



No Plastics
in Nature

A WWF INITIATIVE FOR
A CIRCULAR ECONOMY AND
NO PLASTICS IN NATURE BY 2030

DELIVERING ON CIRCULARITY

FEASIBILITY STUDY FOR REUSABLE E-COMMERCE PACKAGING IN SINGAPORE

Research Partner



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Supporting Partner





ABOUT WWF-SINGAPORE AND THE PACT INITIATIVE

WWF is one of the world's largest and most respected independent conservation organisations. WWF's mission is to stop the degradation of the earth's natural environment and to build a future in which humans live in harmony with nature. As one of WWF's international hubs, WWF-Singapore supports a global network spanning over 100 countries. We work to meet key conservation goals, such as deforestation, haze pollution, food security, sustainable finance, sustainable consumption and illegal wildlife trade.

Started by WWF-Singapore and based on WWF's No Plastic in Nature Initiative, Plastic ACTION (PACT) is a business initiative that aims to reduce waste and move towards a circular economy. The programme empowers companies to adapt their business models and processes to be more resource-efficient. By providing businesses with guidance and best practices, PACT enables them to make science-based decisions for responsible production and consumption. This will lower their environmental footprint, and address the growing consumer demand for sustainability.

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E-commerce in Singapore is booming, with over 200,000 e-commerce parcels delivered daily in the country. Further accelerated by Covid-19, the sector is projected to grow by nearly 50% by 2025. But packaging required for e-commerce delivery is not environmentally friendly and the waste it creates is likely to increase in the next few years. This project aims to study the feasibility of implementing reusable business-to-consumer (B2C) e-commerce packaging in Singapore, with the vision to lower the environmental footprint of this sector.

Top e-commerce product categories in Singapore include fashion and apparel, electronics and groceries (food & personal care). The fashion and apparel category is currently the most suitable for the implementation of reusable packaging, given the relative ease of handling non-fragile products and possible standardisation of e-commerce packaging across retailers.

For reusable e-commerce packaging to be environmentally sustainable, it must meet a minimum number of uses. This can range from four to six uses, depending on the design and material. **Customers play a pivotal role in making this a reality.** One of the most important aspects of making reusable packaging feasible and sustainable is establishing a **frictionless process for customers to use and return packaging.** Furthermore, reusable packaging design should also strike a balance between durability and carbon efficiency.

Singapore has a well-developed logistics network. Given Singapore's small size, it has the **advantage of a short return leg for reusable packaging.** A key challenge then, is customers' preference for convenience. Convenient options for customers to return packaging can be made available using the well-developed logistics network of post boxes and pick-up and drop-off points.

Another key challenge is the higher cost of reusable packaging. Reusable packaging solutions will be more expensive for retailers, at least in the

short term. However, their benefits are far-reaching for retailers as it presents an opportunity to enhance brand equity and create tangible environmental impact. **The cost of reusable packaging will also reduce with economies of scale.** Hence, a multi-retailer effort is advisable for the long-term feasibility of reusable packaging.

This report ends with a general concept of how the reusable packaging scheme can be implemented. As the logistic arrangement differs amongst retailers, stakeholder collaboration will be crucial in implementing reusable packaging. Retailers, logistics providers and government institutions must work together, test various reusable packaging models and use the learnings to create industry-wide standards and scalable processes. Retailers interested in embarking on this journey are strongly encouraged to contact us for a non-obligatory consultation.



EXECUTIVE SUMMARY

INTRODUCTION

Singapore's e-commerce market has been growing fast and is projected to grow by nearly 50% by 2025.¹ Partially driven by Covid-19, three in four internet users in Singapore above 16 years old have shopped online.² Currently, around 200,000 parcels are shipped daily in Singapore,³ and this number is set to grow.

While online retail has made many goods and services easily accessible, the packaging waste it generates has a negative environmental impact. Out of the 1.56 million tonnes of household waste generated in Singapore in 2018, one-third is packaging.⁴ E-commerce packaging compounds Singapore's waste problem as it contributes to about 2–3% of overall household packaging waste currently,⁵ a figure that could double by 2025. Given that the recycling rate in Singapore is already low — 4% for plastic waste — much of this will be incinerated and end up in landfills.⁶

A possible solution is using reusable packaging, which can be collected from customers and used repeatedly to prevent landfill waste. However, it is necessary to consider the sustainability of reusable packaging is and the factors that will impact its implementation. With this in mind, this report sets out to answer the following key questions:

1. Can reusable packaging be an environmentally sustainable option in Singapore?
2. What are the critical considerations for implementing reusable e-commerce packaging?
3. How can reusable packaging be implemented in Singapore?

