



1.2 Theories Related to Sustainability

1.2 Theories Related to Sustainability

The newer approach to CSR takes a systems theory perspective, which means that responsibility is related to interconnectedness and includes a wide range of actors. By discussing theories that underpin CSR and sustainability, this book moves from describing the goals of CSR to describing tactics for achieving them.

Before detailing the benefits of building a sustainable business or organization, or how sustainability feeds and motivates CSR, we discuss the roots of some CSR and sustainability ideas. Most great ideas emerge dependently, with roots in other disciplines. Similarly, many believe that corporate sustainability stems from a mind-set called systems theory.

Systems Theory: A Foundation for CSR and Sustainability

Systems theory or **general systems theory** operates on the fundamental idea that all phenomena exist as a network of relationships among elements in a system. Also, all systems, whether social or biological, have common patterns. These theories therefore involve identifying and considering connections between different groups, such as ecological systems, social systems, and biological systems. Elements of systems theory relate to classical philosophy. Today biologist Ludwig von Bertalanffy is probably the best and most noted systems theorist. He published *Perspectives on General Systems Theory* in 1975. In it, he argues that all systems share certain characteristics. Common elements include inputs (such as raw material), throughputs (such as shaping the raw material), and outputs (a final product ready to be sold). A system can be defined by what it takes in, what it changes, and what it puts out. For example, a lumber company takes in rough-cut trees (input); then employees dry, saw, and plane the wood (process); after these processes, the firm offers a final product in the form of lumber (output). For a less tangible example, consider a communication system. There are inputs (words and signals); throughputs (listening to or recording the words and signals); and outputs (additional words and signals that are ideally related to and link with the inputs).

As mentioned, systems theory operates on the fundamental idea that all phenomena have a network of relationships with common patterns. The notion of patterns leads us to the second set of ideas in the family of systems theory that we call complexity theory. While the ideas seem closely related to biology and life sciences, business advisors such as Peter Senge (1990) and Margaret Wheatley (1992) have written a great deal about the importance of systems theory in business thinking and planning. To understand the relationship, we first need to describe complexity theory.

Complexity Theory: Another Precursor to Sustainability

Complexity theory refers to a general theory of systems that describes how corporations, or any changeable structures, adapt to their environment and cope with conditions of uncertainty (Gleick, 1987). This theory helps us understand why sustainability is such a precious and fragile commodity in business. Complexity theory provides a lens through which to view all systems, including organizational ones such as corporations. Complexity theory stems from observing nature; its central tenet is the idea that all systems are organic and emergent (or that they constantly grow and change). Someone who notices patterns in a business organization within a dynamic market and says, "This organization has a life of its own" is knowingly or unknowingly recognizing a key theme of complexity theory (Hammond, 1997).

How does such a seemingly vague idea relate to business and CSR? An organization that builds cars or creates chemical compounds (or any product or service) operates in ways bounded by resources, talent, and market opportunity. Owners and managers can change somewhat over time, but the paths for change are limited—a car manufacturer cannot keep its core resources, talents, and market opportunities and become a real estate firm. While firms can change, we cannot predict which path an organization will take. Each managerial decision, each corporate action leads to a new set of complex realities.

Consider how Ray Anderson turned Interface Carpet from a waste-producing organization to one with almost zero waste. Doing so required a change in his mentality and awareness. He took an unpredictable path and gained an outcome not foreseen by his employees or his competitors. Thus, the ideas of complexity theory and systems theory come together to suggest that it is possible to move business from the typical unsustainable behaviors commonly practiced today and move toward the sustainable and restorative practices of the future. Systems theory and complexity theory provide a bridge for understanding how the past need not determine the future of business. Consider the following description of complexity theory:



Strive For Quality at the Source

The seventh concept of continuous improvement in the Shingo model relates to the others because its focus is to assure quality at the source. Perfection can only be achieved if every element of the work is done right. This means that quality is measured from the source or the supplier, all the way through the process, to delivery. Managers who encourage coworkers to ensure quality inputs, throughputs, and outputs and to focus on goals emphasize quality at every part of the process, not just at the outcome.

