



Sustainable e-Commerce Shipping Landscape Study

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1. Introduction

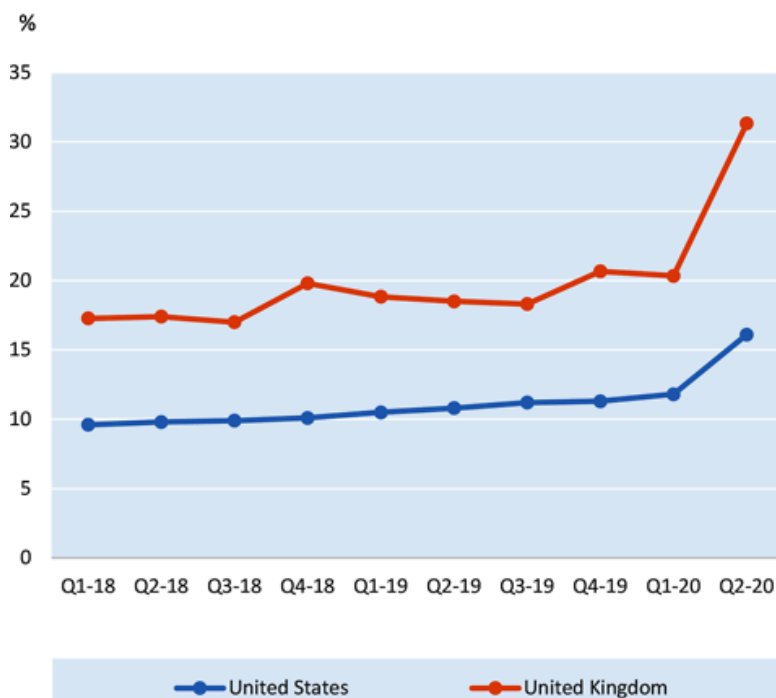


This is a picture from a random day in my household, where currently it is just my husband and I. All of those packages arrived on a single day. At different times, most from the same providers, yes we might order a little too much from Amazon. Though something like this happens multiple times a week, and it only has gotten worse since covid has started. Think of how many more packages you have received this year, was most of your Black Friday shopping done online? I know mine was. With the start of covid and lockdowns around the world, many turned to e-commerce to shop.

E-commerce has gone up a significant amount and so have deliveries. According to UN trade and development experts UNCTAD, the e-commerce sector saw a “dramatic” rise in its share of all retail sales from 16% to 19% in 2020. That’s quite significant.

Source: <https://unctad.org/news/global-e-commerce-jumps-267-trillion-covid-19-boosts-online-sales>
UNCTAD: <http://unctad.org/en/Pages/Home.aspx>

Figure 1.a. Share of e-commerce in total retail sales, United Kingdom and United States (2018-2020)



Consumers are on board with packaging that makes environmental sense

- Sustainability-marketed products grew 7.1 times faster
- A P&G study from the Gillette men’s razor division found that 54% of men cared about sustainability now more than ever.
- Consumers are even willing to pay over 10% more for sustainable packaging

Sources:

<https://www.stern.nyu.edu/sites/default/files/assets/documents/NYU%20Stern%20CSB%20Sustainable%20Market%20Share%20Index%202020.pdf>

<https://www.forbes.com/sites/forbesbusinesscouncil/2021/11/02/creating-sustainable-packaging-and-communication-strategies-that-benefit-the-bottom-line/?sh=6228b3135056>

https://www.google.com/url?q=https://www.cosmeticsdesign.com/Article/2020/10/29/Male-consumers-interested-in-sustainability-during-COVID-19&sa=D&source=editors&ust=1638587761640000&usg=AOvVaw0jxuLJmykFcD6Pbi_fcUFQ

<https://triviumpackaging.com/sustainability/2021BuyingGreenReport.pdf>

All shipped items require some degree of packaging, but the online shipping boom is [creating a massive cardboard footprint](#) from all of the materials used to ship. Additionally, organizations want to make sure their products are received in perfect condition. This can result in excessive padding techniques using styrofoam packing peanuts or additional paper. When people want something, they want it now, and this can result in buying a number of items one-at-a-time, rather than waiting and making a larger order.