This study was conducted to answer these questions. Over 20 subject matter experts from the Singapore e-commerce retail sector, global reusable packaging industry, Singapore government institutions, and logistics and last-mile delivery companies were interviewed. These experts shared their perspectives on e-commerce retail, packaging operations and reusable packaging in e-commerce globally. This report gathers these insights, targeting impactful recommendations. Reducing e-commerce packaging waste is a challenging task without an easy solution. The report will outline practical steps that could reduce the generation of packaging waste.

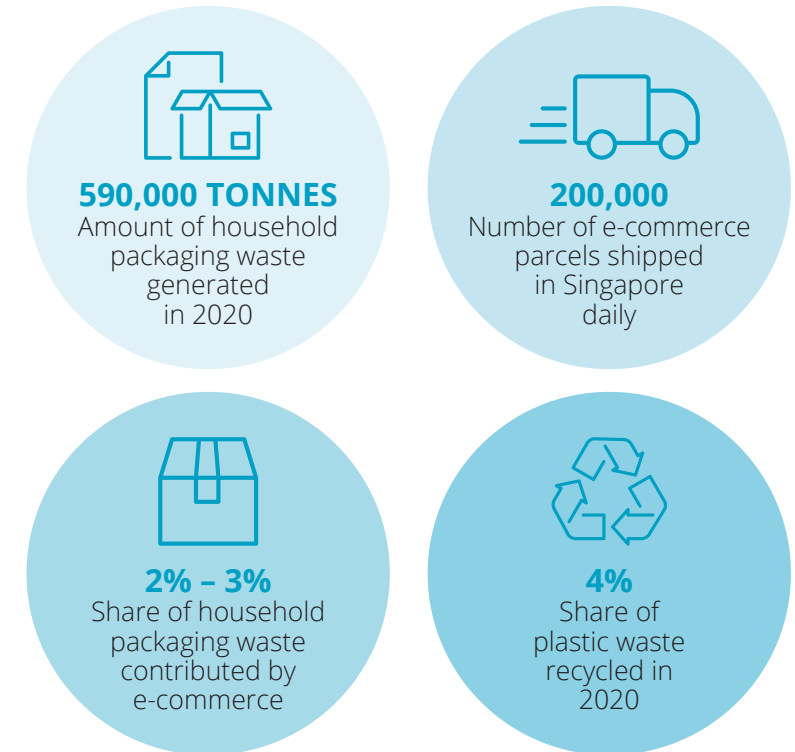


Figure 1: Packaging waste in Singapore

- 1 Report: Statista Digital Market Outlook Singapore 2021; Refer to Appendix D
- 2 <https://janio.asia/articles/who-are-singapore-s-online-consumers/>
- 3 <https://internationalfinance.com/cainiao-alibabas-logistic-arm-expand-last-mile-network-singapore/>
- 4 <https://www.towardszerowaste.gov.sg/zero-waste-masterplan/chapter3/packaging/>
- 5 Extrapolated based on China's e-commerce packaging waste that was 9.4 mil tonnes for 60 bil annual parcels in 2019
- 6 <https://www.nea.gov.sg/our-services/waste-management/waste-statistics-and-overall-recycling>



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SECTION 1: VISION AND OPPORTUNITY FOR REUSABLE PACKAGING

Highlights the vision for reusable packaging in Singapore. It looks at whether reusable packaging in Singapore is sustainable and which category is most suitable for implementing reusable packaging in Singapore.

1.1. A VISION FOR REUSABLE E-COMMERCE PACKAGING

REUSABLE PACKAGING AS A NORM FOR E-COMMERCE IN SINGAPORE

Singapore is a densely populated city-state with an affluent population, which has given rise to a well-developed domestic logistics network.

Across the island, SingPost, the country's national postal service, has more than 700 boxes and 200 parcel locker terminals.⁷

Other key last-mile logistics providers, such as Ninjavan and bluPort, have over 700 active parcel drop-off points combined.⁸ In addition, the Singapore government is further investing in the Pick network – a network of parcel lockers, or Pick-Up and Drop-Off (PUDO) points — at major Housing & Development Board (HDB) estates and Mass Rapid Transit (MRT) stations to support the growing e-commerce industry.⁹ Singapore's goal is to have a locker station around five minutes' walk from every HDB estate.¹⁰ This developed network can be utilised to support a robust reverse logistics supply chain that enables a circular economy.

Before assessing the feasibility of implementing reusable packaging in Singapore, the sustainability of reusable packaging and factors that drive sustainability must first be addressed.