Think Systemically

The eighth Shingo principle moves into the area of enterprise alignment and encourages all leaders and employees to think systemically (another nod to systems thinking). It is essential to thoroughly understand the relationship within and between different parts of the organization, in order to make better decisions and improve. In the Shingo model all levels of the organization are encouraged to know about the interrelationships of all the other levels of the organization. Typically, sustainable organizations are not congested hierarchies, but rather flat structures that require less administration, bureaucracy, and communication.

Create Constancy of Purpose

The ninth principle in the Shingo model relates to creating a constancy of purpose. The goal of this principle is to create unwavering clarity about why the organization exists, its direction, and its purpose, as well as the role and value of all those involved. The underlying idea relates to the concept of unity—that is, in order to create a consistency of purpose, people need to innovate, adapt, and take risks together.

Foster Value for Customers

The tenth and final principle in the Shingo model stipulates that employees must create value for customers. The customer represents the systemic connection to the market. Ultimately, the customer defines the value created and demonstrates that belief by purchasing or otherwise interacting meaningfully with the product or service. Thus, all organizational members benefit from trying to adopt the customer's perspective. Organizations that fail to effectively and efficiently deliver on what is most important to the customer typically fail.

Of course, the Shingo model represents just one of many methods companies can employ to keep continuous improvement central to the organization. Some companies choose deliberately from the available options, while others may utilize some key principles without adopting all of them. Companies that formally embrace and train employees on continuous improvement methods tend to experience more consistent market success and gains.

An early and excellent example of a sustainable manufacturing organization in the United States is New United Motor Manufacturing, Inc. (NUMMI) in Fremont, California. NUMMI was originally the site of the General Motors (GM) Fremont assembly plant; it was closed down until GM and Toyota launched a joint venture to manufacture vehicles marketed by both brands. GM considered the venture an opportunity to learn from Toyota about how to manufacture high-quality smaller cars, while Toyota sought its first North American manufacturing base and the opportunity to deploy the Shingo model in production with American workers. When the NUMMI plant reopened in 1984, 70% of the hires came from the laid-off GM workforce. Many of the former GM employees were sent to Japan to learn the Toyota Production System that embodies the Shingo principles. Within weeks of opening, the NUMMI factory produced cars with fewer defects per 100 vehicles than those produced in Japan (Imai, 1986). Employees reduced waste and were happy, and product quality was high. Plant owners and the workers' union engaged in joint activities that benefited the community, showing that the new system had implications beyond the factory boundaries (O'Reilly, 1998).

One important lesson from the NUMMI plant experience relates to continuous improvement principles, which can lead to higher sustainability and corporate responsibility. These principles are not culturally embodied in Japanese, Chinese, Korean, German, or any other culture. Anyone willing and motivated to learn the principles can apply them to multiple areas. Some United Automobile Workers Union members who worked for GM in the previous plant almost destroyed the plant with a lack of productivity, acts of sabotage, and poor behavior. Yet those same employees, inspired by a system of listening, empowerment, and improvement without conflict, created one of the most successful manufacturing sites in history (O'Reilly, 1998).

Continuous improvement, coupled with and informed by ideas from systems thinking,



Respect Every Individual

The first principle in the Shingo model involves respecting every individual (Shingo, 1986, 1987). When people feel respected, they willingly dedicate effort, mind share, and loyalty to organizational efforts, which typically increases effectiveness. Individuals are respected when organizations nourish employee potential (by offering them training and development, good leadership, advancement options, and fair and transparent procedures). Respect is also evident when companies invest in employee health, safety, diversity, and co-ownership. This can range from simple processes to cutting-edge activities that lead in social responsibility and corporate sustainability (or at least the social side of both).

Lead With Humility

The second Shingo principle involves leading with humility. Leaders, including senior management, need to continuously learn and listen to people within their organization. As an active listener, a good leader acknowledges that he or she does not and cannot know everything. Leaders who embrace humility tend to take a more open and learning-orientated approach to each conversation and interaction with coworkers—and this applies to coworkers at every level of the organization. A possible result of doing so is generating better solutions that include a wide range of ideas; another is benefiting from more engaged and involved employees who each feel they can make a substantive contribution because leaders listen and care about new input.

