# How e-commerce affects sustainability at multiple levels, environmentally and socioeconomically

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## Abstract

Ecommerce is increasingly popular and has grown exponentially in the past few decades. However, it is responsible for disastrous environmental degradation resulting from its abundant CO2 emissions and plastic pollution. This study delves deeper into the exploring global role that e-commerce has played and continues to play in climate change. Firstly, by investigating the role that it plays in the environment, then by looking at its logistics and packaging, and additionally by discussing the role that consumer perception plays in e-commerce companies' decision making. A key concept in this study is that e-commerce harms the environment by the potentially avoidable pollution caused by its unsustainable packaging. Materials used in such packaging are often single-use plastics which are utilized excessively in proportion to the item it envelopes and contributes to the 30% of waste e-commerce holds in America. Another key result is that e-commerce popularized next-day deliveries. This exacerbates its extensive logistic network situation with an increasingly harmful use of CO2 at a global scale. These rushed deliveries increased e-commerce CO2 emissions by 68%.

These results are highlighted in a case study on Amazon in the following ways: by looking at what Amazon has replaced in terms of packaging and transportation, and how much of it. While Amazon has made strides in reducing packaging and including electric vehicles delivery, there is much progress remaining to be fulfilled. On a larger scale, these results signify that e-commerce is growing but is still in need of improvement to grow at the pace it is while also being sustainable. The continuous and even increasing effects of e-commerce are serious. People and industries could take actions such as placing shipments together, recycling properly, using less packaging, and using sustainable materials to minimize those effects.

## Introduction

Imagine the Earth being wrapped around 800 times in air pillows. While this may seem dreamy and comforting, in reality this number reflects the amount of plastic packaging Amazon produced solely in the year 2021 (Rosane, 2022)[1]. E-commerce, or the practice of selling and purchasing goods online, has been on a steady rise since the mid 1990s (Tian, Stewart, 2023)[2]. However, this practice skyrocketed as a result of the global pandemic. This vast escalation in cybercommerce has severely impacted the environment.

Numerous factors such as overpackaging, packages being far too big for their respective item, and a lack of recycling systems for plastic packaging results in a high increase of plastic waste in the biosphere. Notably, our oceans and their inhabitants bear the brunt of this outcome, as 8 million tons of plastic seeps into what holds 70% of our earth (Kosior, Edward, 2020)[3]. While E-commerce seems well organized and suited to modern life, 29.8% of waste in America, or 75 millions tons, directly derives from these online delivery systems (Bertram, Chi, 2017)[4]. All this unrecyclable plastic poses huge problems for ecosystems, wildlife, and human health,

[1] Rosane, "Amazon's Plastic Packaging Problem Is Growing, Oceana Report Finds."
[2] "History of E-Commerce."
[3] "Current Industry Position on Plastic Production and Recycling."
[4] Bertram and Chi, "A Study of Companies' Business Responses to Fashion e-Commerce's Environmental Impact."

especially in developing countries. For example, plastic contaminates oceans and alters ocean pH, which causes abnormalities and alters the lifespans of certain organisms (Piccardo, Provenza, Grazioli, Anselmi, Terlizzi, Renzi, 2021)[5]. Although some positives have arisen from the popularization of e-commerce, such as the reduction of CO2 emissions caused by consumers, the negative environmental effects from packaging waste are distinctly much more substantial.

