CHAPTER 8

Delivering Value via Sustainable Supply Cycle Strategies

CHAPTER OBJECTIVES

A. Introduction

STARBUCKS

Consumers can buy coffee anywhere, but there is no mistaking the ambiance and aroma that surround a Starbucks. The company that revolutionized the way we buy coffee has also been working behind the scenes to ensure that its rich coffee will continue to be available in more than 40 countries across the globe for a long time. The company is committed to minimizing its impact on the planet, and it is passionate about sharing this commitment with its partners throughout the supply chain.

The Starbucks Shared Planet program is an environmental commitment that recognizes that conservation should occur throughout the supply chain—from coffee growers in Guatemala to recyclers in Seattle (Figure 8-1). On the supply side, Starbucks has worked in conjunction with Conservation International for 10 years to develop Coffee and Farmer Equity (C.A.F.E.) Practices. CAFE consists of 24 comprehensive, measurable standards designed to enable suppliers and farmers to become sustainable sources of coffee. Growers are required to meet criteria for product quality, ethical accounting, social responsibility, and environmental leadership. The program has paid huge dividends for growers, who become able to strengthen their marketplace positions and exercise some control over transformation of their organizations and operations.[1]

In 2008, 77%—295 million pounds (651 kilograms)—of the coffee Starbucks bought was purchased from suppliers verified and approved under C.A.F.E Practices guidelines.[2] The average cost of $1.49 per pound ($3.28 per kilogram) is 5% above the average price for C-grade Arabica. This price enables producers to increase their quality of life in terms of improved housing, enhanced education, and increased investments in their farms. Moreover, the stability realized through stable incomes reduces the need to migrate for employment.[3]

The premium price on the supply side has enabled the company to refund some portion of the price back to suppliers. In contrast to many performance standards, growers are rewarded (rather than penalized) for meeting sustainability standards. Growers must have third-party verification of their performance on the C.A.F.E. Practices Generic Scorecard, and this performance is reviewed annually.[4] In 2008, for example, 13% (38 million pounds/17 million kilograms) of the coffee purchased from C.A.F.E. Practices suppliers came from new and existing suppliers who had improved their scores by 10 percentage

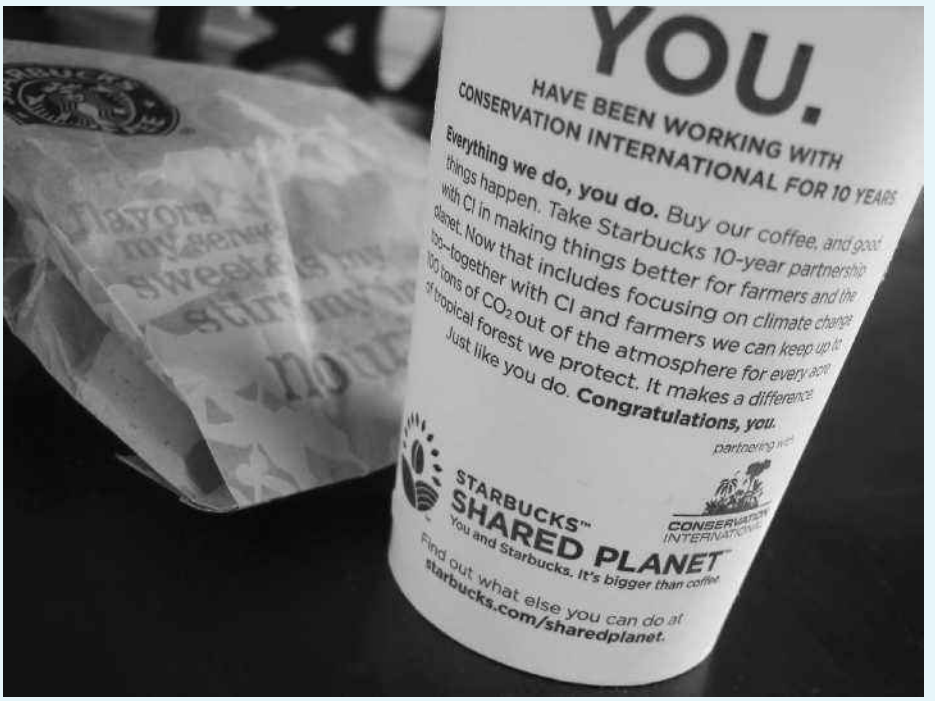


FIG. 8-1 Starbucks Shared Planet Program

Source: © *Terri Miller/ E-Visual Communications, Inc.*

points or more. These suppliers were rewarded with an additional $1.9 million in premiums over contract prices.