Aim for Perfection

The third Shingo principle involves seeking perfection. Of course, this introduces a duality because such a goal is unattainable, as systems are dynamic. However, while the goal remains lofty, seeking perfection requires a leader to continually improve to bring the organization closer to sustainability. Many companies have expanded the perspective on what is possible; as they continually focus on perfection, they find new opportunities, technologies, and ideas that lead them forward. Expanding goals can also help achieve new heights.

Focus on Process

The fourth Shingo principle calls for a focus on process (Shingo, 1986, 1987). Many organizations that do not use Shingo or similar principles primarily focus on output and fail to fully analyze or consider how employees arrived at that output. However, a more responsible and sustainable company continually evaluates internal processes in order to control the use and flow of inputs and outputs. Focusing on the process means studying the value and consequence of each step in any manufacturing or service-creation process. Focusing on process also means breaking operations into steps and dependencies in order to evaluate which steps (if any) can be eliminated, simplified, improved, or otherwise changed. Companies with a focus on process tend to be more humane places to work, because managers do not blame people when outputs fall short; rather, they consider how the process forced a less-than-optimal outcome. When there is less blame, a culture of effort and safety can flourish (Liker, 2004).

Embrace Scientific Thinking

Organizational leaders seeking to be socially and environmentally responsible by applying Shingo (or similar) principles learn enough about themselves and the organization to gain insight into what is really going on at work, as is illustrated by the fifth Shingo principle, which revolves around embracing scientific thinking. In management, scientific thinking means using data and clear measurements to verify assumptions. It involves forming hypotheses, creating tests, gathering data, creating new hypotheses, and making direct observations. A key part of the kaizen process involves going to the *genba*. In Japanese, this means going to "the place where things are happening." Applying the idea of the *genba* to CSR and sustainability means that more sustainable choices come from frontline employees who are doing the work, rather than from some manager who is far removed from day-to-day activities and processes. More generally, the idea applies to CSR and sustainability because it suggests that people must analyze the heart of all processes to better understand why they exist, what purpose they serve, and how they might change.

Consider Flow and Pull Value

The sixth principle in the Shingo process relates to waste. The principle of waste deserves its own discussion (see next section) because the topic of waste, or eliminating it, drives most initial CSR and sustainability behaviors. The sixth Shingo principle does not use the word *waste*. Rather, the associated phrase is *flow and pull value*, which indicates that companies strive to maximize value for customers. Companies create value in response to real demand in a continuous and uninterrupted process of products and services. Waste is considered anything that disrupts the pull and flow of products and services, and thus the topic of waste is implied rather than explicitly stated. We discuss types of waste in greater detail later in this chapter.

Strive For Quality at the Source

1.3 Continuous Improvement

There are essentially two choices when managing a business—one can either stay the same and gradually decay over time or purposely enact a cycle where the business gradually or dramatically improves. To strategically decide to analyze all processes with the intent to understand and improve them is to commit to continuous improvement in business. In this case, *improve* means to *adapt* to the changing environment and become more efficient and innovative with the business's inputs and throughputs. Simply put, dynamic organizations that prevail in the market continuously improve. Consider, for example, how if a company wins awards one year, those award-winning behaviors become expected and status quo the next year; to win the next award, the company must do something more than before.

