

Green growth in e-commerce : Environmental management and customer actions

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Abstract

The global e-commerce industry has been experiencing rapid growth, especially post COVID-19 pandemic, which has significantly transformed market structures and consumer shopping behaviour. The waste generated and the plastic pollution due to e-commerce is increasing tremendously post pandemic. The surge in e-commerce has contributed to an

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alarming increase in packaging waste, aggravating the plastic pollution crisis. Research indicates that traditional in-store shopping can substantially reduce CO₂ emissions highlighting the environmental impact of online shopping. In response to these challenges, many e-commerce companies are implementing green technologies and sustainable practices to mitigate environmental impacts. However, individual customers also play a crucial role in promoting sustainability in online shopping. By making informed choices, consumers can significantly reduce their carbon footprint and contribute to a more sustainable future. This research explores effective strategies for managing environmental impacts and integrating green technologies in e-commerce operations, emphasizing the collaborative efforts of companies and customers to achieve sustainability. The research reveals that though majority of customers are concerned about environment and sustainability; while shopping they aim to satisfy their immediate needs. Customers have shown willingness to opt for the strategies like concession on returning the packaging, discounted price for less packaging and bulk purchases in a single order if introduced and implemented effectively by e-commerce companies.

Subject Classification: 00A99.

Keywords: Customers, E – commerce, Environment, Online shopping, Packaging, Sustainability.

Introduction

The global e-commerce industry has been experiencing rapid growth, especially post COVID-19 pandemic, which has significantly transformed market structures and consumer shopping behaviour.[1] The fastest growing retail industry in India is e-commerce. During the pandemic, when most businesses were closed, e-commerce served essential goods and services to people across the country. As a result, people turned to online shopping instead of local markets. This led to a 21.5% increase in India's e-commerce industry in 2022, reaching \$74.8 billion. It is expected to grow by 84% to \$111 billion by 2024 and to \$350 billion by 2030, showing significant growth and development. [2] E-commerce is no longer limited to websites; retailers are developing smartphone apps for easier access and shopping, increasing the number of users and converting them into customers. In 2021 the smart phone using population in India had reached 830 million which gave a major push to the e commerce industry. Mobile shopping is predicted to grow by 21% annually over the next four years. [3]. Between 2023 and 2027, total e-commerce sales are projected to increase by \$2.3 trillion, an overall rise of 38.9% [4]. 1970s onwards the plastic production has increased faster than any other material. If this trend continues, global plastic production is expected to reach 1,100 million tonnes by 2050. A significant concern is the rise in single-use plastic

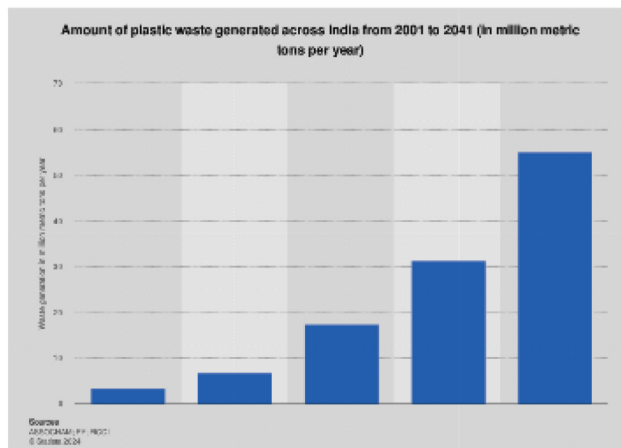


Figure 1

Plastic waste generated from 2001 -2041 (estimated) [9]

products, which are designed to be discarded after one brief use. About 36% of all plastics are used for packaging, including single-use containers and shockingly around 85% of these plastics end up in landfills or as unregulated waste. [5]. The plastic production is increasing in response to the ever-increasing demand of plastic specially for packaging materials. The surge in e-commerce has contributed to an alarming increase in packaging waste, aggravating the plastic pollution crisis. The global e-commerce plastic packaging, which was 2.1 billion pounds in 2019, is estimated to reach 4.5 billion pounds by 2025 [6]. In India, the e-commerce sector generated approximately 98,000 tons of plastic packaging waste in 2021, a 73% increase from the previous pre - COVID year.[7]. Being the largest producer of polymers, India generates the maximum amount of plastic waste after US and European Union. India with population of approximately 1.4 billion produces 26,000 tons of plastic waste everyday which is approximately equivalent to 26,000 small cars. [8]. Statistical data reveals how the amount of plastic waste generated in India is estimated to increase to over 50 million metric tons by 2041 [9]. The Indian Institute of Packaging reports that packaging consumption per capita has doubled over the past decade from 4.3 kg to 8.6 kg per annum as is seen in Figure No 1 [10].