Starbucks' ecological commitment has enabled the company to establish sustainable sources of supply to meet its rapidly growing demand while simultaneously providing a systematic response to consumer concerns about social and environmental facets of production[5]. The environmental commitment is carried throughout its distribution channels. The company takes stock of its greenhouse gas emissions and recognizes that 75% of its footprint is associated with electricity for stores, offices, and roasting plants; 24% is associated with store operations and coffee roasting; and less than 1% is related to corporate jets and vehicles. Starbucks is also aggressive about postconsumer waste and has a goal to use 100% recycled cups by 2015.[6]

The Starbucks example illustrates how companies can take command of their supply chains to deliver value to consumers. In this chapter, we examine the role of distribution as a central facet of efforts to achieve sustainability. Consistent with our focus on marketing as the means by which firms offer value to consumers, we focus in this chapter on the distribution function as the way by which the firm delivers value to consumers. We begin by diagnosing the elements of the supply cycle, from raw materials procurement to postconsumption disposal. We then outline several benefits that firms realize when they attempt to raise the sustainability of their distribution efforts. We subsequently outline green marketing activity associated with logistics. We close the chapter by describing the role of ISO 14000 in the firms' efforts to attain sustainability.

B. Diagnosing the Elements of Sustainable Supply Cycles

Supply cycles support virtually every marketing product delivery across industries. The supply cycle for textbooks, for example, includes the timber industry, soybean farmers (who supply raw materials for ink), paper producers, ink manufacturers, printers, book binders, wholesalers, retailers, teachers, students, and recycling centers. An understanding of supply cycles requires that one appreciate both the *organizations* involved in making a product available for sale and the *functions* performed by these organizations. An understanding of the functions performed within the cycle is highly germane to efforts to raise sustainability. In efficient supply cycles, these functions offer benefits to some member of the supply chain. As discussed in Chapter 1 in the treatment of the *triple bottom line*, these benefits may be associated with heightened economic, social, and financial performance. The sustainability of the organization, however, derives from the simultaneous pursuit of these alternative facets of performance in the triple bottom line. When one has an understanding of the benefits derived from each function, then one can work toward developing environmentally friendly supply channels that offer heightened benefits throughout the value chain.

In many industries, the functions performed within the channel are ascribed to specific organizations. For example, the auditing function to some degree is associated with accounting firms. Although in many cases one can eliminate an organization from the supply cycle, one cannot eliminate the value derived from the activities performed by an organization. Thus, a textbook manufacturer may elect not to use retailers, but then the sale of books to students must be achieved via the Internet or other means. In the following section, we outline a series of activities performed in a supply cycle, and we treat these entities as separate organizations. We present these activities as separate but recognize that in many cases, one organization will elect to perform multiple functions in the supply cycle. For example, Starbucks Coffee is a retailer that owns most of the supply cycle from coffee bean processing to retail operations[7].

Academic research offers a number of definitions for the delivery of value. The marketing definition of a **channel** describes it as a set of organizations involved in the process of making a product available for consumption.[8] Similarly, logistics frames the supply chain as a set of organizations linked directly to the flow of products and information from a source to the consumer.[9] Both of these definitions incorporate the specific entities that direct products to consumers, but they do not emphasize the value that derives from product offerings. By contrast, Porter describes a value chain as the set of primary and support activities performed by the firm to serve as sources of competitive advantage.[10] A company achieves a competitive advantage by understanding how its channel provides value to the consumer. Although this perspective provides keen insight into efforts to deliver value to consumers, it does not specifically address the relationship between value and the environment.

We define **supply cycles** as the "set of entities associated with yielding environmental, social, and economic value from resource procurement through resource processing, consumption, and postconsumption." Our definition incorporates the logic of the value chain described by Porter, and it incorporates the logic of supply chains and distribution channels in logistics and marketing strategy. This definition calls for understanding of the input–output process at each stage of the supply cycle

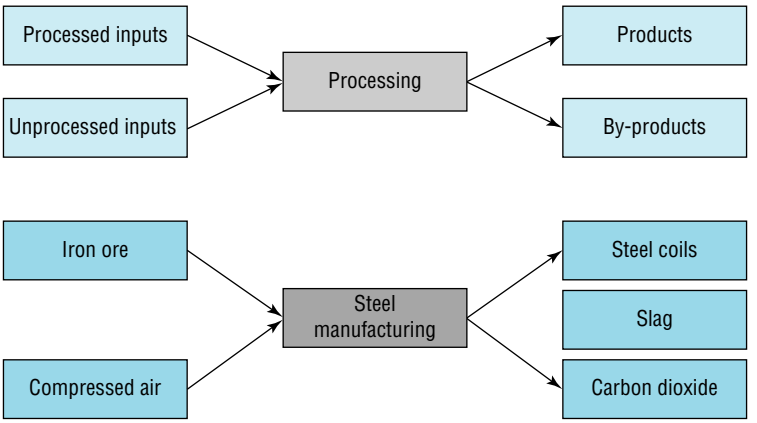


FIG. 8-2 Inputs and Outputs at One Stage of the Supply Cycle

as well as an understanding of the value chain (Figure 8-2). The input–output process presumes that each level of the supply cycle (manufacturer, retailer, consumer) engages in some sort of processing. There are inputs to processing and there are outputs.