Oversized packaging causes 5 million yearly unwarranted delivery journeys in England alone (Reed, 2022)[6]. This implies that due to the large size of the package, less packages can fit 5 per shipment vehicle than if the packages were smaller. So, more trips or more vehicles have to be taken between the shipment facility and consumers' homes to carry all the packages. If frequent, these unwarranted journeys have the potential to increase CO2 emissions and offset any potential gains the e-commerce has over in-person shopping. While decreasing package size and amount of filler might solve various transportation and environment problems, it is critical to consider consumer opinion involving trust and satisfaction. Thus, tackling these problems could be more efficient through legislative measures such as encouraging delivery systems to create recycle-networks for post-delivery waste or implementing packaging and environment protecting taxes (Li, 2021)[7]. Fortunately, one such existing legislative measure, The 2022 Inflation Reduction Act, aims to cut emissions which pushes delivery companies in the right direction to minimizing climate damage. In 2021, the European Union passed the European Climate Law, which has similar goals to the IRA. It aims to reach no greenhouse gas emissions by 2050 in addition to a few more objectives. More relevant and more recent climate laws fall under the 2023 California Climate Accountability package. These bills are a part of a global movement that requires companies to report their greenhouse gas emissions and more to measure climate risk. While introduced in 2023, the requirements are still in the process of unfolding and the long-awaited reports are continuously being postponed (McGowan, 2024)[8]. Corporations are stuck, however, between abiding to climate legislation goals, food delivery packaging requirements (increases waste), making sufficient revenue, and fulfilling customer expectations (Pullman, Fenske, Wakeland, 2010[9]). Another aspect of the e-commerce process governments should pass legislation for is the unjust treatment of developing countries and areas who suffer from factory pollution, poor treatment of laborers, and unfair imports. While this isn't entirely a climate issue but rather a social issue, it's just as important to enforce regulations for these problems as well. In short, legislation can help fine-tune multiple aspects of the e-commerce industry to become more friendly towards the environment as well as humans.

After introducing e-commerce and its effects on the environment, transportation, economy, legislations, and the public, I present a case study of Amazon, which exemplifies all these topics allowing me to highlight aspects such as popularity, sustainability, policies, technology, and reported data in more specific detail. Amazon is the spitting image of the rise of e-commerce and holds influence globally. Environmentally, Amazon has created significant damage, as seen in the creation of 709 million pounds of plastic waste solely in 2021. Amazon

[5] Piccardo et al., "Impacts of Plastic-Made Packaging on Marine Key Species."
[6] "What's Worse for the Planet than Millions of Vans Delivering Shopping? Millions of Vans Delivering Air | Waste | The Guardian."
[7] Han et al., "Impact Analysis of Environmental and Social Factors on Early-Stage COVID-19 Transmission in China by Machine Learning."
[8] "California Moves To Delay Corporate Climate Reporting Requirement Until 2028."
[9] Portland State University et al., *Food Delivery Footprint*.

and other influential companies must change their policies in order to create a positive domino effect throughout the e-commerce industry.

**Section 1: Environmental Effects**

Oceans are the environment most affected by e-commerce. Oceans are a carbon sink, meaning they absorb more CO2 than they release, and thus are more vulnerable to climate change. Not only can global warming impact oceans, but overfishing, habitat destruction, and pollution all degrade the oceans (Worm et al. 2006)[10]. This results in a phenomenon known as reduced biodiversity. The acidification of the waters, the rise in temperatures, and the tons of microplastics fatally stress many organisms in ocean environments, causing their death or relocation, and reduced biodiversity in respective regions (Craig 2012)[11]. Biodiversity is critical for healthy ecosystems because it is what dictates whether an ecosystem is strong enough to survive drastic climate changes. Biodiversity is measured through three specific lenses: species, ecosystem, and genetic. The more species there are, the more relationships formed that intertwine into food and energy webs. The variety of ecosystems support more species and provide more resources and nutrients. Variations in genes allow for natural selection (rather than die-offs), meaning organisms with genes that help them survive their changing habitats continue to reproduce those stronger genes. Losing biodiversity can potentially regroup and distribute what used to be strong ecosystems. With the change of climates, ecosystems shift north or south towards their preferred temperatures within their range of tolerance. And as different species need different climates and resources to survive, slight changes of these necessities may disrupt ecosystems as individuals relocate for their own needs. Not only that, but shaky food supplies from altered ecosystem food webs  and water conditions from changing temperatures could result from reduced biodiversity, affecting humans directly.