Environmental impact of e-commerce compared to traditional shopping: The impact of e-commerce extends far beyond its own operations, causing significant effects in other industries and the environment. The environmental impact of e-commerce is complex,

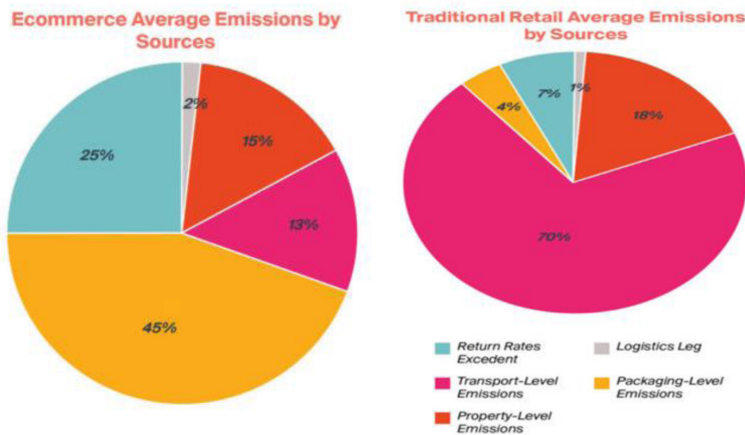


Figure 2
Sources of GHG Emission [12]

involving both the way e-commerce platform's function and the entire lifecycle of the products sold by them. While retail (both online and offline) is the largest economic sector contributing for 15% of global GDP, it is also accountable for 25% global greenhouse gases emissions. While both online and offline retail activities harm the environment, their sources of emissions differ. In e-commerce, the biggest source of emissions is packaging, which accounts for 45% of emissions, compared to only 4% in traditional retail. The return rates contribute to 25% emissions in e-commerce vs 7% in traditional retail as is evident in Figure No 2 [11]

One of the major concerns about e-commerce is the product packaging material like plastic, air pillows, bubble wraps, which usually never returns to the supplier and thus becomes one time use only. According to the forest conservation group Canopy, 3 billion trees are pulped annually to produce 241 million tons of shipping cartons. Additionally, of the 86 million tons of plastic packaging produced globally each year, less than 14% is recycled. [13] Research on environmental impacts of online and traditional in-store buying indicates that physical store shopping can reduce CO₂ emissions by up to 70% to 84%, highlighting the environmental impact of online shopping. [14]

Green practices by E-Commerce companies

There is an increasing awareness about adopting sustainable practices by e-commerce companies. Brands like Mamaearth and Kiehl have shifted

to 100 % sustainable packaging showing their commitment to sustainability. Recycled and ethically sourced materials have been made popular in fashion by brands like Neeman's and Nykaa. Popular brand like Timex has started using recycled ocean sourced plastics in their watches [15]. There is growing trend of adopting greener technologies by start-ups in India. They reveal that transitioning to a greener economy is both essential and achievable. [16]. As evident from the examples above, e-commerce retailers are embracing sustainable practices but what about the customers who play a crucial role in this entire value chain. While they understand the importance of sustainable practices to protect the environment, their purchasing decisions are often driven by factors such as price, discounts, and ease of buying. By making informed choices, consumers can significantly reduce their carbon footprint and contribute to a more sustainable future. This research tries to appreciate the various green practices followed by e-commerce retailers, comprehend the role of customers in integrating green technologies in e-commerce operations while emphasizing the collaborative efforts of companies and consumers to achieve sustainability.