Every entity in the supply chain has two forms of input and output. Inputs include those factors processed by an entity higher in the supply chain, and they further include resources (e.g., water, air) obtained from the environment. Every entity in the supply cycle has two types of outputs—products and by-products. Products are the focal outcomes of processing, and by-products refer to all other results of processing. For example, the steel manufacturing process outlined in Chapter 14 describes iron ore and compressed air as input to steel production. These inputs are combined in a series of processes that yield steel coils as the product output and by-products that include slag and carbon dioxide. To the extent that the steel manufacturers find uses for these by-products, they are able to increase revenues and lower their costs of operations. Thus, if the steel manufacturer is able to market the slag to the concrete industry, the steel manufacturer eliminates the costs of slag disposal while achieving increases in revenue. In addition, the slag by-product of steel production lowers the carbon footprint cost of the road production industry.

We refer to the process of delivering value as a supply cycle due to the relationship between the environment and the product development process. Ultimately, inputs are derived from the environment and outputs are returned to the environment. Product outputs are the motivation to engage in the supply cycle, and these outputs become inputs to the next stage of the supply cycle. The by-products either become inputs to other supply chains or they are returned to the environment.

Since the environment is both the source and result of supply chain activities, the complete cycle of the value chain must incorporate consideration of the environment. For example, Figure 8-3 describes a simple (one raw material) supply cycle for bicycle production. At each stage of the process, the entities involved in the

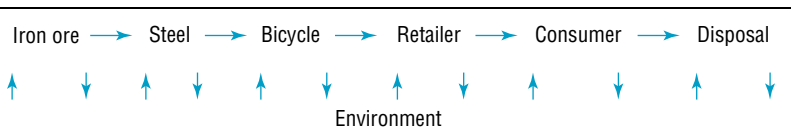


FIG. 8-3 Inputs and Outputs Across a Supply Cycle

supply cycle provide product inputs to the next stage of the cycle. These entities derive their value either from processing at an earlier stage of the supply cycle or from the environment. Thus, the bicycle manufacturer gets steel from a metal producer, but bicycle production also relies on water derived from the environment. At each stage of the supply cycle, an entity interacts with the environment, both collecting and sending materials. An entity such as a retailer produces by-products that are either employed in other supply chains or returned to the environment. To the extent that these outputs are incorporated into other supply chains, the entity can derive revenue from the by-product. In contrast, by-products that do not have value in supply chains must be transferred back to the environment. These outputs do not generate revenue, but they increase the cost of operations.

Viewing the delivery of value as a supply cycle provides the opportunity to examine the specific outputs and their inherent costs and benefits. Consistent with this perspective, Walmart developed a **sustainability scorecard** in 2007 that identifies 14 categories of products or processes with the greatest environmental impact.[11] These 14 categories are associated with the firm's goals to use 100% sustainable energy, achieve zero waste, and market sustainable products. The firm has subsequently increased its use of solar panels and natural lighting as forms of sustainable energy, and it has pioneered innovations in material handling in its efforts to reduce waste. The firm has also adopted many sustainable technologies such as the exclusive sale of ultraconcentrated detergents.

C. Benefits of Sustainable Supply Cycles

The focus on the triple bottom line provides the opportunity to address multiple advantages that accrue due to sustainable supply cycles. Consider the following benefits associated with responsible supply cycle management.[12]

Better Working Conditions, Reduced Turnover, and Improved Product Quality When an organization takes the time to investigate the firms and activities within its supply cycle, it has the opportunity to identify the conditions under which raw materials are transformed into consumer products. For example, the Mayflower Vehicle System PLC is a Birmingham, England-based subcomponent assembler in the British auto industry.[13] In its analysis of the sustainability of operations, it addressed the waste associated with shop floor operations. Consideration of waste included defective parts (per million), personal productivity, frequency of stock turns, delivery schedule achievement, equipment effectiveness, value added per person, and floor space utilization. Change agents realized that these waste reductions goals were more palatable to employees when the employees were endowed with a sense of ownership over processes and equipment associated with the jobs. Thus, the review of operations to achieve heightened levels of sustainability yielded better working conditions, a social facet of the triple bottom line. Better working conditions also yield economic returns in the forms of lower employees turnover[14] and enhanced product quality.[15]

Improved Efficiency and Profitability The pursuit of sustainability in the delivery of value calls attention to the inputs and outputs associated with every level of the supply cycle. By focusing on efforts to reduce inputs and maximize the productivity of outputs, the firm has tremendous opportunity to raise profitability. Packaging exemplifies a number of ways in which sustainability can influence profits. By employing efficient packaging, the firm reduces warehouse, distribution, and

transportation costs. Efficiency can be achieved by lowering the amount of fiber in packaging via package designs that are lighter in weight and use less corrugated board. Efficiency can also be realized by using reusable packaging and through the automation of case forming and stretch wrapping of pallets of materials.

