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Walmart's Sustainability Journey: Bottled Water Mini Case

If the customer wants bottled water, we are going to sell bottled water. But even if you're going to sell bottled water, you can sell it and have less of a negative impact.

—H. Lee Scott Jr., Walmart CEOⁱ

The negative impact of bottled water on the environment had long been the subject of active discussions among business leaders and environmentalists, fueled by popular accounts that bottled water is no better than its more environmentally friendly alternative, tap water.ⁱⁱ Thus Lee Scott, Walmart's CEO, needed some response to a question posed by a reporter from *The Wall Street Journal* about whether Walmart would continue to sell bottled water, considering the retailer's recently announced goal to sell more sustainable products. Scott's response—that the company needed to continue selling bottled water, but it should try to do so more efficiently—raised important questions for the company's sustainability strategy.

The first level of questions pertained to where Walmart should draw a line in its efforts to sell sustainable products—should it sell a product with a high environmental cost or not offer it at all? Should the retailer continue to meet customers' demands, regardless of the environmental impact, or should it take a leading role in shaping consumer choices, such as by offering a choice of only sustainable products in its stores? These questions created serious technical and operational challenges, related to how to continue selling bottled water but with less negative environmental impacts. They also prompted further questions about the trade-offs and challenges

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associated with pursuing a comprehensive sustainability strategy. Should a corporation actively try to educate consumers about the sustainability of various products, or should they work behind the scenes to minimize the environmental impact of the products that consumers desire?

Ultimately, if a company is constrained by consumer demand, what actions can it reasonably take to reduce the environmental impact of the products it sells?

Bottled Water

Water in a plastic bottle might not be the most exciting product category, but sales of bottled water have registered nearly continuous growth for more than three decades. The idea of bottling water began in Europe in the 1700s, when mineral spring water was bottled and sold for its reputed healing properties. In the early twentieth century, bottled water in Europe offered a safe alternative to unsanitary tap water in many areas. Bottled water entered the U.S. market much later; sanitization of public water had been available there since early in the twentieth century. But consumption of bottled water in the United States saw rapid increases in the 1990s and 2000s, rising from 9.8 gallons per person in 1992ⁱⁱⁱ to 27.6 gallons per person in 2009.^{iv} Overall, consumption of bottled water grew a thousand-fold between 1984 and 2005.^v The drivers of this increase were numerous and varied: an aging municipal water infrastructure; a perception that bottled water was safer and tasted better than tap water;^{vi} and greater mobility that required convenient, portable water delivery methods. Another important growth driver was the increased focus on healthy diet and lifestyle choices, in which proper hydration and avoidance of sugary drinks both play important roles. People who consume bottled water regularly are twice as likely to cite health concerns as a factor in their beverage choices than those who do not. Furthermore, the increase in bottled water consumption was accompanied by a greater share of households using water filters at home.

Overall, water made up 41% of the beverages Americans consume, and bottled water constituted nearly one-third of total water consumption.^{vii} Studies showed that bottled water drinkers were disproportionately from ethnic minorities and had higher-than-average levels of education. Furthermore, though bottled water often was compared to tap water, only 30% of its consumers said they would drink tap water if bottled water were not available; the others would choose some other bottled beverage. Thus the market that featured bottled water also included carbonated soft drinks, sports drinks, juices, coffee, milk, and beer. In this category, bottled

water had gained ground against all its competitors, especially soft drinks. Between 2000 and 2009, bottled water's market share increased from 9% to 14.5%, while soft drinks fell from 30% to 24%. During the economic downturn that began in 2008, sales of nearly all beverages decreased, but bottled water sales decreased less than those of all other beverage categories.

Bottled water sold in many sizes and formats, bottled in both glass and various types of plastic bottles, but 70% of water sold in the United States used a "single-serve" format and came in polyethylene terephthalate (PET) plastic bottles. Bottle production began with a "preform," which consists of the PET plastic for a bottle, condensed into a small capsule. Single-serve preforms and bottles, which average about 9 grams each, were shipped to bottling facilities, where they are "blown" or expanded using machines that blew hot air into the preform, forcing it to take to the shape of a mold.

