Chapter 9: Sustainability

The APICS Dictionary app defines sustainability as "an organizational focus on activities that provide present benefit without compromising the needs of future generations."[49]

Sustainability has become a focus of companies around the world. As we discussed in the product design chapter, this idea of being concerned about the environment is not a new idea since Clemson University was working on a compostable Coca-Cola bottle as early as 1969. And Sun Chips produced a compostable chip bag as early as 2008 (only to pull it off the market quickly because of customer complaints of being too noisy).[50]

The concern for the environment can trace it roots to the Clean Water Act of 1972. The impetus for the Clean Water Act was several incidents. The first was the fires on the Cuyahoga River near Cleveland, Ohio in 1969.

> "On June 22, 1969, around 12pm, floating pieces of oil slicked debris were ignited on the river by sparks caused by a passing train. Specifically, following an investigation, the cause was determined to be the oily debris trapped beneath two wooden trestles, rigid support frames, located around the Campbell Rd. hill in Southeast Cleveland. The fire was determined to have reached heights of over five stories and lasted between twenty and thirty minutes. There was reported to be around $50,000 of damages including: $45,000 from the destruction of the bridge owned by Norfolk & Western Railway Co. and $5,000 from the Newburgh & South Shore Railway trestle."[51]

It was not until 2019, fifty years later, that the Cuyahoga River was cleared for fishing again. The second impetus was the contamination of the James River near Hopewell, Virginia, as a result of the dumping of Kepone, the key ingredient in the manufacturing of Agent Orange

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[49] For more on the APICS Dictionary app, go to the Apple Store or the Android Store.

[5050] See: https://channelsignal.com/blog/what-ever-happened-to-the-sun-chips-compostable-bag/

[51] https://ohiohistorycentral.org/w/Cuyahoga_River_Fire

used in the Viet Nam war as a defoliant. Kepone was determined to be a strong carcinogenic agent. Like the Cuyahoga River, it took decades to clear the James River for fishing.

ISO 14000 Family of Standards – Environmental Systems

"ISO 14001 sets out the criteria for an environmental management system and can be certified to. It maps out a framework that a company or organization can follow to set up an effective environmental management system.

Designed for any type of organization, regardless of its activity or sector, it can provide assurance to company management and employees as well as external stakeholders that environmental impact is being measured and improved."[52]\

The ISO 14000 standards help companies monitor, improve or establish environmental programs. "ISO 14001 is an internationally agreed standard that sets out the requirements for an environmental management system."[53] These standards are not the end all or panacea for environmental issues but at least provide a start point for improving environmental standards.

What is Sustainability?

Sustainability is a focus on what is now being dubbed the "Triple Bottom Line." For centuries companies have focused on making a profit. The labor movement of the early 20th Century brought to light the need to fairly treat employees – although one could argue that this issue got its start with the abolition movement in the United States in the 1800's. And one could argue that we still have labor treatment issues today.

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[52] https://www.iso.org/iso-14001-environmental-management.html

[53] https://www.iso.org/files/live/sites/isoorg/files/store/en/PUB100371.pdf

The "Triple Bottom Line" is a focus on the profits, the people in the organization and the environment. This is a relatively new term that started appearing around 2008. This new focus on more than just profits is critical to future success. Native Americans have asserted for centuries that actions taken have impacts on seven generations in the future. This focus on trying to protect the planet is critical to future generations. It is more than just the lip service given to carbon emissions and green house gases.

Sustainability is a corporate responsibility to ensure that there will be a livable planet in the future. It is not an overnight action as can be seen by the efforts to clean up the Pacific Trash Gyre – if it can be cleaned up, the estimates are for more than five years to clean up this area in the Pacific Ocean where the currents move the trash dumped in the ocean.

Electronic Waste as Part of Sustainability

Electronic waste is simply anything that is disposed of that has a plug or a battery. Electronic waste is a rapidly growing problem globally. "One-half of all **e-waste** is personal devices, such as smartphones, screens, computers, tablets and TVs, and the rest is household appliances and heating and cooling equipment."[54]

The European Union established directives in early 2000s to restrict the use of hazardous substances in manufacturing as well as the disposal of waste electronic equipment. The Waste Electric and Electronic Equipment Directive (WEEE) as originally released in 2002. It has since been updated several times with the latest version released in 2012 and went into effect in 2014. "WEEE is a complex mixture of materials and components that because of their hazardous

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[54] https://sdg.iisd.org/news/un-report-highlights-environmental-health-risks-from-e-waste-urges-circular-economy-shift/

content, and if not properly managed, can cause major environmental and health problems. Moreover, the production of modern electronics requires the use of scarce and expensive resources (e.g. around 10% of total gold worldwide is used for their production). To improve the environmental management of WEEE and to contribute to a circular economy and enhance resource efficiency the improvement of collection, treatment and recycling of electronics at the end of their life is essential."[55] The WEEE Directive ties back to our discussions of designing for the environment in product design and our discussions of reverse logistics. The goal of WEEE is not only to prevent hazardous materials being dumped into landfills, but to get companies to start thinking about the reuse of products when they reach their end of life. Designing for the environment and end of life will reduce. the e-waste contributions to landfills.