Source:

<https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/containers-and-packaging-product-specific-data>

<https://www.sana-commerce.com/blog/impact-of-ecommerce-on-the-environment/>

Additional video highlighting the problem

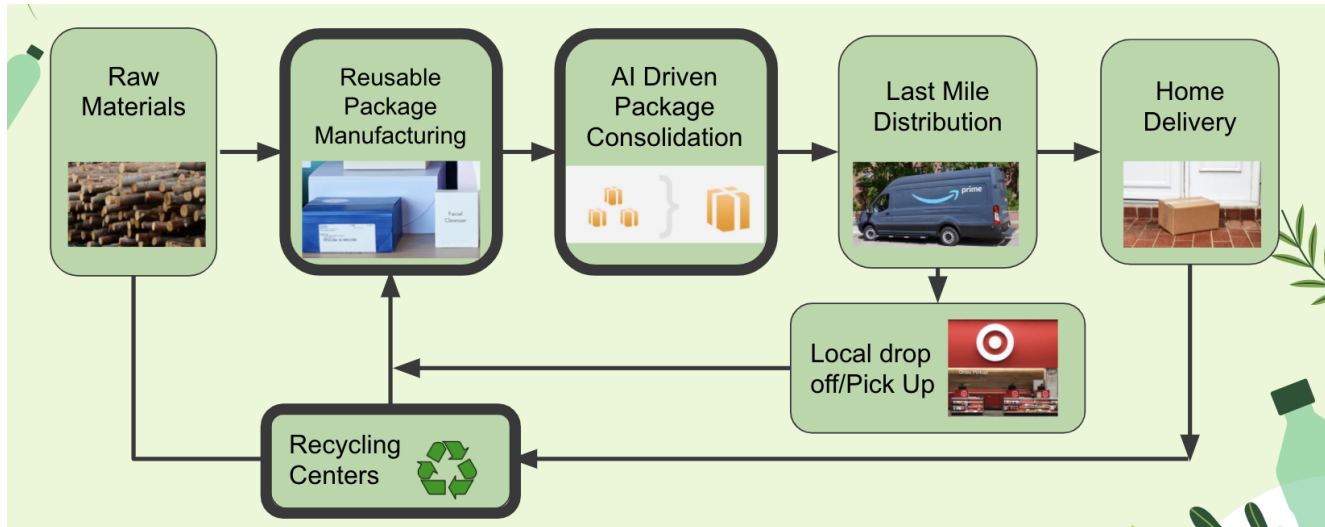
<https://abc7chicago.com/cardboard-recycling-packaging-box-boxes/5302139/>

The challenge is that consumers are often bombarded with incomplete and confusing messaging and lacking infrastructure when it comes to disposal and recycling.

<https://www.packaginginsights.com/news/puzzled-by-plastics-global-consumers-lack-confidence-in-recycling-and-collection-systems-hi-cone-report-concludes.html>

2. E-commerce Sustainable Shipping Ecosystem

The ecosystem shown below highlights the ideal sustainable flow of packaging material from raw material to end user and through the recycling process. While each pillar plays a crucial role in the sustainable process, today's major players are centered around innovation in packaging, optimizations in package consolidation, and a robust recycling program.



2.1 Recycling Process

2.1.1 Existing Market

Contrary to [popular sources](#) the US recycling rate is *not* 34.5% like it was in 2015. The recycling rate for all materials (solid waste and compostable) fell from 34.7% in 2015, to **32.1% in 2018**. Americans are recycling less than we did in 2015. This is the most current EPA recycling statistic as of 2021. As yet, there is no news on how the pandemic directly impacted the recycling rate. On November 17th, 2020 at the America Recycles Summit – the Director of [the EPA announced](#) the goal to increase the national recycling rate to **50% by 2030**.

At the top of the list of measures taken to achieve the improvement in the recycling rate, is to **reduce contamination** in recycling. Wish-cycling is still enemy #1, with the EPA citing a stronger need for [public education and outreach](#).