Bottled water also can be classified into several subcategories, such as carbonated, mineral, artesian, spring, purified, and deionized. None of these varieties includes flavorings as such, though added minerals can enhance flavor. Water comes from various sources or goes through several processes, depending on its labeling. The most common label—purified water—may be from any acceptable source, including springs or municipal sources, but the dissolved solids must be removed from it using distillation or reverse osmosis. Spring water comes from underground and rises to the surface without active extraction. Mineral water may be from any source but contains a minimum level of minerals. Regardless of its source, all bottled water must be sanitized and filtered.

Recent trends indicated that consumers prefer packages of multiple, smaller bottles rather than single, larger bottles, so the fastest growing product category is 12- and 24-packs of single-serve, 10 fluid ounce (237 ml) bottles. Walmart's private label water brands, Sam's Choice and Great Value, sold in such packs, were bottled in five locations in North America (Quebec, Florida, Texas, and two West Virginia sites), and competed primarily on price.

Walmart and Sustainability

"We didn't get where we are today by being like everyone else and driving the middle of the road," said Lee Scott, CEO of Walmart, in October 2005. "We became Walmart by being

different, radically different.”^{viii} The radical difference Scott proposed that day was sustainability leadership, committing the company to be supplied by 100% renewable energy, to produce zero waste, and to sell products that not only sustained communities but also protected the environment. He gave no timelines for achieving those goals, and he readily admitted that he didn’t know exactly how to achieve them. But the environment was being degraded by human activity, which was hurting people—“Katrina in slow motion,” Scott called it, referring to the devastating 2005 hurricane—and people involved in business had an opportunity and the responsibility to eliminate this negative impact.

In retrospect, the speech and emphasis on sustainability came to be regarded as a significant change for Walmart, yet Scott couched it as a continuation of Walmart’s longstanding principle of finding business opportunities in unlikely places. Scott made the case that sustainability was not just another task on a to-do list but rather a lens through which to see the world and business.^{ix} This led the company to rethink the role of consumers in achieving sustainability. For instance, Walmart actively influenced customers’ light bulb purchasing decisions, directing them toward more expensive compact fluorescent bulbs and away from cheaper, energy-intensive incandescent bulbs.^x Sustainability was not a philanthropic add-on but a new way of doing business that could also ensure additional profits for the company. For example, waste is both an economic loss and an environmental hazard, and thus Walmart would focus on waste reduction strategies. In particular, Scott emphasized supply chain waste and pollution:

If there is waste or pollution, someone along the line pays for it. For example, if our trucks are inefficient from a fuel standpoint, we’ll pay for that at the diesel pump. If the dumpsters behind our stores fill up with trash, you can be assured that we paid someone to send that trash to us, and we will pay someone to take it away.^{xi}

Sustainability and Bottled Water

The negative impact of bottled water on the environment has long been the subject of active discussions among business leaders and environmentalists. A 2007 *Fast Company* article^{xii} brought the issue to the forefront, framing the decision to drink bottled water as one with deep ethical implications. For instance, Fiji Water produced more than a million bottles of water a day, yet more than half the people on the island of Fiji did not have reliable, safe drinking water.^{xiii} Water bottlers acted quickly to defend themselves and establish their sustainability credentials. Still, consumers and watchdog groups remained skeptical. One group, commenting

on the controversial Fiji Water product (bottled on the remote Pacific island and shipped to locations worldwide), asserted:

The fact that a product that comes packaged in plastic and is shipped thousands of miles from its source of origin could claim the mantle of sustainability is dubious at best.... While we appreciate Fiji Water's attempt to mitigate the negative environmental impacts of their water operation, the fact remains that the only truly sustainable water is the kind that requires no fancy packaging or clever marketing gimmicks: tap water.^{xiv}