Another innovative example of packaging sustainability is in club stores such as Sam's Club. The packaging that is employed at these stores often functions as a shipping container and display package. Optimal packaging in these stores ensures defect-free delivery, enhanced shelf appeal, and lowered store waste. Together, these benefits raise the productivity of retail space while simultaneously reducing overhead.

Better Management of Risk Firms that understand their liabilities are better positioned to limit their exposure to risk. *Risk* refers to variations in possible outcomes and their likelihoods.[16] Assessment of liabilities includes analysis of supply cycle disturbances and their negative consequences.[17] Lowered risk can be associated with cost avoidance, lower insurance premiums, reduced legal and regulatory costs, and preferred rates on loans.[18]

In the supply cycle, risk emerges from the value stream, asset considerations, interfirm networks, and macroenvironmental issues. Analysis of risk in the value stream takes into consideration the flow of materials, information, and money in the supply cycle. Firms evaluate the sourcing and processing of products and by-products (including waste) by upstream partners in the value cycle. In addition, organizations also assess the consumption and postconsumption practices of consumers of their products. **Asset considerations** refers to conditions under which a firm invests in specific technologies that have limited use outside of their intended purpose.[19] When organizations embrace global supply specialization of processes, they face greater risk associated with quality control and security of component supplies.[20] Interfirm networks call attention to the degree to which one is dependent on other organizations in the supply cycle. When firms are highly dependent on other organizations, they face greater levels of risk that should be controlled via contracts or strong working relationships with stakeholders. The **macroenvironmental issues** refer to the overall level of risk encountered in the social, economic, and natural environments.

Although these four levels of risk may be viewed independently, there is an interaction among these contingencies. For example, cash flow in the personal computer industry is influenced by the investments that software companies make in the dedicated operating systems of Microsoft and Apple. As these investments appreciate, the software firms become more dependent on the architects of the operating system.

Enhanced Brand Reputation Firms that invest in sustainable practices in the supply chain develop positive brand reputations that pay dividends in multiple relationships. For example, Cisco Systems has developed a strong reputation as an industry supply chain leader. In this firm's supply network, almost 90% of the production is delivered by someone other than a Cisco employee.[21] Cisco's proactive approach to the supply chain fosters strong working relationships with a few suppliers. Their supply strategy also involves listening carefully to customer requests, monitoring technological advancements, and offering customers a range of options.

Stakeholder Returns Increased Organizations that focus on the triple bottom line have the ability to anticipate and monitor risk associated with economic, social, and environmental returns. By engaging dialogue with both upstream partners and

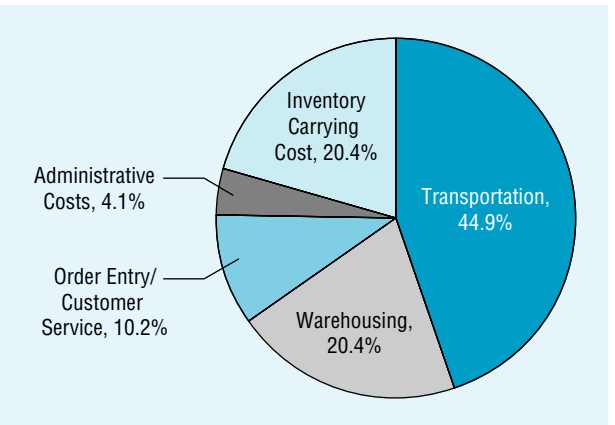
downstream consumers, Cisco has been able to establish strong interfirm relationships. In addition, it is able to maintain a very low level of turnover in volatile high-technology markets.[22] Consequently, this firm and others that nurture strong supply cycles are more attractive to investors because they are better equipped to manage these multiple facets of risk than their competitors.[23] Attention to supply chain sustainability also reduces the likelihood of a firm encountering criticism or other reprisals from NGOs and communities.

D. Sustainable Logistics

Logistics refers to the process of planning, allocating, and controlling human and financial resources dedicated to physical distribution, manufacturing support, and purchasing operations.[24] Distribution communications, inventory control, materials handling, order processing, parts and service support, plant and warehouse site selection, procurement, packaging, return goods handling, salvage and scrap disposal, traffic and transportation, warehousing and storage, customer service, and demand forecasting are activities associated with the logistics function. To gain an appreciation of the role of logistics, consider the fact that this function represented almost 10% of the United States' gross domestic product in 2006. On average, logistics represent 9.9% of the costs to the firm,[25] and these expenditures are primarily associated with transportation, warehousing, order entry/customer service, administration, and inventory carrying costs (see Figure 8-4). Firms gain competitive advantage from the assets they possess and via capabilities that enable them to deploy these assets advantageously.[26] Analysis of the logistics function provides the opportunity to assess these assets as well as their deployment from their point of origin to consumption.