Literature Review

The researchers have reviewed research papers, news articles, reports and posts on social media related to the topic. The literature review can be summarized under following sub-sections:

Growth and Transformation of the Global E-commerce Industry –

The global e-commerce industry has witnessed unprecedented growth, particularly following the COVID-19 pandemic. The pandemic drastically reshaped market structures and consumer shopping behaviors, with more consumers turning to online shopping platforms [1]. This shift resulted in a 21.5% increase in India's e-commerce industry in 2022, reaching \$74.8 billion. The sector is expected to grow by 84% to \$111 billion by 2024 and further to \$350 billion by 2030 [3]

Environmental Impact of E-commerce –While the growth of e-commerce has brought convenience and economic benefits, it has also led to severe environmental challenges like aggravating the plastic pollution crisis. Global e-commerce plastic packaging, which was 2.1 billion pounds in 2019, is projected to reach 4.5 billion pounds by 2025 [6]. In India, the e-commerce sector generated approximately 98,000 tons of plastic packaging waste in 2021, a 73% increase from the pre-COVID year [7]. One study shows that India being the major producer of polymers

generates 26,000 tons of plastic waste daily [8]. The Indian Institute of Packaging reports that per capita packaging consumption has doubled over the past decade from 4.3 kg to 8.6 kg per annum [10].

Plastic Production and Pollution –Global plastic production is increasing due to the rising demand for packaging materials, particularly from the e-commerce sector. If current trends continue, global plastic production is expected to reach 1,100 million tons by 2050. Approximately 36% of all plastics are used for packaging, and around 85% of these plastics end up in landfills or as unregulated waste [5]. The extensive use of packaging material by e-commerce companies leads to release of greenhouse gases and pollutes the land, soil and oceans. The plastic leakage in the environment is expected to increase from 22 million tons (2019) to 44 million tons by 2060 [17]

Comparative Environmental Impact of E-commerce and Traditional Retail –The retail activities -both in-store and online affect the environment adversely though their source of emission differ. In e-commerce, packaging is the largest source of emissions, accounting for 45%, compared to just 4% in traditional retail. Return rates in e-commerce contribute to 25% of emissions, versus 7% in traditional retail [11]. According to the forest conservation group Canopy, 3 billion trees are pulped annually to produce 241 million tons of shipping cartons. Of the 86 million tons of plastic packaging produced globally each year, less than 14% is recycled [13].

Reducing Environmental Impact –Research indicates that traditional in-store shopping can reduce CO₂ emissions by up to 70% to 84%, highlighting the significant environmental impact of online shopping [14]. Drawing on insights from social entrepreneurship strategies aimed at maximizing impact, this study explores how consumer behaviour in e-commerce can drive environmental sustainability through strategic interventions and innovative practices [18]. The increasing influence of e-commerce industry and its adverse impact on the environment necessitates a combined effort from companies and customers to ensure environment sustainability. E-commerce plays a pivotal role in empowering rural regions of a country like India by allowing them to leapfrog traditional economic barriers.[19] Disruptive technologies like AI, blockchain, and IoT enable real-time environmental monitoring and can promote sustainability and help predict future environmental risks.[20]

Research Gap

Extensive research has been conducted on the origin of e-commerce, the growing trend of online buying among customers across the globe, increasing plastic production and plastic waste generation. Number of studies are carried out highlighting the adverse environmental impact of packaging waste generated by e-commerce companies, impact of in-store buying vs online shopping with respect to CO₂ emissions. Additionally, research also explores the different sustainability practices initiated by e-commerce companies for environment management for a green future.

However, it is observed that there are very few studies focussing on the role of customers in sustainable buying behaviours while shopping online. It is high time that the customers make informed decisions and collaborate with the e-commerce companies to reduce their carbon footprint and contribute towards a more sustainable future. With this thought the researchers have taken up the study to understand the customer awareness of sustainability initiatives in e-commerce and to suggest strategies emphasizing the role of both companies and customers in promoting sustainability.

Objectives of the study

- To understand customer behavior in online shopping on e-commerce platforms.
- To evaluate the awareness of sustainability initiatives in e-commerce among customers.
- Examine customer behavior and decision-making processes related to sustainability in online shopping.
- To identify effective strategies emphasizing the role of both companies and customers in promoting sustainability.

