GOING GREEN: SUSTAINABILITY CHALLENGES IN E-COMMERCE DELIVERIES DURING THE PANDEMIC

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Abstract

In the last decade or so, the growth of e-commerce in India and across the globe has been astounding. While this has triggered widespread euphoria about the convenience of online shopping and home delivery, the environmental impact of shopping through e-commerce portals has received insufficient academic attention. Mounds of packaging waste are generated due to the craze for online shopping and to meet the customer expectations of ultra-fast delivery of items ordered. The pressure on delivery ends up throttling logistics systems as batching of orders proceeding to neighboring locations is not possible due to the delivery commitments made by E-commerce players. The Covid-19 pandemic made online shopping inevitable because there were forced lockdowns in various parts of the world. Right from groceries, green groceries, apparels and electronic items, online shopping became the preferred panacea for pandemic ills. Online shopping festivals commence from midnight and extend over duration of 3-4 days. To amplify customer experience, E-commerce players offer value propositions like express delivery, same-day delivery etc leading to adverse environmental impacts in terms of the load on logistics (delivery) systems and the packaging waste that they end up generating. This research effort traces the adverse environmental impact of E-commerce shopping and highlights the actions that are needed to arrest this growing and disturbing trend that is threatening to destroy our ecology. While consumer education about the need to embrace sustainable practices is important, it remains to be seen whether this effort will lead to socially and environmentally responsible behavior on part of the consumers who shop online.

Key Words : *E-commerce sustainability, environment, social, economic, consumer, packaging, circular economy, green logistics*

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Introduction

In 2017, the global retail market was US $23.24 trillion of which US $ 2.3 trillion was the market for e-commerce. This figure swelled to US $ 3.53 trillion. It is expected to grow to US $ 6.54 trillion by 2022. The Indian e-commerce packaging industry was worth US $ 32 billion in 2015 and this increased to US $ 451.4 million in 2019. It is expected to reach US $ 975.4 million by 2025 and register a CAGR of 13.8% during the period 2020-2025.

As per a report in the Economic Times dated 16th October 2020, by mid Nov 2020, online retailers in India could increase their cumulative sales to $ 6.5 billion. Forrester Research estimates that the number of online shoppers in 2020 will rise to about 60 million up from 45 million e-shoppers in 2019.

The US environmental protection agency claims that e-commerce packaging accounts for 30% of solid waste generated in the US. Estimates about the amount of e-commerce packaging or disposal of solid waste have been meagre. E-commerce packaging comprises plastic, paper, bubble wrap, air packets, tape and cardboard cartons. No one has any clue about recycling of this waste in India and what is expected is that these materials will eventually end up clogging drains and landfills.

E-commerce's value proposition to customers is delivery excellence as quality of goods sold has almost become a hygiene factor. The growth of e-commerce has led to a stiff competition between E-commerce and brick-and-mortar retail stores.

While convenience is one of the strengths of E-commerce, scant attention is paid to the generation of waste that results from increasing purchases through this channel. Purchase of electronic products, clothing, accessories, footwear and consumer goods necessitates increased reliance on packaging. If packaging is poor, it can lead to customer dissatisfaction. While in the West, there is greater awareness about recycling of waste, in India the awareness is low.

Customer expectations around faster delivery have become more and more pronounced leading to excessive packaging. Consolidated delivery of packages is replaced with multiple individually packed deliveries leading to humongous generation of waste – some of which is not biodegradable.

Excessive packaging also results in loss of forest cover as wood pulp is the raw material for packaging cardboard. In the US, 165 billion packages are shipped and the cardboard used would roughly equal about 1 billion trees to be chopped.

Ironically, the problem of mounting waste from e-commerce has received insufficient attention from policy makers. Services like Amazon Prime are built on their promise of faster delivery resulting in excessive packaging to delight customers and to spur the latter to purchase more and more. Food delivery aggregators have also contributed to this mayhem. The justification given by e-commerce companies is that this packaging is recyclable – however the vital question is – who is going to be responsible for recycling this waste? Recycling has also its own environmental effects.