Because oceans are CO2 sinks, as more CO2 is emitted, the oceans will get warmer. A large majority of the ocean has increased between 0.2 and 1 degrees celsius (Craig, 2012). While those numbers seem miniscule, this increase has already created major changes in the inner workings of our oceans. For instance, Phytoplankton, which are a principal factor in regulating climate change as they absorb carbon through photosynthesis, are having their ability weakened by the rise in temperature of the ocean. As the ocean rises, a phenomenon known as upwelling which brings nutrients upwards from the depths of the ocean is reduced. Since phytoplankton need these nutrients to grow, their ability to photosynthesize is weakened as they themselves are weaker and even experiencing a decline in population. This can be catastrophic as there are billions of Phytoplankton, and their role of supporting oceanic life and maintaining decreased CO2 levels is so key that their demise would have a serious global effect (Dutkiewicz, 2022)[12]. Phytoplankton are the primary producers of the oceans and are the base of almost all food and energy pyramids. Marine organisms have food resources because of phytoplankton and the CO2 levels are much lower than they could be because of them as well. Furthermore, organisms, including phytoplankton, can't adapt quickly enough to the effects of climate change. Rapid changes in their environment, such as temperature changes, can cause death, decreased biodiversity, and a broken food supply chain.

[10] "Impacts of Biodiversity Loss on Ocean Ecosystem Services | Science."
[11] Turley and Gattuso, "Future Biological and Ecosystem Impacts of Ocean Acidification and Their Socioeconomic-Policy Implications."
[12] Dutkiewicz and Müller, "The History of Cenozoic Carbonate Flux in the Atlantic Ocean Constrained by Multiple Regional Carbonate Compensation Depth Reconstructions."

Since the dawn of the Industrial Revolution, and the explosion of the use of fossil fuels, emissions have skyrocketed. All of this CO2 leads to ocean acidification or the change in the ocean's pH, a measure of acidity. The pH changes when CO2 dissolves into the seawater and reacts to form carbonic acid. Already, the ocean's pH dropped 0.1 units towards acidity and is predicted to drop even further. The main category of species affected by acidification are those with shells who need calcium carbonate to build these exoskeletons. These calcifying organisms are important in both the carbon cycle and in aquaculture, thus their disappearance would be greatly felt (Weerathunga, 2023)[13].

Another factor of climate change is sea level rise. Sea level rise is caused by the melting of icebergs due to a global increase of 3 degrees celsius and thermal expansion. Thermal expansion can be defined as the tendency of matter to expand its size and density due to an increase in temperature. The sea has risen in both height and temperature in deeper waters 50% more than previously expected (Craig, 2012). This expectation was an increase of 0.5 to 1 degree celsius between 2007 and 2029, but the ocean temperature ended up increasing 4 degrees celsius from around 17 degrees in 2007 (NOAA, 2008)[14] to 21 degrees in 2024 (Copernicus, 2024)[15]. Risks associated with sea level rise are abnormalities in sea animals and decreases in the quantity of marine organisms such as fish, algae, and plankton. Abnormalities can look like the degradation of coral reef formation due to their vulnerability to a changing habitat (Domenici, 2020)[16]. Coral reefs are a major contributing organism to oceanic environments as they supply food and a habitat to many other organisms. Meaning that their depopulation will lead to the decrease of other populations as well. A decline in the amount of marine animals affects biodiversity as well. The rise in sea level will destroy 30% of our coastal wetlands (Craig, 2012), impacting marine biodiversity throughout the entire oceanic system as these areas have especially high biodiversity. These points contribute to the idea that sea-level rise, a result of climate change, has negative consequences for the survival of our marine ecosystems and organisms.

A further matter of concern is pollution. Pollution refers to the entrance of harmful materials to the environment, known as pollutants. Pollutants lead to various health problems and disturbances for both animals and humans alike such as respiratory issues, nutrient balance or damage of ecosystems, and population sizes. Various pollutants include Nitrogen Dioxide (NO2), Carbon, lead, and plastics–the focus and major byproduct of the increasing e-commerce. Firstly, plastics are very durable, taking years to compose meaning they linger in the environment (Vegter, 2014)[17]. Throughout their stay, plastics can negatively impact marine life in 3 main ways: entanglement, ingestion, and chemical contamination (Wilcox, Chris, 2016)[18]. Entanglement imposes the highest risk and death rates for oceanic animals, with plastic bags being one of the main forms of plastic to cause entanglement. Being stuck in plastic can be lethal quicker than ingestion, as it causes injury, dismemberment, and death. Still, ingestion is a major component that harms wildlife. Microplastics, for example, make up 80% of waste in