Although logistics has traditionally been associated with the flow of goods toward consumption, **reverse logistics** that trace products back from the point of consumption have increasingly been addressed in supply chains.[27] The interest in reverse logistics has been prompted by concerns about returned goods, proper disposal of end-of-life products, production planning and inventory management, and supply chain management.[28] In 2005, the total cost of returns was estimated to be

FIG. 8-4 2007 Average Company Logistics Costs



Source: *Based on Hoffman, William (2007), "Logistics Redraws Efficiency,"* Traffic World, *271 (51/52), 19–21.*

$100 billion, and roughly 70% of this merchandise was not defective but was returned for some other reason (e.g., wrong color, size, minor package defect). Recognizing the high cost of returns, Walmart set a goal in 2008 to end defective product returns among its largest 1,000 suppliers in less than four years. The company plans to use on-site audits, enforcement of social and environmental standards, and the threat of lost business to support efforts to realize this goal.[29] A perspective on reverse logistics provides the opportunity to examine the influence of return goods, and it further provides the opportunity to determine the extent to which promotional campaigns, product life cycle issues, and retail inventory levels influence supply chain decisions.[30]

Given the magnitude of logistics and the effect of logistics management on the cost of operations, it is imperative that the firm view this function as a source of sustainable competitive advantage. Increasingly, firms interested in enhancing triple bottom line performance examine the following facets of logistics:[31]

Fleet Optimization The costs associated with product transportation are extensive, and since most forms of transportation rely heavily on fossil fuels, this facet of logistics is highly germane to sustainability concerns. Organizations are making a host of efforts to curb this function carried out either within the firm or via third-party suppliers. Importantly, optimization of the fleet cost is achieved by limiting the cost of transportation as well as by limiting the amount of travel undertaken by these vehicles. For example, in 2007 Staples installed governors on all of its fleet vehicles. These governors capped the speed of delivery trucks at 60 miles per hour. After installing these devices, the company realized a 25% savings in fuel economy and cut diesel fuel costs by 500,000 to 750,000 gallons. Similarly, UPS implemented a system several years ago that trained drivers to map their routes to turn right whenever possible. This simple strategy saves fuel, reduces emissions, and yields safety advantages because drivers do not have to cross traffic. In addition, left turns require more idling time waiting for oncoming traffic, whereas right-on-red regulations help save fuel. UPS estimates that in 2007 the company saved 3.1 million gallons of fuel and eliminated 32,000 metric tons of emissions via the right-turn policy.[32]

A second means by which to lower transportation costs is associated with the planning of the distribution function. When organizations take into consideration the relative location of the ultimate consumer and the firm's distribution centers, they can get aggressive about the costs to deliver product to consumers. For example, Procter and Gamble reassessed its staging and distribution costs and reduced the number of distribution centers by 200 locations.[33] In the process, the firm was able to deliver products to consumers in a more timely fashion.

Energy Efficiency Beyond the costs of transportation, firms can also achieve higher levels of efficiency by controlling the energy utilization at distribution and production centers. Enhanced efficiency is realized due to the use of advanced building materials. New construction that focuses on the design of airtight facilities enables companies to limit waste associated with heat and cooling losses.[34] For example, in the United Kingdom, ProLogis has developed a warehouse for Sainsbury's, one of England's largest grocers. This facility features wall-mounted photovoltaic panels that generate electricity, solar walls that produce heat from sunlight, an on-site power plant that reuses the heat produced by air conditioning, an on-site recycling facility, energy-efficient lighting, and air-tight construction that minimizes energy loss.

Innovative Technology Several innovative technologies provide enormous opportunity to manage the logistics function. Four technologies that influence operations

include *routing and tracking computer systems*, *inventory management software*, *RFID (radio frequency identification)*, and *GPS (global positioning system)*.

In the global courier services and shipping industry, UPS faces a marketplace characterized by increased need for time-definite services.[35] UPS has expanded its reputation as a leading package distribution company by developing an equally strong capability as a mover of electronic information. The company has developed an information processing system designed to provide a competitive advantage in this challenging market. UPS delivery specialists capture the signature of every package and document recipient using handheld, pen-based custom computers. The system collects electronic data on more than 9.5 million packages each day. This system is supported by the largest IBM D-baseII installation in the world. The system has been designed to allow simple introduction of future technologies into the network. In addition, reporting capabilities provide the opportunity to deliver customized reports to UPS patrons about their products and customers. The **routing and tracking computer system** has improved the company's efficiency and price competitiveness while simultaneously offering improved information handling and customer service.