It cannot be denied that e-commerce is triggering consumerism like never before – consumers tend to shop more than what they need during their online shopping expeditions – all that they need is an Internet connection/ hotspot on their smart phone and a debit / credit card or digital payment options. Incessant promotions by e-commerce organizations (through communication on Email, social media etc.) are intended to entice consumers to shop more. These organizations offer attractive discounts and bombard customers with advance information about their impending shopping festivals.

The million dollar question is that Will e-commerce companies focus on sustainability over speed? Can consumers be provided reusable containers? Greater awareness must be created so that consumers club their purchases and e-commerce companies must improve their logistics systems to ensure a single delivery instead of multiple deliveries

at multiple times. Consumers can be incentivized for doing so. This research effort has attempted to trace the developments in ecommerce sector and their adverse impact on the environment.

Review of Literature

It is a widely accepted notion that E-commerce shopping reduces overall carbon imprint. A study by Carnegie Mellon University claims that the carbon imprint in USA has reduced by 30% due to invasion of E-commerce. Traditional brick and mortar stores need display and security lighting and air conditioning. Employee transportation adds to the carbon foot print. Consumer transportation to and from the store also adds to the energy consumption.

However, today E-commerce presents challenges of a different kind. Transportation of goods from suppliers to distribution warehouses and from warehouses to consumer's homes can add to the carbon footprint. Frequent ordering, dispatch and delivery of goods add to the traffic congestion and contribution to a humongous amount of solid waste.

Today consumers interact with retailers both offline and online. The lines between shopping for entertainment and shopping with a real intent to purchase have blurred. Consumers indulging in showrooming (visiting an offline store and buying online) end up increasing carbon footprint through transportation.

Consumers are relying on online retail to procure goods leading to a drastic transformation of the retail environment (Harris et al, 2020). Growth of food delivery sector has led to the demand for freight transport in urban areas (Galati et al, 2020). The Covid-19 pandemic has led to increase in revenues for the E-commerce sector (Viu-Roig & Alvarez-Palau, 2020). But the question remains – at what cost?

In a survey conducted in Thailand, only 11.8% of those surveyed felt that the products received via the e-commerce channel arrived with an excessive packaging (Chueamuangphan, Kashyap & Visvanathan, 2020). Research has also revealed that online shoppers return products twice or thrice as often as in-store buyers. Tendency of online buyers to buy goods impulsively and to return those goods that they don't need causes untold harm to environmental interests. This necessitates the need for investment in consumer education (Kuwa & Ahmed, 2020) about sustainability issues. Thus, the popularity of E-commerce and online shopping in recent years has highlighted the need for a more efficient, sustainable and reliable reverse logistics mechanism (Dutta et al, 2020). The environmental impact of e-commerce packaging has increased significantly in the last few years. Packaging materials and technology evolved quickly until the 90's but later on further reductions in cost and further reductions in their environmental impact became a challenge. Packaging material made from non-renewable materials add to the complexity (Escursell et al, 2020).

There are different assessments of the environmental impact of E-commerce compared to traditional retail. E-commerce reduces greenhouse gas emissions due to reduction in travelling needs of individual customers (Chueamuangphan, Kashyap & Visvanathan, 2020). However, E-commerce operations are being criticized for not being sustainable. Increase in packaging waste, high return rates (& destruction of returned goods) and longer distances to be covered for delivery of the items are the main concerns that need to be addressed (Sievering, 2020).

Packaging waste from e-commerce is however a huge dampener. The adverse impacts of online shopping can be classified as first order (information and communication technology equipment usage), second order (changing the logistics processes for product fulfillment and delivery) and third order (rebound) effects (Chueamuangphan, Kashyap & Visvanathan, 2020).

Waste due to large amount of packaging materials from the express delivery in E-commerce is causing concern. Research has revealed that the waste of express delivery packaging materials in China has increased from 0.2 million metric tons in 2007 to 9.2 million metric tons in 2018 (Su, Duan et al, 2020)

Consumer awareness about green initiatives has greatly increased in recent times. But will this awareness lead to responsible consumer behavior while placing online orders is something that needs to be investigated. Only the right behavior on the part of consumers can make it easy to adopt green logistics practices. Consumers have to be sensitized to the need to adopt environment friendly measures (Kavas, 2020).

