise is bridging the gap between the companies needing help and the organizations offering it.

The Center for Sustainable Enterprise can leverage its' unique position to create a meaningful impact in the sustainability movement to help the Chapel Hill and the Triangle become a beacon for other communities to look to when creating more sustainable practices.

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