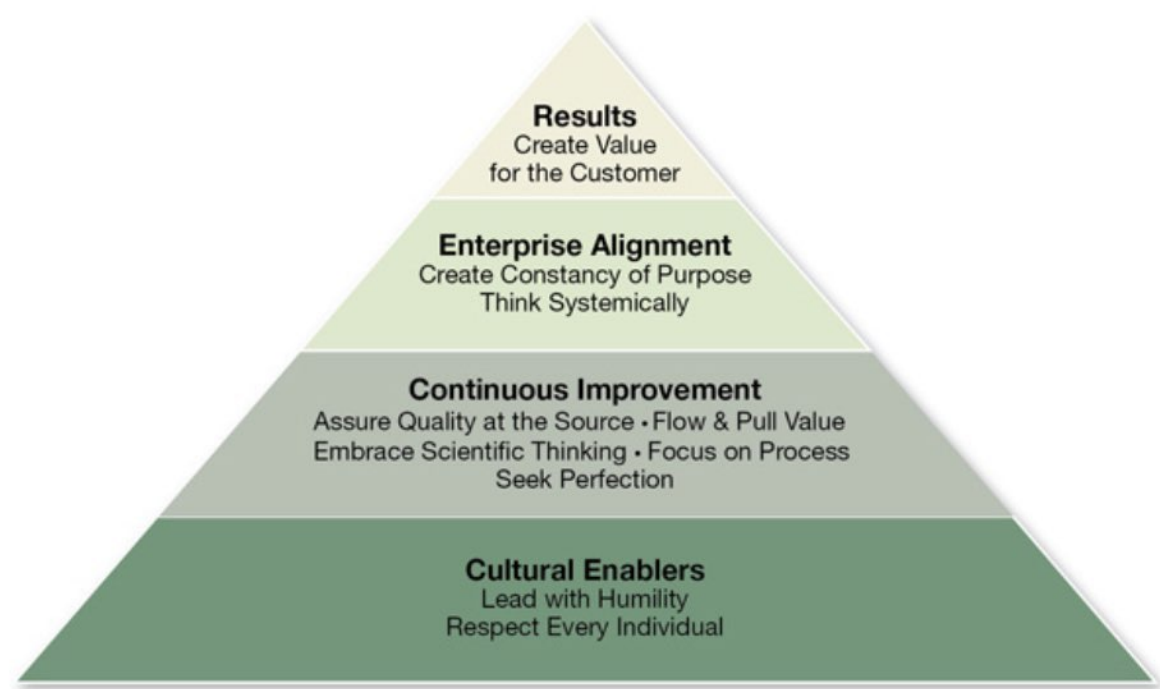
Operations management classes teach a number of specific processes that firms adopt to formally enact continuous improvement. Two examples of such programs are the Shingo model and Six Sigma. These programs emphasize ongoing adaptation as the only way an organization can adjust to a changing environment and the only way to sustain financial stability, customer loyalty, employee dedication, and lower environmental impact (Shingo, 1986, 1987).

At the core of such continuous improvement is a concept called *kaizen*, which means "change good" or "change for good" in Japanese. Kaizen became famous in the United States from Masaaki Imai's 1986 book, *Kaizen: The Key to Japan's Competitive Success*. Continuous improvement concepts are similar to those described previously that relate to general systems theory. That is, they are focused on continuously adapting inputs, processes, and output to reduce waste and improve sustainability.

The Shingo Model

The **Shingo model** represents one of the more useful and successful change management or kaizen systems. Based on the work of Dr. Shigeo Shingo, who brought the Toyota Motor Corporation to manufacturing prominence in the 1970s and 1980s, the model takes a specific approach to operations and continuous improvement. It is based on 10 principles that begin with the social and human side of business. The Shingo model differs from other kaizen systems in that it starts with the human dimension, while still including economic and environmental dimensions, in order to help organizations find long-term ways to become sustainable. The 10 Shingo principles fall into four overarching categories. The categories and principles build on and reinforce each other—the cultural enablers and human emphasis form the model's basis, and all additional principles build on that foundation (see Figure 1.1; Shingo, 1986, 1987).

Figure 1.1: The Shingo Model



Source: Shingo Institute—shingo.org. Reprinted with permission.

Respect Every Individual

The first principle in the Shingo model involves respecting every individual (Shingo, 1986, 1987). When people feel respected, they willingly dedicate effort, mind share, and loyalty to

1.4 Defining Waste

multiple people to waste motion. Think of all the movement required to stop what you are doing to move to another place to attend an unnecessary meeting.

Increased motion on the part of employees (and to a lesser extent, on the part of machines) also introduces the possibility for accident and diminished work safety. While safety is a principal concern for many manufacturing and service organizations, the most common impact that work has on our bodies is related to long-term motion or lack of motion. For example, some work environments feature prolonged sitting or cause problems related to eye strain and computer work. Many companies have taken steps to offset these impacts by adding standing desks to work areas and building exercise rooms in their office space.

Overprocessing

The eighth kind of waste involves *overprocessing*, which occurs when employees or machines perform work not requested by the customer. This can include adding components and features that were not requested or making the product too precise, more complex, or of higher quality than expected or paid for. For example, much of today's technology is overprocessed. There are too many features in particular software or too many capabilities on a phone or a laptop computer; typical customers do not need most of these features. This makes the product excessively complex and adds to its cost.