Communication gaps exist between e-tailers, consumers and logistics service providers. Etailers determine the distribution alternatives on their websites while logistics service providers develop and offer the distribution services. This leads to a situation wherein customers have limited options to influence greening of the logistics operations (Sallnas & Bjorklund, 2020). It is essential to develop consumption behavior that is aligned with sustainability goals (Chueamuangphan, Kashyap & Visvanathan, 2020) but e-tailers should also work with logistics service providers to drive their sustainability agenda.

If customers are educated about the environmental and social impacts of last-mile deliveries, they are likely to choose a more sustainable last-mile delivery. E-commerce companies have to give consumers the option of choosing between different deliveries based on cost considerations as well as environmental and social factors. However, their responses in the survey conducted as part of empirical study may be different from their actual behavior (Ignat & Chankov, 2020).

Opportunities to reduce consumption of packaging materials and mitigate their impact will need policy measures by Governments (Su, Duan et al, 2020) to support the greening of the logistics operations. Reduction in waste through process of recycling, recovery and remanufacturing helps minimize environmental losses (Dutta et al, 2020)

More research is needed to identify the use of sustainable packaging materials like cellulose containing materials like carton board. Distribution processes need improvement. The whole e-commerce packaging paradigm needs to be revisited (Escursell et al, 2020). Transformation of e-commerce into green e-commerce will require e-commerce companies to invest in packaging innovation, sustainable supply chain mechanisms and reverse logistics systems to promote reuse and recycling (Chueamuangphan, Kashyap & Visvanathan, 2020).

The four impact (economic, social, environmental, and technological) dimensions on E-commerce operations haven't received much attention in literature. This impact needs an investigation to shape public policy (Viu-Roig & Alvarez-Palau, 2020).

Supply chains have to become socially responsible to mitigate the harmful effects on environment (Zhang et al, 2020) by aligning sustainability goals with those of corporate social responsibility. E-commerce plays a crucial role in creation of a circular economy. A circular economy is based on the principles of designing out waste and pollution and regenerating natural systems. It is a systematic approach to economic development designed to benefit communities, environment and businesses. The circular economy is thus an economic system that is intended to eliminate waste so that resources can be continually used. Circular value can be generated by cost reduction measures, generation of revenues and migration of revenues (Lacy, Long & Spindler, 2020).

Environmental, social and economic aspects of the Internet revolution are important for the e-commerce sector. It is essential to understand how the e-commerce sector can be made more sustainable. Integration of stakeholders' interest is essential for sustainability of the e-commerce sector. There has to be a trade-off between these three aspects. E-commerce can become sustainable if all the three aspects – social, economic and environmental – are considered as fundamental elements. They must not be treated in isolation (Olah et al, 2019).

Success of e-commerce relies on the integration of transportation, information and communication technologies. Individual packaging and multi modal transportation are other sources that cause an adverse impact of e-commerce operations on environment. Web based marketing can lead to consumerism and profligacy. Faster delivery entails trucks playing at less than their full load capacity (Tiwari & Singh, 2011)

A four-step approach has been recommended so that retailers can adjust their distribution network to make their operations more environment-friendly and achieve operational efficiency. These efforts led to a productive outcome when implemented in Coppel, a Mexican retail chain (Gatmaitan & Pozo, 2020). These steps are

1. Measuring the current capacity of the system
2. Forecasting future demand
3. Adjusting capacity to meet forecasted demand
4. Quantifying the environmental impact of each adjustment.

Research Objectives

It is clear from the review of the literature that the issues of adverse environmental impact of E-commerce must be viewed from the lens of actions needed by three crucial stakeholders – the consumers, the E-commerce companies and the Government. The issue needs punctilious attention to arrive at meaningful solutions. However this needs examination of the challenges with a greater sense of acuity.

It is easy to lob at the environmental damage caused by E-commerce due to greater solid waste (packaging) accumulation but we must also remember the contribution of E-commerce to a nation's GDP. Having said this, it is pertinent that E-commerce players strike a balance between their profit motives and environmental goals.