While only 2-5% of landfill materials are e-waste, approximately 95% of the toxins in the land, air, water, flora and fauna in the areas of landfills comes from the toxins found in electronic products.[56] The WEEE Directive sought to reduce this landfill contribution by mandating free return/recycling of electronic equipment and placed the onus on this free recycling on the manufacturer.

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[55] https://ec.europa.eu/environment/waste/weee/index_en.htm

[56] Walden, Joseph, *Environmental Impacts Associated with Current Methods of Re-Use, Recycling and*
Reclamation of Personal Computers and Cell Phones, The University of Kansas, 2012

In 2014, approximately 41.8 million metric tons of electronic waste was generated.[57] In 2016, there was over 44.7 million metric tons (a metric ton is 1000 kilograms or 2240 pounds) of electronic waste generated.[58] By 2020, that total has risen to 50 million metric tons.[59]

The United States does not have a national e-waste directive or regulation. There are statewide regulations in 28 states. However, the good news here is that those companies that are doing business with the European Union must be WEEE and RoHS Compliant.

Restriction of Hazardous Substances Directive (RoHS)

The European Union also implemented the Restriction of Hazardous Substances Directive to drive down and eliminate (with exception of medical and Military) the use of hazardous substances in the manufacturing of electronic products. Most of the substances on the RoHS listing are added to electronic products as fire retardants but are also carcinogenic in nature.

The latest revision of RoHS went in to effect in 2017 and had the goal of "The legislation also requires certain hazardous substances (heavy metals such as lead, mercury, cadmium, and hexavalent chromium and flame retardants such as polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE)) to be substituted by safer alternatives."[60]

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[57] https://tcocertified.com/news/global-e-waste-reaches-record-high-says-new-un-report/

[58] https://www.itu.int/en/ITU-D/Climate-Change/Pages/Global-E-waste-Monitor-2017.aspx

[59] https://tcocertified.com/news/global-e-waste-reaches-record-high-says-new-un-report/

[60] https://ec.europa.eu/environment/waste/rohs_eee/index_en.htm

Sustainability Functional Areas

Environmental stewardship

Every company has to take responsibility for their actions. This is especially critical when considering the impacts to the environment. This also includes looking at ways to reduce energy requirements, reduce packing requirements, reducing waste produced and reducing land fill contributions.

The Walt Disney Company takes this environmental stewardship very seriously. The company prepares an annual sustainability report to let shareholders and customers know what their goals are and how they are doing as shown in Figure 1 from their 2018 report.
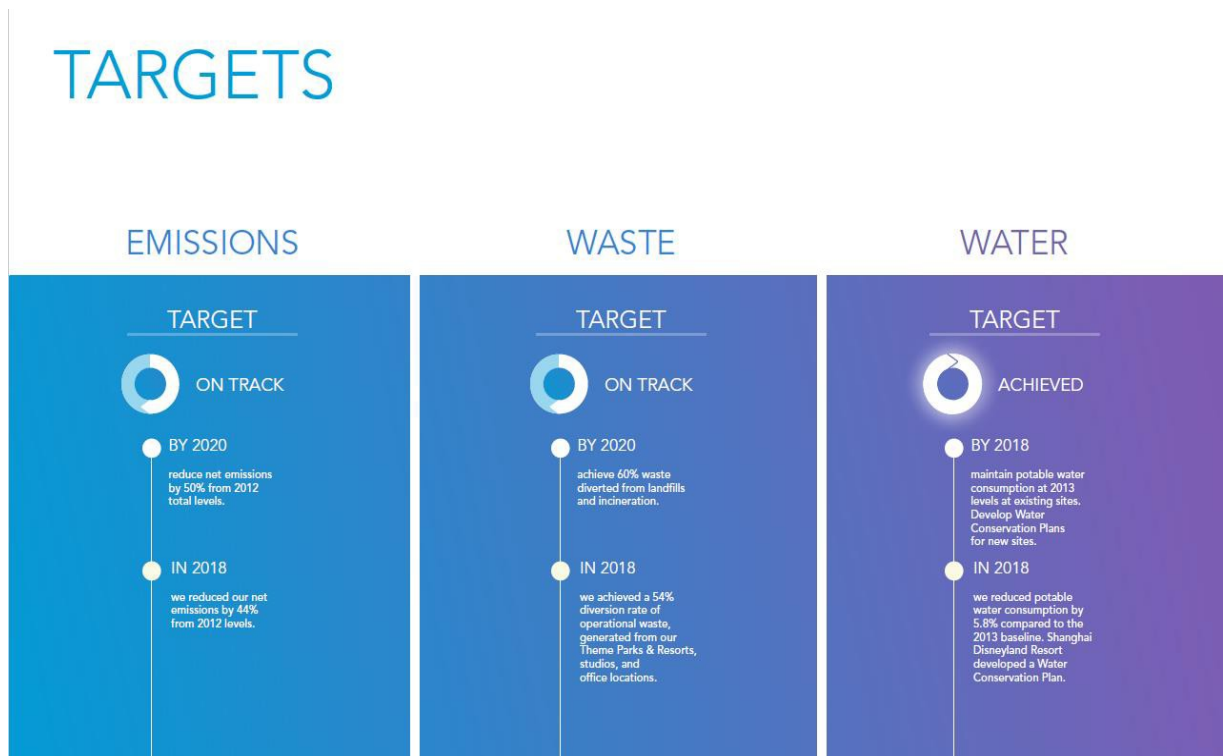