2.1.2 Technologies

When businesses that involve manufacturing make recycling a priority, it can be more sustainable for the environment and have a positive impact on the bottom line. A [2020 study by the National Retail Federation and IBM](#) found nearly 70% of consumers in the U.S. and Canada think it's important for brands to be eco-friendly or sustainable. The manufacturing process plays a big part.

There are constantly evolving demands for various materials your plant could be recycling. For example, [as Republic Services reported in December 2020](#), recycled cardboard, boxes and packaging materials have been in recent demand due to increases in e-commerce and the demand for everyday products.

While there are some challenges, recycling in manufacturing continues to evolve and has come a long way in recent years. New technologies provide companies with more ways to recycle, and since consumers are increasingly ecologically minded, companies that embrace sustainability and improve their recycling efforts could offset recycling costs by improving customer sentiment and, thus, sales.

2.1.3 Challenges

1. **A lack of education** We have come a long way since the early days of recycling. More people are aware of the damage that various materials can create in the environment. However, an astonishing 13 percent of Americans still do not recycle at all. Only half of Americans recycle each day, so what is the problem? A lack of education appears to be an issue, despite the progress that has been made thus far. Many people know that recycling is a good habit, but they are unsure of which items can be recycled. It's this confusion that continues to push Americans toward the trash bin, rather than the recycling bin.
2. **A lack of support: Depending** on the size of the town or city, there may be more pressing needs than recycling to address on a regular basis. As a result, recycling falls by the wayside, and a lack of support contributes to the overall inefficiency of the community as a whole. In order for a recycling program to work, there needs to be cooperation from both legislators and residents who want to go green. Understanding the short-term and long-term benefits alike can motivate towns and cities to establish recycling programs sooner.
3. **Startup costs** It's not always easy for towns and cities to hop on board with the idea of recycling, especially when they learn the initial costs.
4. **A lack of alternative recycling options** In areas where curbside recycling is not an option, it's up to residents to travel to facilities in their town or city where they can recycle their used items. When this is the case, an entire community needs to come together in order to ensure there are enough alternative recycling options in the area.

2.2 Reusable Packaging

2.2.1 Example: Boox



One of the players in the recyclable and reusable packages is boox. Boox is the first shipping box specifically designed to be used over and over again.

It was selected as one of Time's best inventions in 2021.

It is constructed from polypropylene,

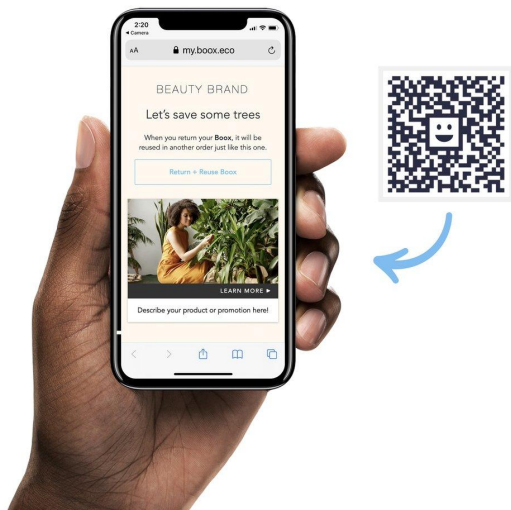
Costs a dollar to 2.50 per shipment

And it can make more than 20 journeys before being recycled.

Boox is really simple to use,
after customers unpack their items

1. they first fold the Boox flat,
2. scan a QR code,
3. and send it back to Boox with the included return label.