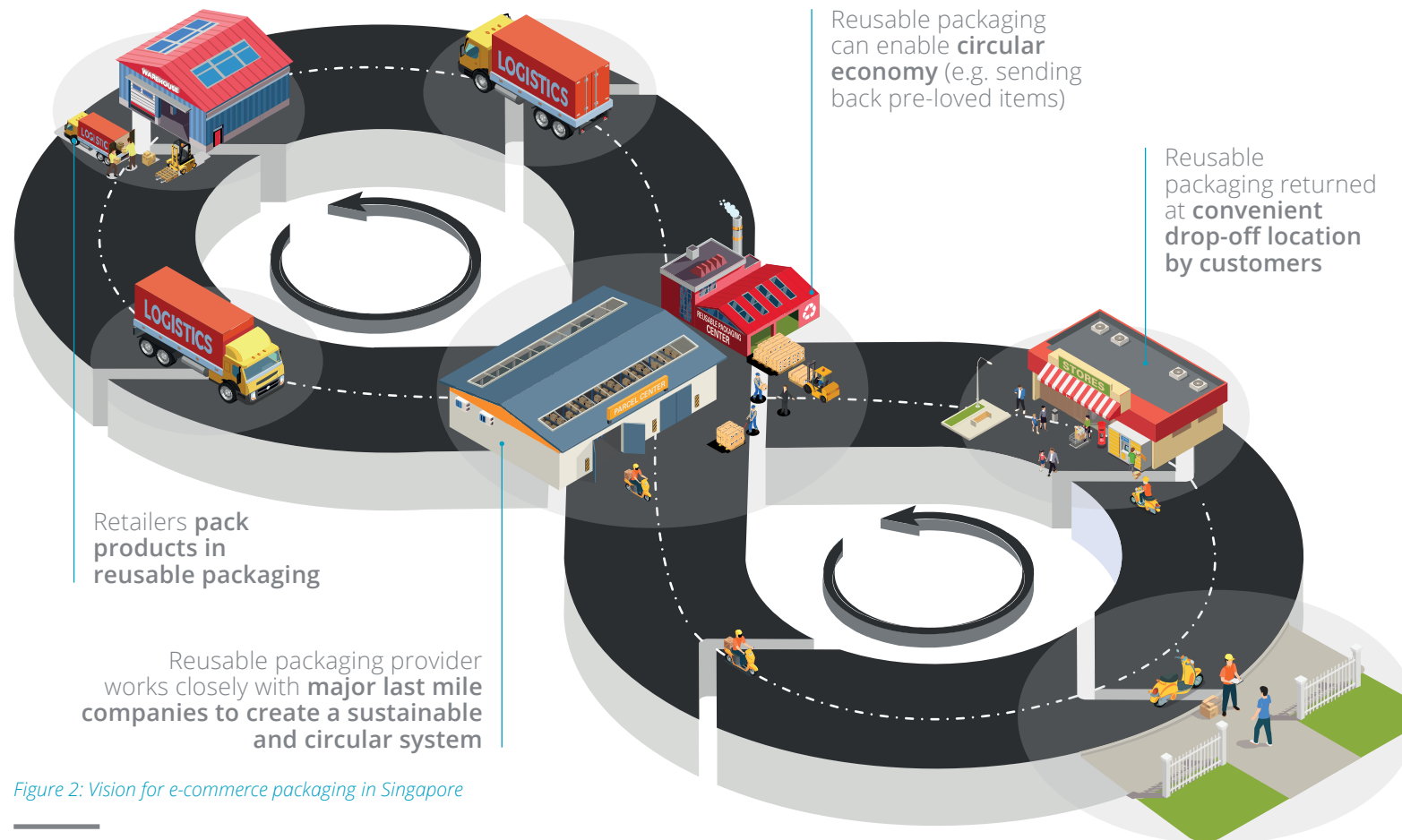


Figure 2: Vision for e-commerce packaging in Singapore

⁷ Carrier intelligence report, Singapore Post, July 2020

⁸ <https://www.ninjavan.co/en-sg/ninja-points#find-a-ninja-point> and <https://blu.com.sg/locations>

⁹ <https://www.picknetwork.com/about-pick>

¹⁰ <http://www.citylogistics.info/business/singapore-builds-a-national-carrier-agnostic-parcel-locker-network/>

1.2. HOW SUSTAINABLE IS REUSABLE PACKAGING?

Using reusable packaging will reduce the amount of resources needed for manufacturing new single-use ones. However, findings show that reducing carbon dioxide equivalent (CO₂e) emissions are strongly dependent on how many times packaging is reused.