Inventory management software is a second innovative technology that provides a source of competitive advantage. Inventory represents a sizeable investment to many organizations. Money invested in inventory does not provide the return that is realized when this money is invested in a financial institution. Organizations therefore prefer to minimize inventory to levels that meet the service expectations of customers. The cosmetics industry exemplifies a market characterized by highly volatile demand along with potential risks of inventory obsolescence and, simultaneously, out-of-stock conditions. Procter and Gamble markets Olay skin care products, CoverGirl cosmetics, Aussie shampoo, and many other products in this setting. Five years ago, the firm began implementing *multi-echelon inventory* (MEI) tools designed to optimize inventory throughout the supply chain.[36] This MEI software has been designed to accommodate increasingly global supply chains, contract manufacturing, dynamic product life cycles, and multichannel distribution systems. This software incorporates mathematical models that enable managers to plan around complex market scenarios. The software uses probabilistic optimization techniques that identify demand and supply variability to make better decisions about inventory policy and strategy. The software has enabled P&G to work with suppliers to cut materials inventories and has enabled them to collaborate with customers to reduce retail inventories. These reductions have been implemented while improving materials and production planning along with improved responsiveness of the firm's manufacturing and distribution systems. Importantly, this system primarily focuses on the optimization of inventory rather than on the reduction in inventory. In the initial installation at P&G, the Beauty Care division trimmed total inventory by 3 to 7% while maintaining service levels greater than 99%. Net earnings increased by 13%, sales increased by 7%, and the number of inventory days on hand dropped by 8 days. These results have prompted P&G to implement the inventory management software across all of the firm's strategic business units.

RFID or **radio frequency identification** is an innovative technology that has significant applications in logistics and retailing.[37] The RFID technology consists of a radio frequency tag with a printed antenna and a radio frequency emitter/reader.[38] The signal from the tag provides a unique 96-bit product identification code. In contrast to bar codes, the RFID tag can be read without line-of-sight reading.

Some of the most insightful initial research on RFID was performed at the Auto-ID Center at MIT[39] by a consortium that included the Uniform Product Code, P&G, Gillette, Coca-Cola, the Department of Defense, and Walmart. In manufacturing, these readers offer a number of benefits. The presence of these tags ensures that all items associated with an assembly are in fact present. Similarly, RFID readers simplify the process of confirming the accuracy of plant deliveries by eliminating the need to corroborate physical delivery of product with a driver's bill of lading. These systems also enable management to determine the appropriate positioning of products in storage. For example, out-of-stock items that arrive at the loading dock can be immediately positioned on the assembly line to increase manufacturing throughput. Because the devices do not require line of sight to read the contents of a container, the warehousing of inventory can be performed with considerable flexibility. RFID devices also provide the ability to identify compatibility issues between two chemical reagents and therefore allow warehousing staff to store such products in separate locations. The tracking capability of RFID also reduces the potential for employee theft by identifying any item leaving a distribution facility.

The RFID readers also offer a number of important benefits to retailers, and the importance of these benefits is reflected in Walmart's 2005 decision to require its top 100 vendors to implement RFID chips.[40] This technology enables retailers to allocate inventory accurately among various locations in the store and to price products variably based on their location. Thus, refrigerated soft drinks could be priced higher than those located on normal shelves. In addition, because the products each possess information that links the date sold with the date of delivery, retailers can be more focused in their efforts to rotate stock in their stores. The ability to track products also provides the opportunity to reduce shrinkage at the retail level.[41]

The implementation of RFID technology has strong implications for the supply cycle. The information accessible to retailers likely increases their power relative to suppliers. The retailer can use the RFID technology to develop its own category management system without the aid of manufacturers. The retailer can also use this information to negotiate higher compensation for obsolescence and spoilage, and it can also be used to urge manufacturers to develop retail-ready displays. These displays fuel additional costs to manufacturers and lower the product stocking cost to retailers.

Global Positioning Systems (GPS) represent another technology that has the potential to transform logistics. GPS is an American radio-navigation system that provides free positioning, navigation, and timing service on a continuous worldwide basis. GPS consists of satellites orbiting the Earth, control and monitoring stations on Earth, and GPS receivers owned by users. The satellites broadcast signals from space that are picked up and identified by GPS receivers. Each receiver provides the location (latitude, longitude, and altitude) plus the time.[42]

Two primary benefits of GPS in the supply chain involve the ability to monitor delivery drivers and their vehicles. GPS allows managers to track every vehicle in their fleet at any given moment. They can study a driver's behavior to determine whether he is driving safely, off-route, or too fast or slow. In addition, GPS ensures that the most optimal routing is taken, resulting in more efficient use of gasoline and diesel. The tracking units also enable managers to assess vehicle performance. Management can determine whether the optimal speed, tire air pressure, and others factors that affect fuel usage are in place.[43]

Packaging As the underlying means for ensuring that products are delivered in usable formats, packaging represents an important element of logistics. Manufacturers and retailers have made some important modifications to packaging procedures that reduce package costs while reducing the amount of damaged goods in the supply cycle. Over the 1995 to 2005 era, Dow Chemical reformulated its packaging in a way that saved more than $3 billion and reduced energy usage by 22%. Similarly, Walmart set a goal in 2008 to reduce packaging by 5%. Walmart estimates this reduction keeps 667,000 metric tons of carbon dioxide out of the air, keeps 213,000 trucks off the road, saves 66.7 million gallons of diesel fuel, and saves the retailer $3.4 annually.[44]

A critical look at the role of packaging must consider the overall supply cycle rather than a single level of the distribution channel. The packaging needs of products vary based on whether rail or truck transportation is involved in moving the product to its destination.[45] Truck-based transportation requires balanced, stackable pallets that maximize the use of trailer space. By contrast, secure and stable packaging is essential for the rigors of rail transportation. Stretch hoods that cover product on five sides provide a higher level of protection than the stretch wrap that secures only the sides of a pallet.