Research Methodology

A comprehensive literature review, covering research papers, articles, and web links, provided deep insights into environmental management and customer actions in e-commerce. This review helped in identifying key variables for a descriptive and exploratory study focused on e-commerce usage, customer awareness of e-commerce sustainability, and customer preferences for sustainability initiatives in the Pune region of Maharashtra, India. Given the vast number of e-commerce users, the

researchers treated the population as infinite. To determine an appropriate sample size, the researchers utilized the Krejcie and Morgan table and statistical formulas for infinite populations, which recommended a sample size of 384 with a 5% margin of error and a 95% confidence level. Cochran's formula and a formula incorporating the Z-score also suggested 384 as suitable. Consequently, 570 questionnaires were distributed, and 540 valid responses were obtained after excluding incomplete responses (19) and non-responders (11). The researchers employed non-probability sampling, specifically convenience sampling, to collect primary data using a structured questionnaire distributed across various age groups in the Pune region. A pilot study with 57 customers included informal discussions, and their feedback was used to refine the questionnaire. Reliability was tested using Cronbach's alpha, and content validity assessments ensured the questionnaire's validity. Secondary data were gathered from diverse sources, including research papers, articles, academic journals, online resources, and newspapers.

Data analysis and interpretation

Table 1
Demographic Profile

Gender	Frequency	Percent (%)	Valid Percent (%)	Cumulative Percent (%)
Male	173	32.04	32.04	32.04
Female	367	67.96	67.96	100.0
Region				
Rural	40	7.407407	7.407407	7.407407
Semi Urban	90	16.66667	16.66667	24.07407
Urban	410	75.92593	75.92593	100
Family Annual Income				
Less than 5 Lac	100	18.52	18.52	18.52
5L-10 L	220	40.74	40.74	59.26
10 L-15 L	170	31.48	31.48	90.74
15 L and above	50	9.26	9.26	100.00
Age				
Less than 18	5	0.93	0.93	0.93
18-24	33	6.11	6.11	7.04

Contd...

25-34	180	33.33	33.33	40.37
35-44	210	38.89	38.89	79.26
45-54	60	11.11	11.11	90.37
55-64	48	8.89	8.89	99.26
65 and above	4	0.74	0.74	100.00
Education level				
Junior College	62	11.48	11.48	11.48
Bachelor's degree	180	33.33	33.33	44.81
Master's degree	250	46.30	46.30	91.11
Doctorate or higher	48	8.89	8.89	100.00
Occupation				
student	120	22.22	22.22	22.22
Employed	236	43.70	43.70	65.93
Self-Employed	120	22.22	22.22	88.15
entrepreneur	26	4.81	4.81	92.96
retired	5	0.93	0.93	93.89
Homemaker	33	6.11	6.11	100.00

Table No.1 describes the demographic profile of the respondents.

Gender: 67.96% female and 32.04% male respondents, potentially influencing preferences and awareness levels. Location: 75.93% urban, 16.67% semi-urban, and 7.41% rural participants.

Income: Largest group (40.74%) earns 5-10 lakh INR annually; 31.48% fall in the 10-15 lakh range, with smaller portions in lower and higher income brackets.

Age: Majority (38.89%) are aged 35-44, followed by 33.33% aged 25-34, and smaller representations in older age groups.

Table 2
Customer's frequency for online Shopping /Ecommerce Usage

Preferences	Frequency	Percentage
Daily	40	7.41
Weekly	161	29.81
Monthly	275	50.93
rarely	60	11.11
never	4	0.74

Table No 2 describes the frequency of online shopping by the respondents. The majority of respondents, 50.93%, engage in online shopping monthly. This suggests that most users prefer making purchases on a monthly cycle. About 29.81% of respondents shop online on a weekly basis. This group represents frequent e-commerce users who make regular weekly purchases. 11.11%, rarely uses e-commerce platforms. A small portion of respondents, approximately 7.41%, shop online daily. This indicates a consistent daily interaction with e-commerce platforms. Only 0.74%, never engage in online shopping.

Table 3
Product Categories preferences for online shopping

Products categories preferences for online shopping	Frequency	Percentage
Electronics	260	48.14815
Clothing	330	61.11111
Groceries	310	57.40741
Books	63	11.66667
Household items	390	72.22222
Beauty products	180	33.33333
Other	98	18.14815

Table No 3 highlights the preferences of customers product category wise while shopping online. 2.22% of respondents prefer shopping for household items online, making it the top category. Clothing ranks second, with 61.11% purchasing apparel online. 57.41% of respondents buy groceries, and 48.15% prefer electronics online. Beauty products are moderately popular, with 33.33% shopping for them online. 18.15% of respondents buy miscellaneous items, reflecting e-commerce diversity. Books are the least preferred, with only 11.67% purchasing them online.