[13] "Weerathunga, V et al. (2023): Seawater Carbonate Chemistry and Fitness and Immune System of Pacific White Shrimp."
[14] "Monthly Climate Reports | National Climate Report | Annual 2008 | National Centers for Environmental Information (NCEI)."
[15] "California Moves To Delay Corporate Climate Reporting Requirement Until 2028."
[16] Domenici and Seebacher, "The Impacts of Climate Change on the Biomechanics of Animals."
[17] Vegter et al., "Global Research Priorities to Mitigate Plastic Pollution Impacts on Marine Wildlife."
[18] Wilcox et al., "Using Expert Elicitation to Estimate the Impacts of Plastic Pollution on Marine Wildlife."

oceans and are found in 9.2% of fish in the north Pacific (Wilcox, Chris 2016). Fish in this region ingest 12000 to 24000 tons of microplastic yearly. This plastic can block animals from receiving needed food and nutrients as well as choking and killing them directly.

**Section 2: Logistics and Packaging**

Around 170 years ago, the global population was 2 billion people. Now, there's just over 8 billion. This large increase of people is bound to lead to overconsumption of products and resources. And with this high demand coming from many corners of the earth, primarily from wealthy countries in the global north, there's a need for a transportation system to take care of the distribution of an abundance of products. With the rise of the internet, packages have become readily available with the click of a button. The effortlessness of the e-commerce process makes it convenient for many, which is why it is important to consider how popular these businesses are and how satisfying costumer's needs play into dealing with the transportation system of e-commerce.

One of the primary problems with this industry are the packages. The types of materials used in packaging are majorly plastic. To make matters worse, these plastics are typically single use or non-recyclable–meaning they are more convenient for short-term use. Using plastics with a shorter life span leads to the use of even more plastics (Lindwall, 2024)[19]. Companies can get away with this because while there are existing environmental protection laws, there aren't enough in number or aren't targeting the e-commerce industry to prevent all its pollution (Ho, 2022).[20] These plastics are made of petrochemicals, fossil-fuel based chemicals, which take up to 1000 years to decompose. For a lot of that time, they remain as microplastics which harm the health of many living things (Ho, 2022). Furthermore, 9 billion metric tons of plastics have been brought about since the 1950s and will pollute our earth for much longer (Lindwall, 2024). Not only are the materials of these packages damaging, but the amount of fillers are excessive. It is true that fillers are placed to protect packages along their journey, they ensure the product remains intact before the customer. However, this means that excess plastic is being potentially wasted in cases where the protective filler is not needed or fails to protect the package. This superficial strategy of product protection should be revisited in a more sustainable, effective, and efficient light. To add on, only 9% of the plastic used in this industry ends up being recycled, which highlights the importance of green and smart packaging techniques (Reed, 2022).One way that this issue could be solved is by configuring packages so that there are multiple products in one box.

Another problem with packaging is the amount of excess space in packages. Packages frequently arrive with a high volume of air that could've been used as space for more packages in a delivery truck, thus requiring fewer delivery runs. Either using smaller, better-fit boxes, or filling up larger boxes with multiple products would solve a few of these problems. Better-fit boxes would allow for more space in a delivery vehicle, requiring fewer vehicles or trips and releasing less carbon monoxide. Multiple products in a box would solve the previous issues as well as protect the products. Meaning, the less space there is for products to move and potentially break, the less need for plastic fillers.

However, customer perception should always be taken into account as consumers hold up our present-day economy. Some customers believe that more fillers and excessive

[19] "Single-Use Plastics 101."
[20] *The Dark Side of E-Commerce: The Negative Effects of E-Commerce on the Environment*.

packaging mean that the company they purchase from cares, is trustworthy, and has quality products. Escursell's study provides data explaining that 71% of customers are pleased and more prone to purchase from an e-commerce company again when their package seems "aesthetic", "premium", and within "brand image" (Escursell, 2021)[21]. These descriptions suggest that their package has more to it than a tight-fit box around their product. If customers are kept satisfied, companies will be kept in business and the economic cycle will continue to go round. Still, the environmental impacts involved with improper recycling and carbon emissions from e-commerce suggest that there should be ways to keep consumers satisfied while simultaneously saving the environment.