The quality of bottled water was also questioned, and sometimes even bottled water representatives were unable to distinguish their products from competitors.^{xv} A market-based study conducted by an advocacy NGO, Environmental Working Group, indicated that bottled water contained contaminants at levels no different than routinely found in tap water, noting,

Several Sam's Choice samples purchased in California exceeded legal limits for bottled water contaminants in that state. Cancer-causing contaminants in bottled water purchased in 5 states (North Carolina, California, Virginia, Delaware and Maryland) and the District of Columbia substantially exceeded the voluntary standards established by the bottled water industry.^{xvi}

In terms of packaging, though PET plastics are highly recyclable and can be converted into products like carpeting, fleece clothing, and playground equipment, as well as new containers and bottles, in 2008 only about 13% of plastic bottles ended up in the U.S. recycling stream. Approximately 2 million tons of water bottles instead moved to landfills.^{xvii} Not only would these plastic bottles take centuries to decompose, but they cannot be incinerated, because burning them releases toxic chlorine gas into the atmosphere and produces ash containing heavy metals. The NRDC also estimated greenhouse effects related to transportation: In 2006, the 18 million gallons of bottled water shipped from Fiji to California produced about 2,500 tons of CO₂.^{xviii} According to a 2007 resolution passed by the U.S. Conference of Mayors, plastic water bottles produced for U.S. consumption require 1.5 million barrels of oil per year, which might otherwise power 250,000 homes or fuel 100,000 cars for a year.^{xix}

Even as these debates raged, consumer demand for bottled water remained and, as Lee Scott acknowledged, was unlikely to dissipate anytime soon. Rather, the consensus view suggested that bottled water would continue to steal market share from other beverages.

Demand Fluctuation of Bottled Water

When Lee Scott told *The Wall Street Journal*, "...even if you're going to sell bottled water, you can sell it and have less of a negative impact,"^{xx} he was thinking about leveraging the company's strengths in logistics and forecasting. Because most sales involved single-serve containers (or multi-packs of single-serve containers), forecasting errors could mean significant fluctuations and waste, not only from holding excess inventories but also stockouts, especially around special events such as July 4 or major sporting events. Year after year, demand during these special occasions was dramatically overestimated or underestimated. The result was a quantity of bottles on hand that was either far in excess of what was needed or not nearly enough. Although bottled water has a long shelf life and is unlikely to expire, excess bottles tied up capital, occupied valuable storage space, and offered the potential for damage while in inventory.

Of course, underestimating demand had significant consequences too. For many shoppers, the appeal of Walmart was its offer of a one-stop shop, with a wide array of products: groceries, general merchandise, apparel, pharmacy, and so on. Walmart shoppers thus expect products to be on the shelves. Stockouts at the store level might be resolved through interstore transshipments to address the shortfall, but this process is highly inefficient. Replacement products also might be coming on the next truck headed for the store from the distribution center (DC), but this delivery might not occur for several days—or more, if the truck did not have any excess space to load the water. From a sustainability standpoint, stockouts waste customers' fuel and time, because they must travel to another store to complete their purchases. Inventory mistakes, whether they are excess stock or shortages, thus are costly in various ways.

The Search for Efficiency

Transportation

Sam's Choice and Great Value water was purified, bottled, and packaged at five locations in the eastern and south-central United States, then shipped by truck to DCs. As a product, bottled water was a transportation challenge: Water is dense, so trucks reach their maximum payload ("weigh out") well before filling all the volume of space in the truck ("cube out"). As a result, for every five trucks transporting bottled water, Walmart was transporting the equivalent of two empty trucks. Then, from the DCs, bottled water moved in mixed product trucks to stores. The simplest opportunity for improving the efficiency of the bottled water distribution was changing

the pallet configuration, an improvement of only about 2%. But for efficiency reasons, Walmart already participated in CHEP, a pallet-sharing system based on the six standard pallet dimensions specified in the International Organization for Standardization (ISO) Standard 6780, so any pallet change would be very disruptive to its operations, and potentially, to operations of others that participated in that system.