In the service industry, overproduction means providing customers with something they did not want or need. Airlines, for example, have stopped providing services such as inflight hot food or luggage transportation for customers who do not want those services. In addition, the same firms charge customers a per-service fee when they want such services. Implementing pay-for-service fees can reduce wasted resources and direct resources exactly where they are needed; this can reduce wasted motion and can lower costs for airlines and consumers.

In addition to the eight types of waste commonly covered by the Six Sigma process and taught by Six Sigma certification programs, two other types of waste result from providing a product or service. The first relates to environmental pollution, and the second to overregulation.

Overregulation



Reed Saxon/Associated Press

Klean Kanteen is an organization that strives to reduce waste by promoting reusable water bottles.

Waste occurs when regulations create workflow and operational changes that misuse, reroute, or otherwise direct resources to activities that do not create value or revenue. Regulations exist to prevent corporations from damaging the environment, causing harm to employees or customers, or breaking the law. Yet even regulatory authorities can lose sight of a regulation's original intentions. For some companies, regulations that require excessive documentation, one-off routines to demonstrate compliance, or the purchase of non-value-added products can over time result in wasted resources (time, money, effort) that ultimately slow business.

Environmental Pollution

Every time we put something in the air, in a landfill, or in the ocean, we not only degrade the value of the air, land, and water, we create health problems or potential health problems for animal and plant life. Environmental pollution differs from the other types of waste because such pollution can come from manufacturing processes or the end-of-life fate of goods. Recycling offers to recover what was once waste into something that adds value. Chapter 2 offers an in-depth discussion of the responsibility that businesses have toward the environment and describes the environment as a stakeholder in the business.

Transportation

Transportation, or unnecessary movement, represents a fifth kind of waste. Of course, all products need to be moved to reach customers, but with each move, the company risks products being damaged, lost, or delayed. A good example of a lean company that pays close attention to transportation costs is the 7-Eleven company in Japan. Transportation costs in Japan are particularly high because of the country's narrow roads and high fuel prices, so 7-Eleven never opens a store that is more than 1 mile from another store. This allows stores to cluster close to each other and reduces transportation costs related to stocking products. 7-Eleven stores in Japan also employ a particularly innovative inventory-control system that requires daily deliveries to each store. As customer needs are anticipated and product restocked quickly, transportation savings dominate stocking and logistical decision making.

In most parts of the United States, buying local products has become a way to reduce the transportation costs associated with manufactured goods and agriculture. Buying locally and reducing or eliminating transportation costs can reduce people's and companies' carbon footprint. Services have transportation costs as well, particularly when consultants travel extensively to reach destinations and stay in hotels while making site visits. Technology helps mitigate transportation service costs, as teleconferencing and videoconferencing enable people to achieve face-to-face communication in real time without travel and other transportation expenses.

Inventory

Inventory is a sixth form of waste and relates to the overproduction waste discussed earlier. It may seem strange to claim inventory as a form of waste, but inventory in the form of materials, works in progress, or unfinished goods represents an investment in raw materials that has yet to translate into a sale or shipment to a paying consumer. For example, retail businesses have sales to move inventory when the cost of storing goods becomes too high. Phrases like "going out of business" and "everything must go" trigger assumptions that the retailer is offering significant savings (or selling at prices lower than the cost of manufacture); often this sale occurs because the company needs to reduce the cost of holding inventory.

In service industries, inventory excess is when people are hired to provide a particular service but are not needed. A restaurant without customers is not only losing product by attrition, but employees are being paid and sitting idle waiting for patrons. When firms can use technology and marketing to better manage customer flow and match service delivery to customer needs, they can significantly limit service inventory waste.

Motion

The seventh type of waste involves physical motion. This type of waste differs from transportation, which refers to product damage and transportation costs. *Motion* refers to the damage the production process inflicts on the person or machine creating the product or service. Having too complicated a mechanical process—such as when a process uses a lot of parts that must be cleaned, serviced, and tuned—adds to the cost of creating a product. Similarly, workers who use too many motions or move inefficiently also add to a product's cost, especially when they suffer repetitive motion injuries or spend too much time manufacturing too few products. In the service industry, consultants who spend too much time and energy on unnecessary research or conduct unnecessary meetings can cause multiple people to waste motion. Think of all the movement required to stop what you are doing to move to another place to attend an unnecessary meeting.

