



Readings and Cases in Sustainable Marketing

A Strategic Approach to Social Responsibility

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Sustainable distribution

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ABSTRACT

Sustainable distribution is a key component of sustainable marketing. Sustainability as a concept in distribution is applicable across all the sectors, products and services and at national and international levels. Logistics involving warehousing and transportation can greatly contribute to sustainable distribution. Food distribution is one of the well-researched areas of sustainable distribution. Several factors influence sustainability in goods distribution that includes packaging, lead-time, postponement as a strategy and information & communication technology. In sustainable services distribution, capacity utilisation is a key element. Transportation management is an important aspect that can help foster sustainable distribution. Managing transportation has now extended to reverse logistics too at the end of the product lifecycle. Several countries have noted the negative externalities of unsustainable distribution and have devised legislation to foster sustainable distribution. Thus, many factors have increasingly forced marketers across the world to make sustainable distribution as part of their sustainable marketing agenda.

Introduction

Distribution in marketing consists of two broad elements, namely channel management and physical distribution management. In the case of retailers, distribution also involves the sourcing of goods from producers. Channel management refers to management of channel partners (individuals/organisations) in distribution process. It deals with relationships and rewards/incentives for various functions of distribution. Physical distribution management or Logistics relates to inventory and transportation management. Marketer's interactions during the management of these two activities are increasingly viewed from a lens of sustainability. Sustainability has gained prominence in marketing due to the efforts of Non Government organisations (NGOs) and the concern of governments for the environment. Sustainable marketing has also become important with the increasing environmental consciousness of consumers and the corporate world. Sustainability is a broader concept than environmental concerns as it encompasses economy, environment and societal dimensions. Integrating sustainability in distribution management therefore means sustainable channel, inventory and transportation management.

Sustainable distribution (Kleindorfer *et al.* 2005; McKinnon 2003) is an important component of sustainable marketing. A prominent feature of sustainable distribution is Green Logistics. Green Logistics relates to less energy-intensive options for warehousing and transportation. Recent change has been the inclusion of logistics of used products at the end of their lifecycle

Sustainable distribution is relevant at both national and international levels. It is relevant in emerging markets because social, economic and environmental constraints are dominant in these markets. In developed markets, the availability of several options makes sustainable distribution one of many options - but not necessarily the preferred option. This chapter aims to present sustainable distribution as a holistic alternative to existing distribution philosophies. It highlights the crucial role of environmental sustainability in distribution.

The sections of this chapter are organised as follows. The chapter firstly discusses food distribution. Food is a fast moving consumer good and distributed widely. Its implication on sustainable distribution is important. The next section deals with the factors that affect physical goods distribution. It details the major factors that affect the sustainable distribution of physical goods. Subsequently, sections deal with reverse logistics, sustainable services distribution, social sustainability, negative externalities and government regulation and marketers. The chapter ends with a conclusion covering an overview of the concept of sustainable distribution.

Food distribution

Food distribution (Husti 2006; Powell 1995) has received particular attention in relation to sustainable distribution due to its impact on transportation and therefore its effect on environment. 'Food miles' (Pretty *et al.* 2005) is a concept used in relation to sustainable food distribution. It argues for limiting food transportation

where possible and, therefore, encouraging local food production and consumption. The concept also has repercussions for the economy and society. The more local production and consumption that takes place, the greater the local economy will benefit. In addition, the medical community encourages the consumption of native fruit and vegetables as a healthy alternative to fast food.

Sustainable food distribution affects the supply chain from production to consumption (MacGregor & Vorley 2007). The growing of fruit and vegetables with physical characteristics that help in efficient distribution is one example – like cubic watermelons (i.e. watermelons that are grown to be square). These watermelons increase the efficiency of transport space utilisation ensuring effective distribution. Another factor in food distribution that affects sustainable distribution is understanding consumption. Effective food demand forecasting ensures efficiency of effort and cost in relation to inventory and transportation management.

An emerging issue related to sustainable distribution is water, which is a scarce resource. The amount of water used in food processing is quite high (Chapagain *et al.* 2006). Severe competition exists for water used for drinking, industrial and agricultural purposes (Ridoutt *et al.* 2009). The exploitation of ground water and a lack of rainwater harvesting or water conservation and management activities have exacerbated the problem. Water distribution with minimal losses has now increasingly become a concern of even corporate entities. Ground water table lowering due to excess exploitation in an Indian state resulted in banning of multinational soft drink brand across several countries. Marketers can encourage sustainable distribution by sourcing food products from suppliers who use minimal water in production. However, this is effective only if it is done in the same number of food miles. Embedded water content in foods has an impact on distribution as it can lead to faster product deterioration. In addition, it could also indirectly support inefficient water usage.