Another matter related to consumer preference, is the speed in which packages are delivered. The popularization of "one-day" deliveries and their convenience influence the type of delivery vehicles companies use. The demand for these fast deliveries result in a lack of full use of the space capacities or larger vehicles. Instead, companies opt for quick and constant delivery runs. This method of delivery is both more costly and more environmentally-impactful with the larger outputs of carbon. Specifically, one/two-day deliveries escalate prices by 15% and carbon emissions by 68% (Villamizar, 2021)[22]. Additionally, America is highly reliant on cars. Unfortunately, this mode of transportation emits the highest amounts of emissions in the transportation sector, which, in and of itself, has the most greenhouse gas outputs in the United States (Wesseler, 2023)[23]. Fast deliveries may use cars such as vans, or simply more trucks to get these high-demand shipments out in time. Both ground and air forms of travel are primarily powered by fossil fuels such as oil. Not only is the cost of oil high, but the cost of using it is depleting resources and harming the environment.

There are roughly 400,000,000 packages delivered in the United States every week, most of which use these environmentally-destructive methods of transportation (Capital One, 2024)[24]

As a result, the general public is a core driver for how companies in the ecommerce industry pack and ship their products. Satisfying needs for product quality, speed, and abundance play into the environmental untenability of the delivery transportation process.

## Section 3: Perception

Change toward and within the e-commerce industry primarily affects people. The shift from traditional selling to online consumerism as well as innovations stem from the user perception.

Employment, which affects almost ⅔ of the population, is intertwined with e-commerce in both beneficial and harmful ways. Firstly, there's room for job creation. As this industry grows, there's a need for different styles of jobs in comparison to traditional selling. For example, the aspects of technology, logistics, and customer service through an online platform require a position. Handling the process of orders, shipment, and returns opens a new abundance of occupations. On the flip side, there's job displacement, as traditional retail positions decline. The more online stores there are, the less there's a need for employees to work in physical stores

[21] Escursell et al., "Sustainability in E-Commerce Packaging."
[22] Muñoz-Villamizar et al., "The Environmental Impact of Fast Shipping Ecommerce in Inbound Logistics Operations."
[23] M'barek and Wesseler, "The Rapid Development of Bioeconomy Policies in the <span Style="font-Variant."
[24] "Package Delivery Statistics (2024): Per Day, Month & Year."

and in-person customer service. There are fewer managers to run buildings since in many cases e-commerce means factory to shipping to home.

Not only do minimum jobs change, affecting employees, but since the market itself is changing, traditional retailer owners themselves are afflicted as well. As the dynamic of the market shifts from brick-and-mortar selling to online retail, the popularity of physical establishments are dwindling. In this day and age, many people find it more convenient to receive their products with the simple click of a button. Having to travel to an in-person store, browse, purchase, and drive home, can be draining or too out of the way in our busy lives. Thus, many traditional retail stores, especially smaller, family businesses, are losing customers and profit. And with job availability falling due to multiple factors including competition, early retirement, and a slowed rate of hiring, finding new jobs and getting on their feet again can be difficult. Overall, this shift can both help or harm people economically.

Furthermore, societal actions have an impact in the e-commerce industry. Consumer behavior dictates the supply and demand in this online industry as much as it does in person. Popularity can influence the demand of a product arguably even more in online retail than in-store with the widespread use of social media. Influencers, and others, can post about or advertise certain products and provide a link for easy purchase. It could take only minutes for customers to purchase something on a website, causing a quicker shortage or dwindle of supply of the product. And since buying merchandise in the e-commerce industry doesn't require the need to physically see and grab the item, it can be even more frustrating to realize it's sold out since the picture remains nonetheless. This frustration can lead to consumers not trusting companies if their availability is constantly low–and the company may lose profit. As a result, it's important for sellers in the e-commerce industry to understand consumer behavior when it comes to an online platform and maintain a trustable and updated website that directly mirrors the supply. For example, I recently  purchased a sweatshirt and waited for shipment updates, but weeks later I received an email that the item was out of stock.