Increased motion on the part of employees (and to a lesser extent, on the part of machines) also introduces the possibility for accident and diminished work safety. While safety is a principal concern for many manufacturing and service organizations, the most common impact that work has on our bodies is related to long-term motion or lack of motion. For example, some work environments feature prolonged sitting or cause problems related to eye strain and computer work. Many companies have taken steps to offset these impacts by adding standing desks to work areas and building exercise rooms in their office space.

Overprocessing

The eighth kind of waste involves *overprocessing*, which occurs when employees or machines perform work not requested by the customer. This can include adding components and features that were not requested or making the product too precise, more complex, or of higher quality than expected or paid for. For example, much of today's technology is overprocessed. There are too many features in particular software or too many capabilities on a phone or a laptop computer; typical customers do not need most of these features. This makes the product excessively complex and adds to its cost.

In the service industry, overproduction means providing customers with something they did not want or need. Airlines, for example, have stopped providing services such as inflight hot food or luggage transportation for customers who do not want those services. In addition, the same firms charge customers a per-service fee when they want such services. Implementing pay-for-service fees can reduce wasted resources and direct resources exactly where they are needed; this can reduce wasted motion and can lower costs for airlines and consumers.

In addition to the eight types of waste commonly covered by the Six Sigma process and taught by Six Sigma certification programs, two other types of waste result from providing a product or service. The first relates to environmental pollution, and the second to

Overproduction

Overproduction represents a second kind of common waste. Overproduction occurs when manufacturers create too much of any particular good or service. A common practice that leads to overproduction is when companies utilize the *batch system*, which means they manufacture something in predetermined amounts regardless of how many customers order. When a customer requests a certain product, a factory may produce more than the customer requested. The factory does this assuming some other customer will want the same product.

However, when the firm must store excess product and the product exists as unsold inventory, it takes up space, ties up resources, and wastes money. Many consider overproduction to be one of the worst types of waste because it includes other waste. For example, overproduction wastes time, resources, effort, raw materials, transport, and storage, and it creates landfill.

Waiting

The third kind of waste relates to waiting. We have all experienced the waste of waiting in line, for example. When we are forced to wait for a late train or plane, a response from a company representative, or receipt of a good or service, we experience *waiting waste*. The time spent waiting is generally time that is not value added; in fact, the principle of the "time value of money" implies that time spent waiting has a cost, because we could have used that time doing something that could have earned money.

Similarly, if a product sits on a shelf in inventory, it is not generating income for a company but rather incurring storage and security costs. For this reason, the best manufacturing companies are those that have relatively few items in storage. Such firms bring in supplies and convert them to product to immediately ship, without wasting time getting it to the customer or wasting resources in storage.

As firm managers increasingly understand the costs associated with storing inventory, managers increasingly compare storage costs with shipping costs. In fact, they often choose to use shipping services rather than store products. For example, consider a company that uses a warehouse to hold products before shipping them to customers. After applying the Shingo principle of scientific thinking and analyzing data, the company realizes that most customers request 5-day shipping to save money. However, keeping the product for several days costs the company money because storing it requires a facility that must be air conditioned and heated and must have security to keep warehoused goods from being stolen. However, if the company ships the product using 1-day shipping, the firm eliminates the need for any storage or warehouse facility. By offering customers free 1-day shipping, the company eliminates warehouse costs, lowers customer wait time, and improves customer service.