Figure 9.1: Walt Disney Company Environmental Goals and Achievement[61]

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[61] The Walt Disney Company, Social Corporate Responsibility Update, 2018, p. 4

In addition, Disney now has eleven resort hotels in Florida that have been LEED Certified (Leadership in Energy and Environmental Design). Prior to the closure from the 2020 pandemic concerns, Walt Disney World was contributing 50,000 pounds of food weekly to the local food banks and were working towards they goal of zero landfill contributions.

Conservation of resources

This aspect ties back to our discussions of product design and designing for the environment. Natural resources are finite. Anytime a company can reduce the energy requirements for manufacturing, take advantage of solar or wind power, or reduce the packaging requirements for a product, they are helping to conserve natural resources.

Reduction of carbon footprint

This one has received a lot of attention over the past decade as companies have worked to reduce their carbon footprints. It also gave rise to the idea of carbon footprint credits and the ability to sell these credits to other companies. This appears to be a zero net gain or lack of improvement if one company can simply sell their credits to another company thus no real reduction in the carbon footprint.

Financial savings and viability

Consumers want to do business with companies that practice ethical business practices as we discussed in earlier chapters. They also are moving toward wanting to do business with companies that are actually working on green initiatives. This move by consumers to green companies is producing more business. At the same time, the move to green activities is saving the companies on waste removal and in the case of companies that are donating products it also provides a tax break.

Social responsibility

Amazingly, almost every company's ethics statement contains something about social responsibility. As more companies adopt green practices and focus on the triple bottom line, there is more pressure for other companies to do the same.

The Circular Economy

The latest buzz word in business is the **circular economy**. Just what is a circular economy? This concept ties to our previous discussions on product design and reverse logistics. The circular economy is "an economic system intended to minimize waste and maximize the use of resources through a regenerative process achieved through long-lasting design, maintenance, repair, reuse, remanufacturing, refurbishing, recycling, and upcycling."[62]

What does that mean? The circular economy ties in product design, life cycle analysis, end of life analysis and disposition, and sustainability. The circular economy seeks to eliminate land fill contributions, carbon emissions and e-waste while seeking to reuse as much of the components of a product as possible. An example of this can be seen in Figure 9.2 with the stop signs and other road signs being produced from the recycle printer cartridges. These road signs are more durable than the traditional aluminum signs and because they are not aluminum, they are not stolen as often as traditional signs.

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[62] APICS Dictionary app, "circular economy"

Figure 9.2: Road Sign from Recycled Printer Cartridges

Summary

This area of operations and supply chain management is becoming more important daily as more consumers become concerned about the future of the planet. Everyone in business will need to become a sustainability manager in the future. Figure 9.3 shows the relationships between sustainability and business success.

Beyond the obvious benefits of reducing overall carbon footprint, and reducing energy and resource consumption, there are many other reasons why organizations should care about sustainability in their supply chains:

Better bottom line — research and experience has proven that sustainability significantly improves financial results.

Consumers and Wall Street recognize the importance of green practices and sustainability -- which more and more drives increased sales and share valuation.

Governmental initiatives in the United States and elsewhere provide tax and investment incentives to companies that employ sustainable practices. In a growing number of regions of the world, sustainable practices are governmentally mandated as law. This trend is escalating rapidly.

Sustainability is equated with corporate social responsibility and stewardship – with being a good global citizen. The positive public relations exposure from identifying and implementing sustainable supply chain practices can yield numerous benefits for companies.

Suppliers and corporate customers are increasingly requiring sustainable practices of their vendors.

The elimination of waste in the supply chain is a hallmark of sustainability.

http://www.sustainable-scf.org/

Figure 9.3: Summary of Sustainability

Thought Questions and Ideas:

1. Research the Great Pacific Trash Gyre. What can be done to help reduce/eliminate this issue?

2. Research your favorite company. What is their corporate social responsibility program? Do the even have one?

3. Why is ethics and corporate sustainability linked?

4. Think about the discussions of JIT, product design and sustainability: how are they related?

5. Why is sustainability important?

Section 3: Source

Source in the SCOR Model is anything that involves the procurement, sourcing and for our discussions will include quality. While quality cuts across all of the SCOR functions and could very easily be part of the discussions related to planning, we will place it here with Source as it is critical to source quality products and components.