Factors affecting sustainable physical goods distribution

Several factors play an important role in attaining success in sustainable physical goods distribution. The subsequent sections of this chapter detail the role of each of these factors and its impact on sustainability.

Packaging

Packaging is a key component of distribution. Product packaging can be reduced using effective product design (Peattie 2001). Additionally, flexible packaging design can enable volume reduction during transport by vehicle space efficiently. Packaging that can facilitate the seamless transfer of goods from one transport mode to another will increase the overall efficiency of the transportation. Containerisation is one useful way of reducing the environmental effects of distribution; multimodal transport using containers eliminates energy being spent repackaging, loading and unloading. Bulk products without packaging can also be effectively transported using containers. Reduction in packaging weight and packaging layers also ensures waste reduction. Biodegradable (Leaversuch 2002)

and recyclable packaging is another way of helping sustainable distribution. Reusable packaging that helps the consumers to use containers for future storage is another sustainable method of promoting packaging. This method reduces future packaging needs and thus the transport burden.

Multi-layered packaging serves several purposes like product protection and transport safety, but packaging weight reduction is a major step through which manufacturing and marketing firms can support distribution (Kassaye & Verma 1992; Lan & Mei 2008). Weight reduction efforts could include cardboard sleeve reduction, change from glass to plastic and use of lightweight glass. Weight reduction results in less waste post product-use and fuel savings in transportation. Thus, it contributes to sustainable distribution and reducing the carbon footprint of the firms involved.

Effect of lead-time

Lead-times in input and output production and consumption have an impact on sustainability across product categories. For many food products, while consumption occurs almost daily, inputs are seasonal and output needs to keep pace with changes in consumption. Manufacturers and marketers can minimise warehousing by matching production and consumption, but this is a difficult task. In such situations, where warehousing is necessary, sustainable distribution needs to strive to reduce environmental impacts and costs. Good warehouse design (Ballis 2006) can minimise energy costs and therefore contribute to sustainable distribution. A picking-and-packing operations study can also reduce energy use by optimising operations (Hsieh & Tsai 2006). Within a large warehouse, staff and machines expend energy picking goods and packing them for transport in the shortest possible time. These two operations when aggregated for various goods and locations and vehicle sizes become complex. A picking-and-packing operations study provides a practical view of the constraints and helps to facilitate a smooth functioning of the warehouse with minimal effort and energy.

Another avenue for reducing environmental impact and cost reduction is warehouse consolidation. Having several small warehouses closer to retail stores increases servicing efficiency; however, it also increases the cost of inventory and warehouse maintenance. Warehouse consolidation aids inventory cost optimisation and warehousing cost reduction. The key to effective warehouse consolidation is better routing and scheduling. The route taken from the supply warehouse to the centralised distribution warehouse of the retailer to the store can be mapped for optimising the trips required. Understanding of the goods flow in time sequence and vehicle capacity utilisation can help better scheduling. These activities require data analysis with the help of information technology tools to optimise routing and scheduling and achieve warehouse consolidation. A dramatic way to facilitate sustainable distribution is to minimise warehousing. The transfer of goods from one transport vehicle to another at a hub eliminates the need for large storage spaces. It also reduces redundant unloading and reloading. Minimising warehouse storage and promoting cross docking thus ensures energy, time and wastage reduction.

Postponement of production

Distributed or delayed finished-goods production (Alderson 2006; Pagh & Cooper 1998; Van Hoek 2001), or postponement until the point of supply to the consumer, is another example of sustainable distribution. The decorative paints industry is a classic case in this sustainable distribution initiative. Before the introduction of tinting machines, a single production site produced several SKUs (stock keeping units) of decorative paints in large volumes and shipped them to many parts of a country. Increased production, storage and transportation costs used to be the norm as the consumption patterns of individual SKUs differed across different locations. The advent of tinting machines made a difference in the entire value chain. Large quantities of the base chemical liquid and small quantities of dye colours are now available at the paint retail outlet. The retailer can prepare and sell varying paint quantities and colours as per consumer requirements instead of looking for available SKUs on the shelf. Storage space requirements for decorative paint retailers have also reduced as a result. Shifting final goods production to the consumer end (Ernst & Kamrad 2000) has enabled the producer to contribute to sustainable distribution (Yang *et al.* 2005)