A daisy-chained approach will need E-commerce players to interact with other business stakeholders like logistics service providers and suppliers to ensure fulfilment of sustainability agenda rather than make vaunted efforts about the revenue that they have generated.

The Government must play an important role in regulation of E-commerce players to minimize the environmental risks posed by E-commerce transactions. Thus, we arrive at the research objectives as under:

1. To identify the sources of adverse environmental impact of E-commerce purchases.

2. To address the environmental risks in E-commerce deliveries and propose a solution to mitigate those risks.

3. To investigate the methods by which online shopping can be made more environment-friendly.

The Role of Packaging in E-commerce

E-commerce companies are now forced to invest in packaging so that they can meet consumer expectations and influence the latter's perceptions in their favor.

Packaging has, in the last few years, become an integral component of marketing so much that some academicians have included it as one of the additional Ps (in addition to Mc Carthy's 4Ps of marketing). In brick-and-mortar, packaging was able to help consumers differentiate between products and influence shelf presence. Packaging has been playing a crucial role in influencing consumer behavior.

Packaging for omni-channel commerce can vary. Purchasing decisions in E-commerce are different and so are the distribution channels. The effects of a damaged pack reaching the consumer in an e-commerce transaction can be devastating. Consumers are aggressive when they have to voice their displeasure with a service outcome that was much lower than what they expected. The resulting dip in their zone of tolerance leads to negative outbursts on social media. This can in turn adversely affect the purchasing behavior of other consumers intending to buy similar products. Research by e-marketer revealed that 83% consumers are unlikely to purchase from an online retailer again after a poor experience.

A company's packaging decisions can result in three types of impacts – the financial impact, the sustainability impact and the emotional impact. Financial impact takes precedence over the other two. In brick-and-mortar retail, handling is by fork lift through a majority of the supply chain. Such packaging designs are not sufficient for e-commerce deliveries. Shipping products has to be done with care and caution – characteristics of products must not harm one another during transportation. Over packaging as an additional precautionary measure can lead to erosion of margins.

If the product is not properly protected through packaging, there is a greater risk of damage and such damaged products end up in the landfill. Over packaging, on the other hand, is an inefficient solution.

In E-commerce, the emotional impact comes into play when customers receive the box. Perceived damage is as severe as actual damage as the consumer might refuse to accept the pack even though the product inside may be fine. Environmentally conscious consumers can express their concerns on social media if they receive a consignment that is over packaged.

Thus, changes in consumer's buying behavior should drive e-commerce packaging decisions that affect future return sales. Consumer expression on social media can impact purchasing decisions of other consumers.

Types of Shoppers

Table -1
Online Retails make various ways to shopping more environment friendly

✔ Use of greener shipping options-delivery using bikes and electric vehicles
✔ Avoid plastic and paper –use recycled cardboard box; avoid individual packaging; the boxes can be reused for storage or can be recycled
✔ Reuse packaging
✔ Stop use of large packages for small items; for example, use of standard size boxes to ship all goods will require filling of the free space with packing materials leading to unnecessary packaging
✔ Ensure that product descriptions are detailed so that customers don't place orders for wrong items. This will minimize returns
✔ Request customers to wait a little longer so that parcels can be consolidated to avoid multiple deliveries; this requires e-tailers to educate their customers on the environmental impact of their purchases and the benefits of choosing sustainable options
✔ Online retailers should desist from making false promises and creating misleading advertising. They should not attempt green washing. When an organization spends more as sustainable instead of minimizing the environmental impact of their operations, this phenomenon is referred to as green washing

Conclusion

The American Institute for Packaging and the Environment claims that growth of e-commerce will result in challenges for waste management industry. Online sales need more touch-points for a product throughout the delivery process. E-commerce packaging has to be sturdier as goods have to reach customers in a good condition. The different type of packaging requirements for e-commerce will create new opportunities in sustainability and supply chain optimization. Logistics needs of e-commerce are starkly different from brick-and-mortar stores. But recycling of waste will continue to an area that needs a sharp focus. Frequent deliveries are also a burden on transportation infrastructure.