Table 4
Awareness of any green practices by e-commerce companies

Awareness of any green practices followed by e commerce companies	Frequency	percentage
Yes	381	70.56
No	159	29.44

Table No 4 checks the awareness of green practices by e-commerce companies among the buyers. Significant majority, 70.56% of respondents, are aware of green practices followed by e-commerce companies. Approximately 29.44% of respondents are not aware of any green practices followed by e-commerce companies. This suggests that there is still a substantial portion of the consumer base that is either uninformed or uninterested in the sustainability initiatives of these companies. This gap highlights an opportunity for e-commerce companies to better communicate their green practices and educate consumers on their environmental impact.

Table 5
Importance of environmental sustainability to customers when making purchasing decisions

Importance of environmental sustainability to customers when making purchasing decisions	Very important	Important	Neutral	Unimportant	Very Unimportant
Frequency	181	255	89	15	0
percentage	33.51852	47.22222	16.48148	2.777778	0

Table No 5 explains the importance of environmental sustainability to customers while buying online. The largest group, 47.22%, finds environmental sustainability important in their purchasing decisions. A significant portion of respondents, 33.52%, consider environmental sustainability to be very important when making purchasing decisions. About 16.48% of respondents are neutral regarding the importance of

Table 6
Willingness to pay more for environmentally responsible products

Customers willingness to pay more for products from environmentally responsible companies	Very willing	Willing	Neutral	Unwilling	Very unwilling
Frequency	90	256	138	56	0
Percentage	16.66667	47.40741	25.55556	10.37037	0

environmental sustainability. A small portion, 2.78%, finds environmental sustainability unimportant.

Table No 6 helps us to understand the willingness among customers to pay more for environmentally responsible products. The largest segment, 47.41%, is willing to pay a premium for environmentally responsible products. About 25.56% of respondents are neutral about paying more for environmentally responsible products. A smaller portion of respondents, 16.67%, are very willing to pay more for products from environmentally responsible companies. A smaller group, 10.37%, is unwilling to pay extra for sustainable products.

Table 7
Consideration of environmental impact while online shopping

Consideration of environmental impact of your online purchases	Always	Often	Sometimes	Rarely	Never
Frequency	55	142	270	73	0
Percentage	10.18519	26.2963	50	13.51852	0

Table No 7 tries to understand the consideration given by customers about the impact of their online buying on the environment. The largest group, 50%, sometimes considers the environmental impact. About 26.30% of respondents often consider the environmental impact of their online purchases. A small portion, 10.19%, always considers the environmental impact of their online purchases. A smaller portion, 13.52%, rarely considers the environmental impact.

Table 8
Awareness about discounts for package returns

Particulars	F Frequency (Yes)	Frequency (%)	F Frequency (No)	Frequency (%)
Do you know any company offering return packaging options or giving benefits for less packaging?	25	4.63	515	95.37
Have you ever participated in a packaging return offered by an e-commerce company	13	2.41	528	97.78

Contd...

Would a discount for returning packaging motivate you to participate in a packaging return program	509	94.26	31	5.74
If a company offered a discount for less packaging to reduce the waste generation, would you be more likely to choose that option	523	96.85	17	3.15

Table No 8 checks awareness among customers about discounts for package returns or use of less packaging material.

- 95.37% (515 respondents) are unaware of companies offering return packaging options, while 4.63% (25 respondents) are aware.
- 97.59% (528 respondents) have not participated in packaging return programs, and only 2.41% (13 respondents) have.
- 94.26% (509 respondents) would join packaging return programs if a discount is offered, while 5.74% (31 respondents) wouldn't.
- 96.85% (523 respondents) would prefer less packaging if discounts are provided, showing strong support for such incentives.

Table 9

Readiness among customers to avail of discounts against sustainable practices by companies

Particulars	Discounts for returning packaging	Reduced packaging options	Carbon-neutral shipping	recycling Programs	Energy efficient Operations	Others
Frequency	431	233	172	315	213	15
percentage	79.81	43.15	31.85	58.33	39.44	2.78

Table No 9 tries to know the readiness among customers to avail of discounts against sustainable practices by companies. A significant majority, 79.81% of respondents, favour discounts for returning packaging. About 43.15% of respondents appreciate reduced packaging options. A significant portion, 58.33% of respondents, support recycling programs. Approximately 31.85% of respondents value carbon-neutral shipping.