No other box or envelope is required



Boox is 44% lighter than a comparable cardboard box, resulting in 44% lower transport emissions

The manufacturing footprint of a brand new, reusable Boox is less than two single-use cardboard boxes

It breaks even on the first use, whether the customer returns it or not, due to the lower transport emissions and lower waste/recycling emissions of Booxes

- After 10 shipments, a single Boox has 70% lower impact compared to cardboard
- Boox's business model reduces packaging waste to landfill by 76%
- Booxes are made from 50% post-consumer material; average cardboard box is only 25-40% post-consumer recycled material

Sources:

<https://boox.eco/>

<https://time.com/collection/best-inventions-2021/6113127/boox/>

https://cdn.shopify.com/s/files/1/0485/9949/8919/files/Boox_LCA_Methodology.pdf?v=1636430706

2.2.1 Example: The Better Packaging

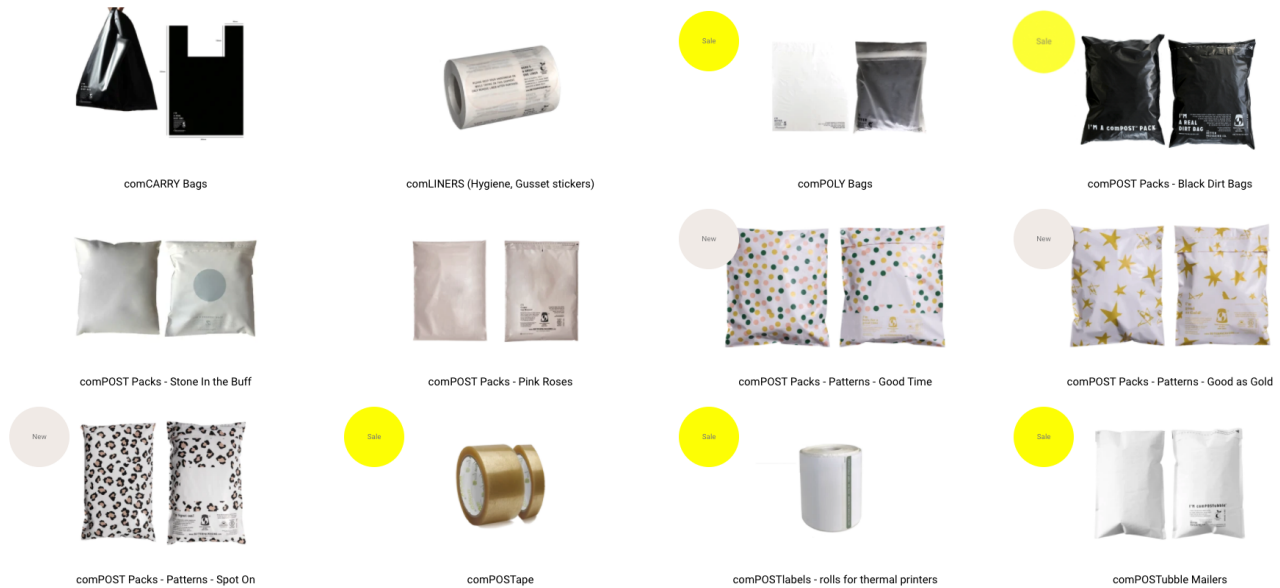
They develop a sustainable packaging solution that considers the complete lifecycle impact of a product from raw material sourcing, right through the end-of-life disposal.

Customer list already include Rip Curl, L'Oreal, Karen Walker, and AllBirds, to name a few

They are getting more adoption with the month-on-month growth of 15% and an expanding catalogue of sustainable packaging options

<https://www.betterpackaging.com/>

<https://theecobahn.com/packaging/the-better-packaging-co-interview-sustainable-packaging/>



The Better packaging has a growing catalog of items. They are a provider of home compostable packaging designed to support eCommerce. From courier satchels and padded mailers, to poly bags and thermal labels

- A description of their comPOLY Bag: I'm made from corn starch with [a man-made binding agent](#) added for flexibility. I am slightly milky in colour but am definitely see-through and bar codes can be read through me. But the best bit ... I can be composted at home! Yip, when you've finished using me, just put me in with your food scraps and garden waste, and before you know it, worms will be eating me for breakfast. Better. Right.

Source:

<https://www.betterpackaging.com/>



Description of the comPOST pack:

I'm the original comPOST Pack - a certified home compostable, fully biodegradable mailing satchel partly made from plants. I have a lovely, matt finish with printed graphics as per the image gallery. I'm flat (i.e. no gusset, but some stretch) with a flap and self-seal strip.