The role of information and communication technology

Information and communication technology (ICT) is a major contributor towards sustainable distribution (Janelle & Gillespie 2004). Channel partners can manage demand-side volatility and supply-side constraints effectively with greater information transparency across the value chain. Demand-side volatility and supply-side constraints have the largest effect on inventory management and transportation. Excess inventory and inefficient transport the results of an absence of information (Chouinard *et al.* 2005; Daugherty *et al.* 2005). The whiplash effect is a common phenomenon observed in many supply chains. In this phenomenon, small changes in consumer demand create effects of larger magnitude at different supply chain levels. The whiplash effect (Lee *et al.* 1997) magnifies with further increases in the number of supply chain levels. Shorter distribution chains and greater information sharing prevents the whiplash effect by promoting better coordination and efficient functioning of the distribution chain.

A lack of information can occur due to communication links being unavailable, especially in rural areas of emerging economies. In these emerging economies, information on supply and demand of goods is minimal. Distribution channel partners can maximise profits on goods in such contexts using information that they possess. Such situations deter information sharing across the distribution channel. They can thus hinder information flow. Mobile communication and its rapid spread in rural areas recently, however, have made information transfer faster and easier. Thus, ICT development has greatly enhanced the prospects of sustainable distribution in rural areas.

Tracking distribution vehicles through GPS (geographical positioning systems) is another way of using ICT to improve vehicle movements and fleet management.

GPS helps in optimising routing and scheduling (Gebresenbet 1999) and assists with coordinating reverse logistics.

Capacity utilisation

A key dimension of services distribution is capacity utilisation. When firms do not utilise resources to their maximum, capacity at that moment is lost. Conversely, better service-capacity utilisation (Kimes 1989; Oliva & Kallenberg 2003) results in sustainable services distribution when demand exists. A good example of this phenomenon is mobile phone towers. A tower's capacity can be outsourced, and different phone services providers can thus avoid setting up multiple towers. In this example there is also a benefit to community health as additional towers result in greater radiation. Thus, tower sharing is a great example of sustainable distribution of services with environmental, economic and social benefits.

Another example of excess capacity utilisation is educational infrastructure. In emerging economies like India, the government's capacity to invest in educational infrastructure is lower. Using existing school, college or university educational infrastructure effectively for a larger reach of service provision is an example of sustainable distribution. Users can utilise infrastructure in two or three shifts. Public-private partnerships for sharing or maintaining the infrastructure can help in reducing unnecessary capacity development. This option is economical as increased existing capacity utilisation reduces costs. It reduces the stigma of having studied in evening or night schools instead of a regular day school. Moreover, income-earning opportunities for teachers and students increase due to this arrangement. In addition, the availability of services in more shifts provides flexibility for both teachers and students. Thus, this arrangement also serves social sustainability.

Transportation management

Transport management (Vanek & Morlok 2000) is an important element of sustainable distribution. Several modes of transport have different impacts on distribution (Murphy & Poist 2000). In the case of road transport, which is the more common form of goods distribution, the nature of vehicles bought, the way vehicles are driven and how transporters use vehicles, greatly determine sustainable distribution (Piecyk & McKinnon 2008; Rodrigue, J. P., Slack, B. & Comtois, C. 2001). Hybrid or electric vehicles (Macharis, C., Van Mierlo, J. & Van Den Bossche, P. 2007) help reduce air and noise pollution and reduce the use of fossil fuels. Larger multi-axle vehicles help in carrying larger quantities of goods at the same time compared to several smaller vehicles and thus increase efficiency (Simons, D., Mason, R. & Gardner, B. 2004). Governments play an important role in both passenger and goods transport. Governments can promote sustainable distribution with incentives for modal shift (Dinwoodie 2006), for example, shifting from road to rail transport. They can also have disincentives like congestion charging and speed limits to reduce impacts of unsustainable transportation. Several governments across the world have helped in shaping sustainable distribution by

spatial planning, communication efforts with the transport industry and development of new infrastructure for smooth movement of goods.