Skills and Underemployment

Underutilized talent represents a fourth form of waste. When managers do not see or utilize the talents and expertise of employees, the latter become less energized and engaged with their work. Distracted employees who use work time and resources to find other jobs, complain to other employees, or listlessly accomplish tasks can waste the money paid to them in salary, create a culture of negativity, and/or make mistakes and errors that create waste and rework expenses. In addition, employees in such positions feel the pain and expense of wasted potential and may feel like a misused human asset—a feeling that can generate negative emotions and even have negative health impacts (iSixSigma, 2016). Many people have had the experience of receiving services from people who are disengaged, which can stem from many sources, including employees being underutilized or incorrectly assigned to a position. Managers have several options to mitigate such problems: First, they can accurately screen candidates and take advantage of job-matching services, which can help place people properly at the outset of an operation. Secondly, they can undertake employee satisfaction surveys and run employee engagement activities, which can increase the connection people feel with work, or at least with the workplace and coworkers. Finally, in jobs where all parties understand that the work feels menial and repetitive, managers can offer compensatory benefits and/or frequent job rotations, which provides a way to support and invest in employees even when managers cannot change the nature of the tasks. People may come to enjoy or at least accept working a menial job because they feel engaged by interesting training programs, good benefits, or valuable on-site facilities.

Transportation

Transportation, or unnecessary movement, represents a fifth kind of waste. Of course, all products need to be moved to reach customers, but with each move, the company risks products being damaged, lost, or delayed. A good example of a lean company that pays close attention to transportation costs is the 7-Eleven company in Japan. Transportation costs in Japan are particularly high because of the country's narrow roads and high fuel prices, so 7-Eleven never opens a store that is more than 1 mile from another store. This allows stores to cluster close to each other and reduces transportation costs related to stocking products. 7-Eleven stores in Japan also employ a particularly innovative inventory-control system that requires daily deliveries to each store. As customer needs are anticipated and product restocked quickly, transportation savings dominate stocking and logistical decision making.

In most parts of the United States, buying local products has become a way to reduce the transportation costs associated with manufactured goods and agriculture. Buying locally and



1.4 Defining Waste

Simply defined, **waste** refers to a product that has zero value. Waste takes the form of pollution to the environment, unfulfilled human potential, or missed market opportunities. Waste represents activity with no benefit. The more waste an organization creates, the further it moves from sustainability and responsibility. Also, waste is usually costly for the firm and sometimes for society at large. Creating waste can be viewed as irresponsible and even unethical. Learning to avoid waste or turning it into something of value is a key principle in CSR and sustainability.

Architect, designer, and sustainability expert William "Bill" McDonough educates people about the concept of zero waste using the phrase "waste = food." This means that waste in one part of the organization could become input (or food) for another part of the organization or sold to another firm to use as an input. Through this concept, waste becomes a potential resource for other systems or organizations. Waste can be an asset that can be sold or reused, rather than a liability and a cost. This is the foundational principle of materials recycling; when applied to more systems, processes, and products, however, it can mean more than recycling paper, glass, and plastic—it can lead to positive change, significant savings, and cutting-edge innovation.

The easiest way to identify waste is to attend to the waste disposal system. For example, consider an electronic components factory in which many cable stubs were noticed in the wastebaskets near each workstation. Employees indicated the waste came from trimming cables within the electronic component. Employees were taking wires off a spool using a rough measurement (or by "eyeballing" the length) and distributing them to each workstation. They then measured accurately, trimmed the wires to length, and installed them on the component.

This process resulted in three kinds of waste. First, measuring the cable twice was a waste of time. It also was a waste of energy, because employees were trimming wires that had already been cut from the spool. Third, the process wasted materials, as each long strand of cable had segments trimmed off each end.

After realizing these levels of waste, the factory workers and managers worked together to change their processes. They started taking an accurate measurement when wire was first cut from the spool. This change allowed each worker to increase his or her daily output. It not only allowed the firm to save money on materials, it put less waste in the landfill.

Firms seeking to be sustainable and to take social and environmental responsibility for their operations pay vigorous attention to systems that help identify where, when, and how to eliminate waste. A useful example of such a system is the total quality improvement program called Six Sigma.

Waste and Six Sigma

Six Sigma refers to a disciplined, data-driven methodology for eliminating defects in any process, from manufacturing to service. It follows formal steps, often requires specific training and certification, and can be applied throughout a company or in a single department. The Six Sigma process identifies eight different kinds of waste found in organizations. We also discuss two additional types not always included in standard Six Sigma descriptions.

Defects

The first kind of waste involves *defects*. Defects occur when manufacturers create products that do not meet minimum manufacturing or customer standards or when the service fails to produce the desired results. Most defects result in a loss for the company and the consumer.

