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A study of companies' business responses to apparel e-commerce's environmental impact

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E-commerce is an innovation in the retail industry that has grown exponentially since it first began, and continues to expand its influence and capabilities globally. This new retailing channel comes with logistical challenges, especially concerning environmental sustainability. Oftentimes, companies that aim to establish a sustainable image alter their manufacturing process in order to reduce waste and pollution, but the product itself is not the only aspect of the company that can change to reduce its impact on the environment. Packaging, including the containers for online orders, accounts for 29.8% of waste in the United States, or 75 million tons per annum, and many of the materials used to package products are not recyclable (EPA, 2015). The effects of e-commerce on the environment are complicated and can be difficult to measure, because it reduces emissions in some areas yet increases emissions in other areas. Although the environmental effects of e-commerce have drawn attention in recent years, data on this issue is still limited and prior findings are inconclusive or incomplete. This research analyzed prior studies regarding e-commerce with a focus on the main elements of the supply chain where e-tailing and traditional retailing differ. The four elements analyzed are packaging, transportation, returns, and disposal. This research is exploratory in nature. A content analysis based qualitative method was utilized.

According to estimates from 2011, packaging makes up 22% of total carbon emissions of an online order ("Here's how," 2013). The use of a 100 gram corrugated cardboard box and up to 33 grams of insulation material for one package can add up to CO₂ emission of 181 grams. This impact is much greater than that of brick-and-mortar packaging such as plastics bags, which emit less than 11 grams of CO₂ (van Loon et al, 2015). With consumers purchasing more items online, and demanding them to be delivered faster than ever, companies must resort to using faster and more expensive means of transportation. The transportation of the product directly to the customer contributes greatly to the environmental impact of e-commerce. Wiese et al (2012) analyzed the carbon emissions of apparel online retailing and traditional retailing, and how distance from store or central warehouse increases or decreases the carbon footprint of a transaction and of a product. The results indicated that, if customers have to travel more than 14 kilometers to go to a store, online shopping will reduce their carbon emissions. Otherwise, their most energy-efficient option is to shop at the traditional retailer.

Apparel returns to traditional retailers account for about 9.96% of total purchases which, compared to 30% returns to online retailers, is much lower (Dua, 2015). The difference is a result of many unique factors of e-commerce, perhaps the most important of them being the inability to physically see, feel, and try on the product before purchasing it. The environmental impact of returning an online purchase depends on which return method the consumer selects,

with the most efficient way being the package carrier altering their normal delivery route to collect packages. This method emits only 362 gram CO₂, but if the customer goes to the retailer's physical location to return an item, their carbon emissions skyrocket to 4,455 gram CO₂, based on the average round trip of a customer to go shopping (Edwards, 2009).

To mitigate the environmental effects of e-tailing, many companies have put into place innovative systems and technologies throughout the supply chain of the online channel. One study conducted by Sealed Air revealed that 56% of e-commerce customers take issue with the packaging that their items come in, with their top two concerns being inability to recycle it and the difficulty in disposing of it (Furlong, 2016). To reduce waste and increase reusable packaging materials, Industry of All Nations, an apparel company, has implemented The Clean Clothes Project, where all apparel are sent in 100% recycled paper envelope-like bags to eliminate plastics from this step in the supply chain (Industry of All Nations, 2016). United Parcel Service, a delivery service which many e-tailers utilize, increased the amount of vehicles that use alternative fuel by 61% in 2013, and by 2014 the company recorded 154 million miles driven in vehicles using alternative fuel plans to reduce its gas and diesel usage by 12% by 2018 (UPS accelerates, 2015). To reduce returns, companies have begun using software tools to match a customer's measurements or known sizes with the products the e-tailer offers to find apparel that will best fit them. Fast fashion company ASOS has implemented Virtusize, a fitting technology that allows customers to compare the measurements of an item they currently own with that of an item they are looking to purchase on the website. This technology has reduced ASOS's returns by roughly 50%. Only 15% of used apparel is recycled or donated in the U.S. (Cline, 2014), but almost 100% of textiles can be recycled or in some way repurposed and thus avoid being sent to the landfill or incineration. Consumer-to-consumer (C2C) retailing is on the rise as a solution to reduce apparel waste. Perhaps one of the most popular online consignment shops is Poshmark, with the value of items uploaded each day equaling more than \$2 million. Attracting and maintaining customers usually causes companies to forgo efforts to create a green supply chain, but in a few situations, companies may be able to have it both ways. The implications of this study suggest that, while online shopping may already be more environmentally-friendly than traditional retailing in many aspects, there are still ways that companies can continue to improve their sustainability.

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