2.3 Package Consolidation

Package consolidation is the practice of combining multiple items from the same order/multiple orders into a single package for e-Commerce shipping.

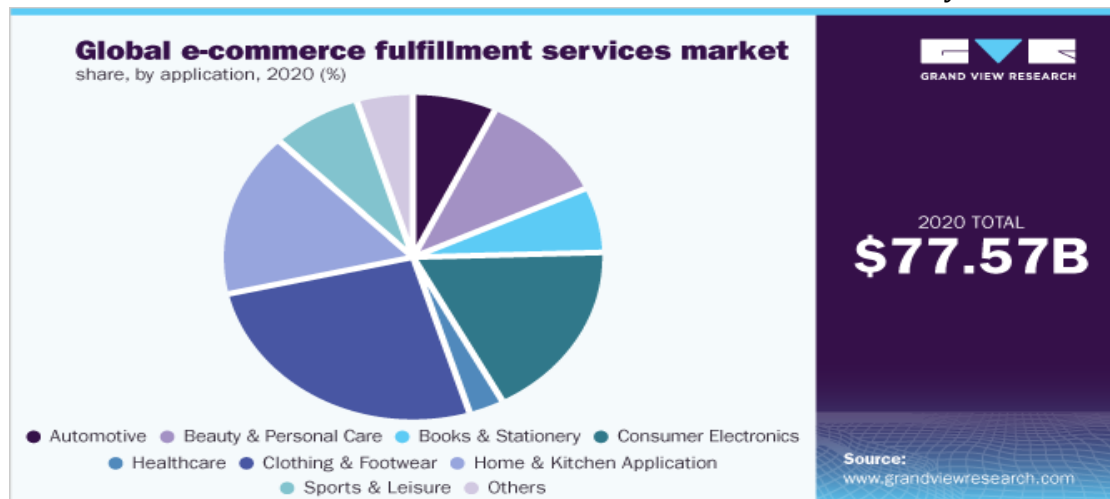
Benefits of package consolidations:

- ❖ Save cost
- ❖ Reduce damage risk
- ❖ Lower fuel emission and expenditure
- ❖ Improve quality control

2.3.1 Existing Market & Technologies



2.3.1.1 e-Commerce fulfillment market

The market size in 2020 is \$77.57 B. And it will be worth \$168.72 B by 2028.



2.3.1.2 e-Commerce retailer domestic shipping

Major players: Amazon and Target.

Company	Common Service	Differentiators	Constraints
	Order consolidation with \$1 incentive	Automated process	Items from same Amazon fulfillment center
		Multiple items from different Target stores	

Amazon:

- (1) Combine items from multiple orders in one package.
- (2) Order combination is an automated process.
- (3) Multiple orders are placed through the same customer account.
- (4) The orders are being shipped to the same address.
- (5) Items from each order are located at the same Amazon fulfillment center.
- (6) The orders are shipping at around the same time.
- (7) Combine items from multiple orders into a single package won't change the amount of shipping you pay for each order. You'll be charged separate shipping charges for each of your orders.

Target:

- (1) \$1 incentive for order consolidation.





Order Summary	
Subtotal (2 items)	\$34.98
Discounts	-\$16.99
Buy 1 Get 1 Free On Swimwear	
Redcard 5% Discount	
\$1 Consolidation Discount	
Delivery	Free
Estimated Taxes	\$1.35
<hr/>	
Total	\$19.34

- (2) Combine multiple items from different Target stores.
- (3) Received positive responses from shoppers.

Apart from order consolidation, Target supports in store pick up and drive up.

2.3.1.3 e-Commerce international shipping

Major players: Ship7, Buyee, MyUs.com, DHL easy shop, and OPAS.

Company	Common Service	Supported Countries
	How does it work: <ol style="list-style-type: none"> Multiple online orders in Country A Ship multiple packages to a centralized address (Country A) Package consolidation Ship one package to shoppers in Country B Benefits: <ol style="list-style-type: none"> Save cost (~80%). Reduce damage risk. Lower fuel emission and expenditure. 	USA UK
		USA Japan
		USA UK
		USA UK

	4. Improve quality control.	USA UK
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Ship7:

- (1) Store & Forward.
- (2) Consolidation.
- (3) Repacking.