While the laws of supply and demand may be exaggerated and confusing in e-commerce, the pre-purchase aspect of this process isn't the only part of consumer behavior that businesses should be aware of. The post-shipping aspect is just as important. The awareness of environmentally harmful packaging is becoming more widespread. Consumers can be put off when their product arrives wrapped in excessive plastic and huge boxes. At the same time, product appearance, quality, and condition may well be the reason a customer purchases from the website again or not. A product arriving damaged, dirty, or late can lead to mistrust. So while people don't want to receive climate unfriendly shipments, they also want their product to be shipped safely and in a visually appealing way. These factors must be balanced by companies in order to satisfy customers and sustain a successful business.

## CASE STUDY – AMAZON

### Section 1: How Amazon is and came to be

Amazon came to dominate e-commerce when it integrated outside sellers which boosted its consumer market leading to cheaper prices and faster shipments (Carino, 2022)[25]. Another big change that allowed Amazon to keep its title as the leader of the e-commerce market was

[25] "'How Did Amazon Reach Its Prime?' By Mary Serene Carino."

when it changed Prime delivery from 2-day to 1-day shipping in 2019. This was especially convenient during COVID, when online shopping increased exponentially. Online shopping has remained high since the pandemic because of its comfort. Additionally, the busy culture of America causes more people to opt for quickly ordering things online rather than taking time to go in-store. Moreover, the easily accessible and usable interface of Amazon's apps and websites increases its popularity and suitability. Amazon has a large global reach. Because of this, changing Amazon itself, in terms of sustainability, would be much easier than convincing over 300 million users to find a new platform (Yaqub, 2025).[26]

Amazon claims they're making progress with regards to sustainability. Some of the facts they've stated on their own website are: that they've decreased 13% of carbon emissions since 2022, they've reached 100% renewable energy years before they planned, and that 680 million packages were delivered through electric transportation. While it is true that these are great accomplishments, there are some gaps in their data.

**Section 2: How Amazon should be**

a. *Prioritize sustainable practices*

Amazon released an article in June, 2024, regarding their significant decrease in use of plastic packaging. They announced in the title that their goal is to have Amazon in North America reduce plastic use in their packaging to zero. This sounds great, but months later and almost halfway into 2025, this is the most recent article on the topic. Another statistic that contradicts this claim (on their website) is that they've decreased single-use plastic usage by 9% since 2022, while another statistic they've declared is that they've replaced 95% of their plastic air pillows with paper. But how much better is paper for the environment? How much of it are they producing and what are its effects? What happens to the paper once it reaches someone's front door?

Better than recyclable material is compostable material. But even before that, the best option is less material as a whole. The order is reduce, reuse, recycle after all. Combining products into one package and using smaller, better-fit packages for products would help reduce total material used. Fortunately, Amazon has a program in place named, Ships in Product Packaging. This program ships packages in the package sellers use. Allegedly, 12% of products have been shipped without excessive packaging since 2023. However, how excessive is packaging sellers are already using without additional Amazon materials? And is Amazon maximizing this program to all eligible products?

Another important thing to keep in mind is, while Amazon may be making these claims of sustainability, and some of these changes might be occurring to a certain extent, taking a look at our own packages tells us more. Admittedly, my family still uses Amazon and have submitted to its convenience. To this day, we notice excessive packages, excessive space in these boxes, and persistent use of plastic.

According to these general statistics, Amazon is becoming more sustainable as a whole. But with it being such a large company shipping 1.6 million packages a day, they need to make

[26] Yaqub, *Amazon Statistics*.

bigger changes if they want to continue shipping at this rate without making a big impact on the environment (ParcelPath, 2025).[27]

*b. Policy and regulation*

How can we get Amazon to change its policies? Government initiatives can be an effective way to reduce environmental impact through Industry standards for sustainability. Current policies include the Inflation Reduction Act. There is a national strategy for reducing waste (found on the EPA's website) that also hopes to build a more circular economy. But in the eyes of industries, this is more of a recommendation than an enforced law.

Amazon is greatly affected by goals to reduce waste and emissions and marks its achievements on its website. The issue isn't if Amazon is reacting to legislation, but if there's legislation focused on reducing waste, changing materials, and recycling programs post-shipment.