Research has revealed that nearly a third of the solid waste in USA originates from e-commerce packaging. There is a prediction that half of all sales in the USA will become online by 2028. The distribution, packaging and returns of online goods can be a major contributor to carbon emissions. Sustainable online shopping is the need of the hour.

Emerging trends in the market place point to the fact that environmental sustainability can enable an organization to increase sales by focusing on customers who prefer to purchase from a company that is green.

Many brands are now realizing the value of producing goods in an environment friendly manner. Sustainable products are sold at a premium. Younger consumers demonstrate a greater level of eco-consciousness.

The toxic chemicals (like brominated flame retardants, polyvinyl chloride and Bisphenol A)   used in the production of packaging materials can affect human health as they enter our food cycle. Long-term exposure to even small amounts of Styrofoam can cause fatigue, nervousness and sleep disorders.

At present, there is no Indian law to regulate e-commerce packaging. Legal experts point to the need for enforcing regulations pertaining to Extended Producer Responsibility (EPR). This mandates that the producer of the waste (packaging products/ plastic) shall be responsible for its end-of-life recycling and disposal. Methods for e-commerce packaging must be based on scientific and environmentally sound principles. Sustainable, environment-friendly packaging is the need of the hour.

E-commerce industry must investigate the prospect of reducing the amount of packaging materials used, recyclability of packaging materials and increase in the use of recycled packaging materials. Customers must be offered the choice of opting for more sustainable methods of packaging.

It is clear that excessive use of plastic and other packaging materials is environmentally unsustainable. The globe in general and India in particular needs a sustainable packaging revolution.

Bigger boxes, more layers, and air pockets will offer great protection to the product that is packed. But once the product is received, these packaging materials will end up as a waste. 72% of consumers around the world are willing to pay more for sustainable packaging. E-commerce companies can also replace filler material with void filling paper, shredding paper or card holders to protect items. If e-commerce companies can commit to cutting down the plastic consumption in packaging, it can make a great difference to the environment. Cardboard, bio plastics and paper packaging are reusable and biodegradable.

Competitive pressure is the driver of demand. E-commerce is mainly driven by market forces. The impacts of government policy are greater for developing nations. Research shows evidence that E-commerce players will respond to customer pressures more than suppliers.

Manufacturers can encourage shippers to use alternative fuels. E commerce industry should improve the efficiency of their product delivery system and move towards environmentally sound packaging. Before opening a new warehouse, e-tailers must do a comparative life cycle analysis.

Earlier customers spent a lot of time shopping in retail stores – but now they spend more time browsing at e-commerce sites. E-commerce companies compete with one another by offering discounts and best prices and super-fast delivery. But we need to remember that this kind of customer service may satisfy customers but will end up harming the environment in the long run. The adverse impact of mounting solid packaging waste on environment and on communities can be devastating. The need is to educate consumers on the strategic power of sustainable delivery. Only environmentally conscious consumers can steer a change in the E-commerce operations for the better. The social, economic and environmental impact of E-commerce operations needs a detailed investigation on war-footing.

Directions for Further Research

The backend processes in E-commerce are complex and intricate. Supply chains have to move
fast to innovate and satisfy customers. However, the environment-friendliness of the delivery aspect of E-commerce has not received sufficient attention from a standpoint of academic research. While offline retail stores are attempting to create a feel-good image in the minds of consumers using the sustainability plank, the attention of e-commerce is, at present, more skewed towards growing revenues by satisfying / delighting consumers. There is also an allegation by skeptics that e-commerce is encouraging consumerism – shoppers buying more than what is needed.

More research is needed to understand the needs of other stakeholders in e-commerce and how this can affect the delivery process. A quantitative research to understand whether consumer's awareness about the need to go green translates into sustainable

buying behaviors will further add to the body of knowledge. Future studies can explore if an attitude of greater sensitivity towards environmental impacts of their actions will dissuade online consumers from placing smaller and frequent orders. The intent of becoming environmentally responsible must be matched by actions of consumers in real-time while they indulge in online shopping. E-commerce players have a huge role to play in engendering this behavioral transformation.

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