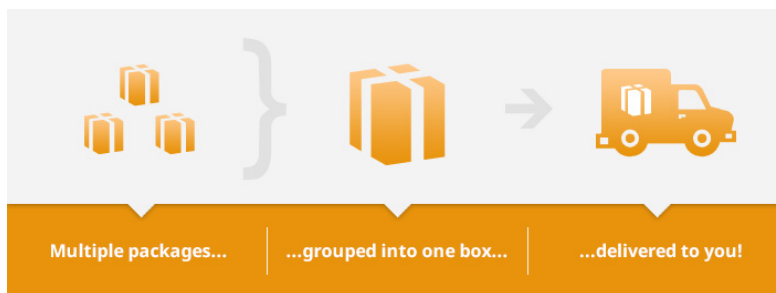
How does it work:



Buyee:

- (1) Cheaper international shipping fee.
- (2) Only available for packages that are stored in the same warehouses in Japan and US.

How does it work:



MyUs.com:

- (1) Package Consolidation.
- (2) 6.6 million members.
- (3) Saving over \$67.5 million on shipping costs (~80%).

How does it work:



DHL easy shop:

- (1) Shop at multiple stores and have your packages delivered to your unique DHL EasyShop

address.

(2) When all of your packages have arrived and are ready to ship, simply consolidate your packages into one virtual shipment to save on international shipping fees.

(3) Can share with a friend or family member.

(4) 14 days of free storage.

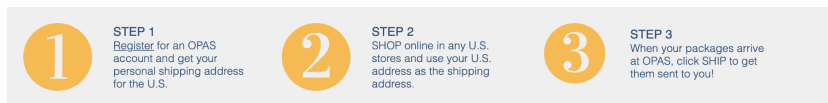
OPAS:

(1) Package Consolidation.

(2) Combine US purchases (multiple stores) and save more on international shipping costs.

(3) Require a US address for package consolidation.

How does it work:



2.3.1.4 e-Commerce supply chain consolidation center

Walmart has been building high-tech (AI driven) consolidation centers to add efficiency to the supply chain. Consolidation centers have a specialized role in moving products quickly on their journey to the customer. These centers receive less than a truckload (known in the industry as LTL) of general merchandise items like toys and kitchen appliances from suppliers, consolidate quantities of this freight in a full truckload (TL) and ship it to regional distribution centers. This allows Walmart's 42 regional centers to focus on the next step – distributing products to stores.



3. Regulations

A big challenge we think we will need to overcome is governments are reluctant to do many of the regulations for recycling.

There are a few exceptions that we think are really helping an individual's behavior. For example, in San Francisco, the city passed Mandatory Recycling and Composting Ordinance in 2009, which requires everyone in the city to keep recyclables, compostable and trash separated. The city also committed to reducing solid waste generation 15% and disposal to landfill or incineration b50% by 2030.

Similarly, Japan's citizens also follow very strict recycling guidelines at home. Waste is picked up on a daily basis and trash is separated and most of it is recycled. Landfill use is at a bare minimum in Japan.

4. Conclusions & Recommendations

Our recommendations in order to make sustainable e-commerce shipping a success in the future is for governments and non-profit organizations to help raise public awareness through campaigns and mandates. We know that awareness and simple mandates really help to change our behaviours. For example, Haiyan, one of our team members mentioned that once plastic bags were no longer free at grocery stores, he stopped using them, or even a co-worker in his office pointing out to him that he was always using paper cups instead of mugs had the intended effect of making him switch over. Raising awareness matters.

Currently the profit margin on sustainable shipping is low. We need more government subsidies for infrastructure improvements.

Since the industry is currently really fragmented, we would also need major ecommerce players and shipping companies to collaborate together

We want to challenge every player to think of creative solutions for packaging, for example Gigi received this sustainable packaging with her alternative meat food shipment from PrimeRoots, which is a company founded by a Berkeley Grad. The more usage we have for the second life of a packaging the more we can help our environment.