Purified water could also be bottled in the DC; it could come from any source, including municipal tap water. If Walmart started purifying and bottling tap water at each DC, it would need to purchase machinery to blow the preforms, purify the water, and fill the bottles. This configuration could limit the negative impacts of the forecasting variations by taking a step out of the supply chain and reducing transportation miles. But Walmart was often the largest customer for the bottlers with which it contracted, such that its business tended to provide balance in production forecasts. Removing that business might introduce more production forecasting error for the bottler. That is, by introducing this additional variation, the overall system might become less efficient, even if Walmart was more efficient.

Forecasting

Walmart had a powerful tool to improve its forecasting: its wealth of point-of-sale (POS) data. But should such forecasting be performed at the store level and then rolled up to the DCs? Or should it be done at the DC and then somehow allocated to the stores? Store and DC replenishment both require forecasts. Most replenishment systems use time-series forecasting methods, which assume an underlying demand pattern. The goal of time-series methods is to see through any noise (e.g., random fluctuations in sales) to determine the underlying pattern, which should include trends and/or seasonality in demand. Complicating the matter was the bullwhip effect, which describes how fluctuations in demand get amplified upstream in the supply chain. Moderate ups and downs in consumer demand become slightly exaggerated in store orders, and then become further exaggerated in DC orders. But not every aspect of the bullwhip effect is random or even necessarily faulty. For example, some orders might be placed to maximize transportation efficiency or address other constraints. Internally generated variation at the store or DC level also meant that relying too much on POS data might obscure meaningful variation. Products with high sales rates often are appropriate for POS-based forecasting. As a fast-moving consumer good, bottled water should be well-suited to bottom-up POS-data forecasting. But it also may suffer a bullwhip effect, involve a lot of non-turn volume, and exhibit seasonality. Other factors cause changes in demand for bottled water as well, such as weather conditions.

Searching for Win–Win Solutions

In his “Twenty-First Century Leadership” speech, publicly announcing Walmart’s new sustainability strategy, Lee Scott explicitly posed the question: “Is this consistent with our business model?” Walmart’s success in increasing operational efficiencies had answered this question in the affirmative: The retailer identified many quick wins that offered both financial returns for the company and improvements to its environmental footprint. Yet bottled water posed a more direct challenge to Walmart’s business model. Calls for Walmart to discontinue or curtail its sales of bottled water suggested trade-offs between environmental and business goals when it came to selling sustainable products, raising a whole new set of questions for Walmart: What is the role of the firm in educating consumers and changing consumption patterns? Should Walmart lead or follow broader societal trends? And how much is enough? Is improving operational efficiency a sufficient solution to the challenge of selling bottled water, or would the company need to do more?

Endnotes

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- ⁱⁱ Stossel, J. “Is Bottled Water Better than Tap?” *20/20*, May 6, 2005. Available at: <http://abcnews.go.com/2020/Health/story?id=728070&page=1>.
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- ^{vi} The health advantages of bottled water compared with municipal water sources have been the subject of nearly constant debate. Bottled water can come from either municipal water sources or springs. Regardless of the source, the U.S. FDA requires bottled water producers to sanitize and purify their products prior to bottling. But the FDA does not require bottle water producers to identify contaminants, whereas municipalities are required to do so.
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- ^{xi} Scott, op. cit.
- ^{xii} Fishman, op. cit.
- ^{xiii} Ibid.
- ^{xiv} See <http://www.foodandwaterwatch.org/pressreleases/fiji-water-bottling-the-myth-of-sustainability/>. Fiji Water responded vigorously to these attacks on its sustainability. See for example <http://www.environmentalleader.com/2007/11/07/fiji-water-to-go-carbon-negative/>.
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- ^{xvi} Environmental Working Group, “Bottled Water Quality Investigation: 10 Major Brands, 38 Pollutants,” 2008. Available at: <http://www.ewg.org/book/export/html/27010>.
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