Table 10
Willingness to participate in sustainability initiatives

Participate in the following sustainability initiatives if offered by e-commerce companies	Very willing	Willing	Neutral	Unwilling	Very unwilling
Discounts for returning packaging	359	142	27	12	-
Opt for Reduced packaging options	247	234	59	-	-
ordering once for multiple products and taking in one packaging	335	158	47	-	-
participating in recycling Programs	303	146	91	-	-
being thoughtful for ordering as to reduce returning of the products	315	157	68	-	-
Financial incentives and discounts for opting sustainable practices	210	278	52	-	-

Table No 10 checks willingness among customers to participate in various sustainability initiatives practised by e-commerce companies. 92.78% are willing to participate in packaging return discounts, showing strong support for recycling incentives; only 7.22% are neutral or unwilling. 89.07% support reduced packaging options, with no respondents

Table 11
E-commerce platforms efforts that make it easier for customers to participate in sustainability initiatives

	Provide clear information about initiatives	Offer financial incentives (e.g. Discounts)	Increase availability of sustainable products	Simplify the process for returning packaging	Ensure transparency about the impact of initiatives	Others
Frequency	454	297	329	427	259	27
Percentage	84	55	60.93	79.07	47.96	5.00

unwilling to adopt this practice. 91.30% are willing to consolidate orders into one package to reduce waste, with no opposition. 83.15% are open to participating in recycling programs, though 16.85% are neutral; no one is unwilling. 87.40% are willing to be more thoughtful in ordering to reduce returns, reflecting a sense of consumer responsibility. 90.37% are willing to participate in sustainable practices if offered financial incentives or discounts, highlighting the power of incentives.

Table No 11 explains what practices by companies will make it easier for customers to participate in sustainability initiatives. The majority of respondents (84.00%) believe that providing clear information about sustainability initiatives is crucial. Over half of the respondents (55.00%) value financial incentives, such as discounts, to encourage participation in sustainability initiatives. This suggests that monetary incentives are a significant motivator for consumers to engage in sustainable behaviours. A large majority (79.07%) believe that simplifying the process for returning packaging would make it easier for them to participate in sustainability initiatives. This highlights the importance of convenience in encouraging sustainable practices among consumers. Nearly half of the respondents (47.96%) value transparency about the impact of sustainability initiatives. This suggests that consumers want to understand the actual environmental benefits and outcomes of the initiatives they are participating in. A significant portion of respondents (60.93%) want an increased availability of sustainable products. small percentage (5.00%) mentioned other efforts

Major findings:

- The sample is predominantly female, urban, and falls within the 35-44 age range. Most respondents have a bachelor's or master's degree, are employed, and come from middle-income families.
- The majority of respondents, 50.93%, engage in online shopping monthly. About 29.81% of respondents shop online on a weekly basis. 11.11%, rarely uses e-commerce platforms and 7.41%, shop online daily
- The highest preference is for household items, with 72.22% of respondents shopping for these products online. Clothing is the second most popular category and after those groceries. Almost half of the respondents, 48.15%, prefer buying electronics online.
- A significant 70.56 % of consumers are aware of sustainability initiatives by e-commerce companies. When making purchasing

decisions, 47.22 % of consumers consider environmental sustainability important, 33.52 % find it very important, and 16.48 % are neutral on the matter.

- Regarding the willingness to pay more for environmentally responsible products, 47.40 % are willing, 25.5 % are neutral, 16.7 % are very willing, and 10.37 % are unwilling.
- In terms of considering the environmental impact of their online purchases, 50 % do so sometimes, 26.2% often, 13.5% rarely, and 10.18% always.
- To support green growth in e-commerce, 70% of consumers opt for eco-friendly delivery options and 45% participate in recycling programs.
- The main barriers preventing consumers from making more sustainable choices in e-commerce include high cost (59.5%), lack of information (51%), limited availability of sustainable options (45.9%), and lack of trust in sustainability claims (37%).
- Sustainability initiatives that would encourage more shopping from e-commerce platforms include discounts on packaging returns (79.81%), recycling programs (58.33%), reduced packaging (43.15%), and energy-efficient operations (39.44%).
- Consumers show a high willingness to participate in sustainability initiatives, particularly in returning packaging for a discount, being thoughtful while buying, and considering financial incentives, though neutral responses are also present.
- A vast majority, 96%, would choose the option of less packaging if it came with a discount to reduce waste generation.
- E-commerce platforms can facilitate customer participation in sustainability initiatives by providing clear information (84%), simplifying returns (79.07%), increasing the availability of sustainable options (60.93%), offering incentives (55%), and ensuring transparency (47.96%).
- It is observed that even though customers have concerns about the environment and sustainable practices, in reality the majority of the customers sometimes only think about the environmental impact while doing online shopping.
- The data indicates a low level of awareness and participation in current packaging return programs among respondents. However,