Almost everyone has experienced a defect in service. An example of a defect in service is when you miss a meeting because an airline overbooked a flight. You paid to get to the meeting but did not receive the benefit of attending the meeting. Similarly, if you purchase a car that does not work, you incur the cost of buying and maintaining the car without the benefit of using it. Defects in service or products frustrate customers as well as the people who make the product or provide the service. Requesting and granting defect-related refunds costs money and represents the waste of having made a product or provided a service without generating actual benefit. Defects increase the price of manufacturing, and the cost can be passed on to the consumer by increasing the cost of the product or service.

Overproduction





1.5 Characteristics of Sustainable Corporations

What constitutes a socially responsible and sustainable company? Some people think these terms are too broad and therefore lack meaning. But characteristics of sustainable companies can form a starting point to give the terms meaning. The remainder of this section will discuss the seven characteristics of sustainable corporations.

First, a sustainable company has a long-term time horizon. Second, such a firm conceptualizes its relationship with people, including employees, expansively. Sustainable businesses are more likely to pay employees a living wage, provide health care benefits, engage in philanthropic activities, and reward productivity. They provide growth opportunities for employees, including tuition reimbursement, health benefits, training, and promotion opportunities. As part of the relationship element, such firms support social causes. They do not abuse relationships nor manipulate unions and other communities.

An example of such a company is Google, which has long been seen as a top place to work—it has made the top of *Fortune* magazine's "best company to work for" list 4 years in a row. Famous for offering catered meals and clean work environments, Google carefully monitors all aspects of worker well-being. In doing so, it noticed that the attrition rate among female employees was higher than that among male ones and set out to understand why. Google found that women who had recently given birth were leaving at twice Google's average departure rate. Therefore, instead of offering an industry-standard 12-week maternity leave, new mothers are now offered 5 months off with full pay and all benefits. Such a change was designed to attract and retain female workers. While the long-term results of such a policy remain unknown, the analysis and resulting policy changes reflect how a CSR, sustainability, and profit mind-set can work in concert.

Thirdly, managers in such firms regard the environment as something to be valued and often take what is called a *full cost* or a *true cost* approach to accounting. Instead of considering natural inputs as free goods, this approach tries to reflect the actual costs of air, land, and water used by the firm. Thus, sustainable businesses conceptualize the relationship with the natural environment differently than traditional businesses. They take proactive positions on reducing their carbon footprint. They see the environment not as a resource to be exploited, but as a gift to be carefully stewarded and restored whenever possible. They not only engage in practices that protect the environment, but also encourage employees to reduce packaging and other waste.

Fourth, sustainable firms may have a different kind of relationship with the government, both by accepting appropriate regulation and opposing overregulation. While they accept appropriate government regulation in areas that protect the environment and employee rights or ensure honesty and fair business practices, they also resist attempts by government to overregulate and cause waste.

Fifth, sustainable businesses attempt to adapt, regenerate, and reinvent themselves. In other words, they have a higher capacity for change because they see change as essential. Change means continuously improving and setting aspirational goals. Returning to the story of chief executive officer (CEO) Ray Anderson at Interface, he set an aspirational goal for his firm: to become a *restorative* company that leaves communities and the earth better than before the firm's involvement. Goals such as these create the opportunity for sustainability and CSR to overlap and complement each other.

Sixth, sustainable businesses have a unique relationship with suppliers and customers. They try to move the product from a supplier, through the business, and on to the customer with maximum efficiency. This means less time or waste in warehouses; it also means meeting customer expectations so that the relationship with the customer persists over time. Sustainable businesses may spend less money on marketing because keeping consumers can be less costly than acquiring new ones. Some sustainability practices also garner free press, which can be more valuable than paid press and can further reduce sales and marketing expenses.

Finally, sustainable businesses have a higher capacity for change. They seek to become more efficient, effective, and innovative, and in the process they may reduce costs and capture new and improved forms of value. This sometimes means that they are able to dramatically reduce a product's cost. Sustainable businesses follow new technologies, change, and adapt, and managers help partners and customers change and adapt. Owners and managers see business as a way to create wealth not just for themselves, but also for employees and suppliers. They take pride in adding value for customers and serving customers in a way that exceeds their expectations.