Supply cycle managers recognize that carton optimization and other freight packaging techniques limit packaging to minimal levels necessary to deliver product free of damage. Implementation of these strategies can yield savings of 10 to 50% of the total transportation and packaging cost. In addition, supply cycle managers are increasingly reusing materials within the supply chain. For example, Amerisource Bergen, the medical supply company, saved more than $22,000 a year and cut 30,000 pounds of paper boxes a year by reusing vendor supply boxes to ship orders.

Interorganizational Relationships Due to the volatility and rate of change in logistics, firms are increasingly recognizing the opportunities and insight acquired through relationships established with other participants in the supply cycle. Third-party logistics firms enable manufacturers and retailers to enhance their sustainability in the supply cycle in several ways:

Enhance vehicle performance. Third-party suppliers have the expertise to consolidate shipping routes and reduce inventory levels. In addition, they can train and monitor driver efforts to use fuel-efficient behaviors that lead to better vehicle performance. These vehicle performance enhancements lower personnel costs, lengthen the useful life of vehicles, reduce fuel costs, and lower the firm's carbon footprint.

Reduce total supply cycle costs. Cost is a sensitive issue in the supply cycle because consideration of cost immediately requires evaluation of the value added by the third-party supplier. Third-party logistics companies implement several strategies to optimize fuel economy and enhance environmental performance. For example, a recent trend among third-party providers is the replacement of standard, two-tire configurations on long-haul trucks with single wide-based tires. These tires save more than 400 gallons of fuel per year and lower carbon emissions by more than four metric tons annually. In addition, third-party logistics companies that use tractor-trailer aerodynamic devices to monitor trailer performance can eliminate more than 5 metric tons carbon emissions annually.[46]

Enhanced customer service. Due to experience with a variety of users and applications, third-party logistics agents can optimize distribution networks and consolidate routes. Importantly, third-party vendors that approach the supply cycle

as a chain of events—rather than discrete processes—can provide synergy to distribution by focusing efforts on maximizing sustainability throughout the supply chain. Manufacturers enjoy greater product availability rates, improved order accuracy, and fewer customer complaints. These activities enhance the level of customer service and preclude the firm from engaging in special deliveries and other accommodations associated with inefficiency. Collectively, this enhanced customer service lowers the environmental influence of the entire supply cycle.[47]

It is important to recognize that the ability of these third-party providers to raise sustainability is linked to the incentives and monitoring practices implemented by retailers and manufacturers.[48] Firms increasingly will reward suppliers with additional business when they pursue these sustainability efforts. Former arms'-length agreements are being replaced with joint process improvements whereby the manufacturer and supplier collectively work to address the sustainability concerns in the supply cycle. Manufacturers and retailers are asking suppliers to provide sustainability metrics and tracking this performance over time.

E. ISO 14000

Managers of supply cycles are increasingly asking suppliers to provide sustainability metrics, and they are requiring third-party certification of major suppliers.[49] In response to these calls for systematic assessment of a firm's influence on the environment, companies of all sizes have implemented **environmental management systems (EMS)**. An EMS is a set of regulations established to achieve environmental goals.[50] The ISO 14000 standards are voluntary standards established by the International Organization for Standardization (ISO). The ISO family of standards has emerged as a family of standards applied across industries to monitor and control interaction with the environment. ISO has more than 100 member countries represented primarily by government and industry standards groups.[51] ISO generates more than 1,100 new standards every year and currently has developed more than 17,500 international standards on a variety of subjects. Given the potential for enhanced performance, many organizations have implanted these standards. The Ford Motor Company, the first automaker to embrace ISO 14000, credits the standard with saving millions of dollars since implementation in 1998.[52]

Two of the primary standards associated in the ISO 14000 family are 14001 and 14004. These standards were updated in 2004.[53] ISO 14001:2004 provides a framework for an organization to control the environmental influence of its activities, products, and services and to improve its environmental performance continually. ISO 14001:2004 outlines the guidelines associated with the firm's approach to sustainability, and it provides a strategic approach to the organization's environmental policy. The standard is broad enough to enjoy application in a variety of contexts that include restaurants, construction firms, hotels, manufacturers and their suppliers, and airports.[54] In addition, small and medium-sized enterprises are also recognizing that they can benefit from ISO 14001:2004 certification.[55] ISO 14004:2004 provides guidelines on the elements of an EMS, its implementation, and the principal issues involved.