there is a high level of willingness to participate in such programs and choose less packaging if financial incentives are offered. This suggests that providing discounts for returning packaging or opting for less packaging could be an effective strategy for companies aiming to reduce packaging waste and encourage sustainable consumer behaviour.

Suggestions:

- Given that most shoppers are middle aged and predominantly females, e-commerce companies should tailor their campaigns promoting sustainability to resonate with this class of customers.
- As almost 50 % shoppers shop monthly, e-commerce companies can introduce some green challenges of collecting reward points or discounts for further sustainable shopping.
- Since the frequently bought items are clothing, groceries and household items, e-commerce companies can use eco-friendly packaging for these items without the risk of being damaged in transit.
- With 70% of consumers aware of sustainability initiatives and 86% influenced by eco-friendly packaging, e-commerce companies should prominently feature their green practices on their websites, marketing materials and final checkout while billing. Highlighting the environmental benefits of these practices can increase the number of buyers.
- Since a significant portion of consumers (80%) consider environmental sustainability important or very important, clear communication of these values and how they are implemented in practice should be clearly communicated by the e-commerce companies.
- Customers are willing to pay more for environmentally responsible products, companies can highlight these products as high-quality, environmentally friendly to justify the cost.
- Only 10 % of customers always think about the environmental impact of their online shopping and 48% think sometimes. To increase these numbers, e-commerce should provide more information at the point of sale like -impact calculations, carbon footprint saved with each purchase, suggestions for more green initiatives.

- E-commerce companies should offer incentives for choosing sustainable delivery options and provide easy access to recycling programs.
- After studying the major barriers dissuading the customers, companies should work on reducing the high costs of sustainable products, provide comprehensive information on their sustainability efforts, and increase the availability of sustainable options.
- Given the major preference of customers to discounts on packaging returns followed by recycling programs, reduced packaging, and energy-efficient operations, companies should implement and promote such programs widely.
- As many customers are willing to participate in various sustainability initiatives, companies can develop user-friendly and rewarding programs, providing financial incentives to boost engagement.
- Clear instructions, convenient return options, and visible benefits can encourage more consumers to join packaging return programs.
- With 96% of consumers preferring less packaging if it comes with a discount, e-commerce platforms should offer clear options for reduced packaging at checkout.
- Even Delivery boys can be trained and motivated to make customer aware about the benefits of the returning packaging to the customers.
- Company should keep the pop up of benefits related to ecofriendly initiatives and its benefits/schemes/offers to customers at the time of making final payments.

Conclusion

The global e-commerce industry has seen rapid growth, particularly post-COVID-19, affecting the customer buying behaviour. This surge in the e-commerce sector has led to a significant increase in plastic packaging waste aggravating the plastic pollution crisis. The research findings highlight the growing awareness and importance of sustainability among online shoppers, particularly within the 25-34 age group. E-commerce companies have a significant opportunity to leverage this awareness by enhancing their sustainability initiatives. Our research findings indicate that while e-commerce companies are adopting green technologies and sustainable practices, there is a critical need for consumer involvement in promoting sustainability. Addressing barriers such as high costs, lack of

information, and limited availability of sustainable options by the e-commerce companies can further encourage consumers to make eco-friendly choices. E-commerce platforms must provide clear information, simplify packaging return processes, and offer incentives to foster greater participation in sustainability initiatives. The findings highlight the necessity for a collaborative effort between e-commerce companies and consumers to minimise environmental impacts. By making informed decisions and embracing sustainable practices, customers can significantly reduce their carbon footprint. This study proposes a combined effort by corporate and customers in paving the way for a more sustainable future in the e-commerce industry.

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