Shipping and waterways are an important component of global trade logistics. 'Greening' the shipping industry (Michaelowa & Krause 2000) has implications for greening world trade generally. In this industry, sustainable distribution starts with energy efficient ships that have lesser weight, using light and composite materials, efficient hull design etc. In addition, the use of renewable energy sources namely electric power, solar and wind power in combination with cleaner fuel forms for powering ships can significantly reduce the effect of burning fossil fuels. The shift from the presently common bunker fuel to less polluting fuel in itself can have a big impact on reducing ocean pollution levels. Another target area for sustainable shipping is port operations (Bateman 1996). Reduction in turnaround time and the utilisation of machinery to speed up operations can control energy wastage. Increased lifts per hour, per crane, double container lifting and an increase in container ship size will all facilitate greater efficiency. Greater efficiency with the current energy consumption results in more sustainable distribution.

Distribution of gas and liquids through pipelines is an economically and environmentally efficient means of delivery. Pipelines can connect the points of exploration, production, storage and final consumption of these products (Bersani 2008). One of the main advantages of the pipelines is that they eliminate the usage of fuel in transportation. In many cases, companies use pressure and gravity in pipelines as methods to effect product delivery. Pipeline transport is largely reliable and especially helpful in the transportation of hazardous gases and liquids. They reduce injuries and deaths that plague other modes of transport and are thus, helpful as a safe method of transport (James 1980). Pipelines are available all through the year and anytime of the day and therefore represent a ready mode of transport. Backhaul is absent in pipeline transportation and this further reduces the pollution impact compared to other modes of transport. Another crucial advantage of pipeline delivery is the lower (almost zero) product damage.

Reverse logistics

Reverse logistics (Dowlatshahi 2000) has gained prominence as part of green logistics especially in the context of e-waste generation. Effective reverse logistics helps in the sustainable functioning of the consumer electronics supply chain (Chouinard, M., D'Amours, S. & A t-Kadi, D. 2005). Consumers's enhanced consumption of durables and Businesses's faster rates of new technology introduction and obsolescence have accentuated the key environment mantras – reduce, reuse and recycle. While anti-consumption philosophy and regulatory mandates for longer technology lifecycles may work, in a free market economy, managing this consumption and disposal cycle becomes crucial. Biodegradability of materials on disposal is a crucial determinant of the environmental sustainability of products. For consumer durables, reuse and recycling are methods for effecting sustainable distribution. Reuse would represent, for example, the use of refurbished consumer durables like mobile phones. Underdeveloped country consumers can use usable mobile phones disposed of by developed country consumers. This could

also happen within emerging economies between urban to rural areas. However, reverse logistics must facilitate the reprocessing or refurbishing of products that are sold as pre-owned products for low-income consumers (Chan 2007). When marketers assure consumers of product longevity, then possession of such goods, economically and socially, is a sustainable proposition. However, a key issue is the passing off pre-owned products as new products. Unsuspecting consumers who are illiterate or not informed enough to make the distinction can fall prey to marketers who exploit them.

Hazardous e-waste collection is sustainable distribution through reverse logistics. If left alone in a landfill, e-waste may cause enormous damage to land water and air and thus affect the health of those who live nearby. Companies involved in reverse logistics collect this e-waste and extract usable materials. Thus they improve waste disposal and contribute to sustainable distribution. Recovering, for example, copper from motherboards of disposed computers/laptops and reselling it for (re)use by computer manufacturers requires the back-up of a strong reverse logistics system. In many developed countries, reverse logistics is mandated for manufacturers and marketers of such electronic products (Mutha & Pokharel 2009). They need to set up a system to ensure that product disposal is environmentally friendly. In many developing countries, laws are either absent or lax in implementation. In such cases, entrepreneurs involved in reverse logistics facilitate sustainable e-waste disposal. They not only help in protecting the environment but also benefit economically. Moreover, they help the society through employment opportunities in the reverse logistics business.

Sustainable services distribution

Sustainable services distribution (Halme *et al.* 2004; Van Der Zwan & Bhamra 2003) is a marketing concept to be considered in relation to holistic sustainability. Offering online services is an important way to contribute to sustainability – economically and environmentally. Serving consumers online reduces several repetitive manual processes in the banking and mutual fund services industries and increases the speed of consumer responses. Online consumer services (Vandermerwe & Oliff 1990) reduce paperwork, contributing to paper usage reduction and the use of less cash in services industries. The reduction of cash transactions has a social benefit too. In several developing countries, the black economy thrives as most transactions are only in cash. The recording of online monetary transactions provides the government with a trail that could be useful in tracing illegal activities. Thus, paperless electronic monetary transactions help governments by facilitating the move from the unorganised to the organised formal sector.