Another aspect of sustainable industrial practices includes the carbon economy. The carbon economy essentially is the transition companies should make to reduce carbon emissions and transform their process into a more sustainable practice. Allegedly, companies are supposed to report their carbon emission statistics to the U.S Securities and Exchange commission (SEC). This included large companies such as Amazon. However, there are companies that may not be displaying the full truth on their emissions. This transparency is arguable. Speculations have arisen for companies, including Amazon, that the full truth isn't being exposed. Some believe that the use of bits and pieces of a larger scale of data can lead to a misleading take on a company's progress in the climate economy.

*c. Technological Innovations*

Advancements in green technologies can help Amazon make the transition to a more eco-friendly business more efficient. Implementing solar panels on warehouses and factories is one advancement that Amazon has started to incorporate, but there's still a mix of fossil fuel use involved. Another innovative strategy is electric vehicles. Transportation is one of the big factors of pollution in Amazon's shipment process. And while they've claimed they've begun to use electric vehicles in the shipment process, fully converting to electric and making less trips by using smaller packages will reduce emissions. It's critical to remember that electricity can still come from a non-renewable source, such as fossil fuels. To become as sustainable as possible, Amazon should work on using clean energy to power their electric vehicles.

Utilizing their technology, such as Amazon Web Services, can help maximize techniques to become a more environmentally friendly business. Amazon Web Services uses data and AI to help corporations and individuals organize and progress. This could be a helpful tool for Amazon itself to improve their carbon emissions and waste production as well as to become a role-model for smaller businesses to shift to sustainability as well. While high-tech could pose promising solutions, it has its drawbacks as the act of using AI uses an incredible amount of energy. A more environmentally friendly suggestion that still increases use of technology is using the power of the human brain more than using AI. Hiring more engineers, for example, could give the same or even finer results as using AI.

[27] *How Many Packages Does Amazon Deliver A Day*.

### Subsec 3: Why Amazon should enact these recommendations –

As the leading supplier in the e-commerce industry, if Amazon sets the example as a clean, green business, smaller companies will follow suit. Amazon has the profits, size, and even pressure to become more sustainable. With their budget, they have the capacity to experiment with the best strategies and optimize the most sustainable solutions. Smaller businesses can get inspiration by Amazon's changes and make an effort to develop as well. Consumer perception of the waste of materials Amazon incurs can inspire the seller itself and other companies to do better to continue to prosper.

A strategy some companies have implemented that Amazon should consider is planting trees. In order to offset their carbon footprint and meet biodiversity requirements, businesses plant a tree for every product sold (as an example). For instance, the sustainable clothing brand, Tentree, plants 10 trees for each clothing item sold. Admittedly, their items are on the more expensive side–another issue in and of itself (finding ways to be both sustainable and affordable). Successfully, Tentree has managed to plant over 100 million trees with this strategy. Amazon could use this as well, being a vendor as well. Planting [x] amount trees with [x] amount of purchases could help balance out the emissions Amazon produces or even go above and beyond and plant enough trees to intake more CO2 than Amazon emits.

## Conclusion

E-commerce affects sustainability both environmentally and socioeconomically. While Amazon has started to lead the charge towards sustainability in this industry, there's still a lot of work to do. Reversing human-caused climate change will take dedication and consistency. E-commerce can become more and more stable as a whole as green innovations improve and more companies take the initiative to focus on change and progress. Dabbling in sustainable practices is more performative than genuinely helpful. The need for large establishments to transition to clean energy and reusable/compostable materials is becoming more and more dire. Industries in the private sector have the chance to make the most impactful changes since they aren't as held back by government intervention as the public sector. Different administrations have different perspectives on climate change, so while some environmental policies may get pushed back, individuals and businesses can continue to take the best courses of action for the planet. While there are many different sectors of the market and other human practices harming the environment, the e-commerce sector has a big impact and has the potential to transition more swiftly than, let's say, getting rid of all fossil fuel plants immediately. Transportation, electricity, and industry make up e-commerce and hold some of the biggest carbon footprints. So, focusing on making e-commerce more sustainable will hit multiple birds with one stone in the fight against climate change.

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