In many cases, organizations desire to make their pursuit of ISO management standards a matter of public record. ISO does not offer certification, but it does provide criteria for determining certification. Certification of ISO 14001:2004 is performed via independent environmental auditors. The accreditation of these auditors is based on their work experience, education, personal attributes

(communication and decision-making skills), and auditor training.[56] External auditors offer consultation over the sustainability efforts of the firm. Certification refers to the auditor's written assurance that it has audited an EMS and verified that it conforms to the standard. Registration, however, occurs when the auditor records the certification in its company register.[57] Certification of ISO 14001:2004 is valid for three years.[58]

Some of the benefits of adoption of ISO 14001:2004 accrue externally. Evidence suggests that, relative to firms with similar assets and performance, companies that implement it realize a competitive advantage over other firms in a market.[59] This advantage is associated with relatively lower toxic emissions among firms that have implemented the standard. The firm also enjoys lowered resource usage, higher energy savings, and lowered costs of waste disposal as a result of ISO 14001:2004 certification.[60] The merits of certification also provide assurance to stakeholders that the firm is committed to sustainability. Certification provides evidence to the local community that the firm is an environmental leader. Government and nongovernment organizations as well as private consumers are more likely to be favorably disposed toward firms that adopt the ISO 14000 standards. Adoption of the standards supports the firm's claim about its own environmental policies. Moreover, it illustrates and enumerates plans and actions that demonstrate conformity to environmental guidelines.[61]

Adoption of this standard provides a strong response to customers and suppliers that place environmental demands on the firm. Among United States firms, for example, those organizations with capital investments or strong ties to Japanese or European firms are more likely to adopt ISO 14001:2004. Because attitudes associated with sustainability tend to be more pronounced in these geographic markets, American firms with strong relationships with firms in these markets are likely to adopt the standards.[62] In addition, the adoption process—complete with an assessment of conformity by a third-party auditor—reduces the need for verification among trading partners.

There are appreciable merits of ISO 14001:2004 certification to stakeholders within the firm. Top management gains confidence that it is monitoring and regulating processes within the firm that influence the environment.[63] Consequently, the firm can support claims about sustainability and provide a strong response to criticisms that focus on *greenwashing*. Employees gain confidence that their firms are environmentally responsible. Given the costs of employee recruitment and turnover,[64] firms that illustrate empathy for environmental concerns provide additional incentives that attract and retain employees.

Summary

A. Introduction

The goal of this chapter has been to examine the role of distribution as a central facet of efforts to achieve sustainability. We focused on distribution as the firm-level function that delivers value to consumers. We diagnosed the elements of the supply cycle, provided several benefits firms realize via efforts to enhance sustainability, and outlined green marketing activity associated with logistics. Given the multi-industry benefits of environmental management systems, we also outlined the role of ISO 14000 certification.

B. Diagnosing the Elements of Sustainable Supply Cycles

We presented supply cycles as the entities associated with yielding environmental, social, and economic value from resource procurement through resource

processing, consumption, and postconsumption. This approach calls for understanding of the input–output process at each stage of the supply cycle as well as an understanding of the value chain. The input–output process presumes that each level of the supply cycle engages in some sort of processing that yields products and by-products.

C. Benefits of Sustainable Supply Cycles

Sustainable supply cycles offer benefits that include better working conditions, reduced turnover, and improved product quality. In addition, these supply cycles yield improved efficiency and profitability, better management of risk, enhanced brand reputations, and increased stakeholder returns.

D. Sustainable Logistics

Logistics refers to the process management of human and financial resources associated with physical distribution, manufacturing support, and purchasing operations. When this vital strategy is managed with sustainability as a goal, the firm has potential to optimize fleet operations, manage energy more efficiently, employ innovative technologies such as RFID, reduce packaging costs, and strengthen interfirm relationships.

E. ISO 14000

The ISO 14000 standards provide firms with the ability to monitor and control interaction with the environment. Companies that implement these standards can realize competitive advantages over other firms in a market. This advantage is associated with relatively lower toxic emissions, lowered resource usage, higher energy savings, and lowered costs of waste disposal. Certification provides evidence to the local community that the firm is an environmental leader. Adoption of ISO 14000 standards provides a strong response to customers and suppliers that place environmental demands on the firm. In addition, the adoption process and the assessment by a third-party auditor reduce the need for verification among trading partners.

Keywords

asset considerations, 167
channel, 164
environmental management systems (EMS), 173
global positioning systems (GPS), 171
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macroenvironmental issues, 167
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Questions

1. To what extent does Starbucks' sourcing strategy enable it to secure long-term commitments from suppliers and consumers?
2. What is the ultimate source for resources entering a supply cycle? How does this differ from the output of the supply cycle?
3. Why is it necessary for firms to assess the by-products of their supply cycles?
4. Why would a manufacturer take time to learn about Walmart's sustainability scorecard even though it does not do business directly with the retailer?
5. What is fleet optimization and why is it relevant to assessing sustainability in the supply cycle?
6. What benefits can a company realize from incorporating RFID technology into the supply chain?
7. How can GPS technology enable a firm to lower its distribution costs?
8. How do relationships with suppliers and customers benefit from sustainable logistics?
9. If firms can increase their levels of sustainability without ISO guidelines, why is it valuable to engage in the cost of certification?
10. What is the value of third-party verification of ISO 14000 certification?

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