Provision of traditional banking services for rural populations is difficult due to remoteness, low transaction value and infrequent transactions. A sustainable banking services distribution method for financial inclusion is through the business correspondent model. This is a financial services expansion model, where large banks outsource retail-banking activities to local organised entities like rural non-government organisations (NGOs). The retail bank benefits as it can cater to a

larger target population at a lesser cost instead of providing a fully operating branch that is uneconomical for low transaction levels. Simultaneously, it also provides local employment. The business correspondent model provides a safe way of lowering non-performing assets, as the correspondents are local entities. ICT facilitates this form of sustainable banking services distribution through low-cost, mobile, automated teller machines (ATMs) and other technologies that facilitate paperless transactions. In addition, in countries like India, biometric cards can help hasten the pace of technology adoption in financial transactions.

Another major outcome of ICT is the development of business process outsourcing (BPO) for efficient services distribution. In large countries like India, when several consumers start purchasing or using new services, multiple service providers replicate similar processes as for example complaint handling in the same industry. This makes services distribution unsustainable. Business process outsourcers specialise in several business processes and serve multiple clients, making the industries more economically and environmentally sustainable. Many business process outsourcers specialise in service industries like insurance. They provide specialised and skilled training in the processes they supply. This specialisation and outsourcing leads to greater societal benefits. Staff are skilled-up, making them more employable and giving them a greater opportunity of higher income earning.

Negative externalities

Current unsustainable forms of distribution have several negative externalities (Delucchi 2000). Various forms of pollution, namely land, air, water and noise, severely affect public health. Road transport development is particularly responsible for crop/forest destruction, as new wider road building requires greater and greater land acquisition. It also leads to reduction of open spaces especially in densely populated countries where the land area is minimal. The movement of heavy and other vehicles at faster speeds to increase efficient freight transport has also resulted in the increased number of accidents and injuries. Other negative effects have been damage to buildings due to construction of transportation highways and traffic. The building of several complex bridges and other transport structures has also resulted in visual pollution. Researchers have documented negative impacts on marine life substantially due to increased marine logistics. Poor fuel quality, inefficient and old ships and dumping of ship waste in ocean waters have polluted the ocean floor. Pollutants ingested by marine life enter the human system through the seafood consumed. Thus, not only offshore drilling for extracting fossil fuels but international trade is a contributor to unsustainable living. Sustainable and ethical sourcing and impacts on community health and nutrition are becoming serious issues to counter negative externalities of unsustainable distribution.

Government regulation and marketers

In some developed countries like the UK, governments have been working towards sustainable distribution. These sustainable distribution efforts have mainly targeted transportation management (Lampe & Gazda 1995), and they relate primarily to

road transport as in many countries road transport is the most frequent mode for freight transport. Regulation on load factor requirements (McKinnon 2000), weight regulations, zonal designations, temporal restrictions and taxation are methods used to minimise the negative externalities of distribution through transport. Marketers have attempted sustainable distribution by eliminating small orders, reducing delivery frequency and increasing their average order size. While sustainable distribution is just a component of the sustainable supply chain, efforts of the government (Aibin, L. I., Min, Z. & Lili, B. 2009; Prakash 2002) and the marketers are likely to succeed if all supply chain participants were to encourage and support a sustainable supply chain.

Conclusion

The manufacturer, marketer, wholesaler and retailer are typical entities that are involved in distribution. However, other entities like warehouse owners, logistics companies, transport firms and ICT entities provide key support functions in product distribution. All these entities need to cooperate in the efforts towards a sustainable distribution system. A commitment to a sustainable supply chain and the attitude of promoting a green marketing environment are crucial for the success of efforts at promoting sustainability. While green logistics can contribute significantly to sustainable distribution, economic and social dimensions are equally important for the holistic implementation of the concept. Partnership across the distribution value chain is a key ingredient for the success of these efforts. Green alternatives for every step of the distribution process simultaneously considering the social and economic dimensions are important. In services distribution, the consumer also plays a role in adopting sustainable alternatives of service consumption.

Sustainable distribution is not only a country-level initiative but also a global requirement for a better planet for the future. International trade can contribute to sustainable distribution through exchange of expertise and trade information. Global transportation requires careful consideration in a global supply chain. Companies need to add environmental and social costs to the economic costs of operating a global supply chain. Marketing decision making in goods distribution internationally must exhibit consideration of sustainability criteria. In addition, government and marketers need to collaborate to make sustainable distribution a reality for attaining the ideals of societal marketing.

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