To understand the carbon footprint of packaging, system boundaries are used to compare the difference in carbon dioxide equivalent (CO₂e) for single-use and reusable packaging (refer to Appendix B for detailed calculations and system boundaries):

1. Manufacturing of the packaging
2. Transport into Singapore
3. Reverse logistics transportation to collect the reusable packaging

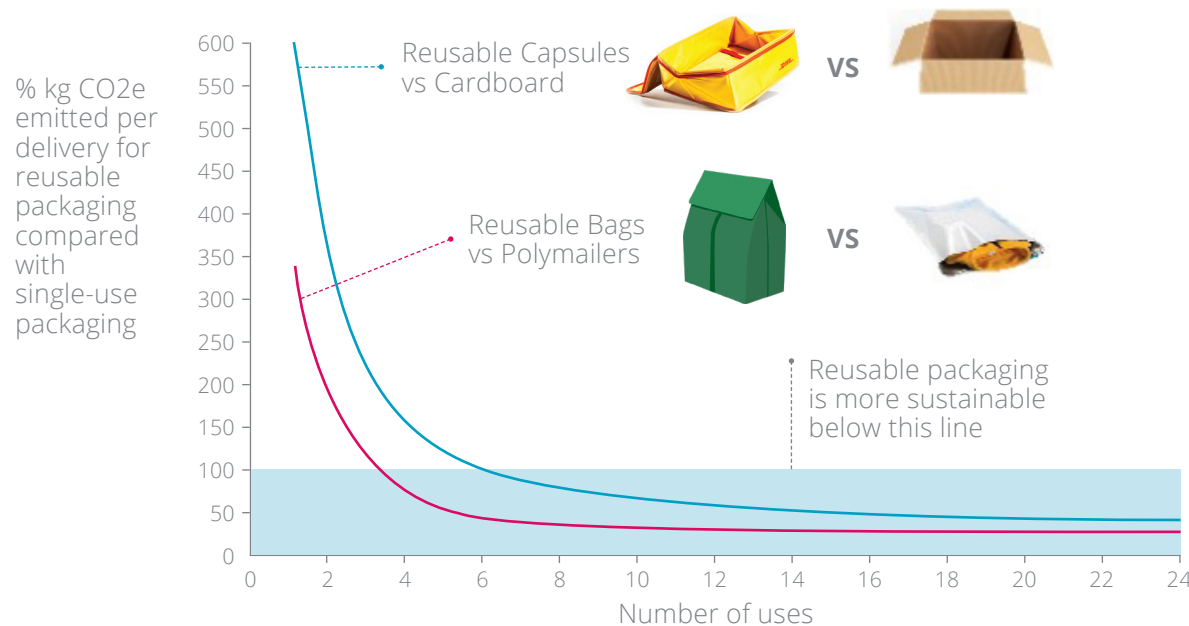


Figure 3: Comparison of CO₂e emissions of reusable and single-use packaging

Figure 3 shows the ratio of CO₂e emissions of reusable packaging compared to single-use packaging. The number of times packaging has to be reused to be sustainable varies from four to six, as seen in Figure 3. Plastic reusable, such as reusable poly mailers, typically have a simpler design and become sustainable after fewer uses as compared to capsules that replace cardboard packaging. Beyond four to six times of uses, reusable packaging will contribute towards reducing the resources needed to make and transport single-use packaging.

The average usage number of **four to six times corresponds to a 75% to 85% customer return rate**.¹¹ This means that out of the 100 reusable bags or capsules sent out to customers, 75 or 85 of them have to be returned respectively. Hence, for most reusable packaging to be environmentally sustainable, a target return rate of 75% to 85% is likely to be a prerequisite.

The threshold number of uses for reusable packaging will vary based on the **design and material of reusable packaging as compared to the weight and material of single-use packaging** that is being replaced. A detailed **Life Cycle Analysis (LCA)** should be conducted before finalising the choice of reusable packaging.

Reusable packaging feasibility varies by retailer profile. A scalable, reusable packaging solution ideally targets products that are easy to handle (e.g. ambient storage condition and non-fragile) and have standardised pack sizes. The following section explores suitable categories that companies can consider for reusable packaging.

¹¹ DHL Consulting, simulation based calculation

1.3. RETAIL CATEGORIES SUITED FOR REUSABLE PACKAGING

Currently, electronics and media, fashion, and groceries (food and personal care) contribute to about 70% of the e-commerce market in Singapore.¹² Each sector has different packaging characteristics, which requires differentiated solutions to reduce e-commerce packaging waste. Figure 4 tabulates the suitability of each category for reusable e-commerce packaging.




RETAILER CATEGORY	KEY PACKAGING CHARACTERISTICS	RECOMMENDATIONS
FASHION AND APPAREL 	<ul style="list-style-type: none">• Shipped in poly mailers or cardboard boxes of standard sizes.• Brand agnostic e-commerce packaging is more acceptable by retailers.¹³• Goods are ambient and non-fragile, which makes the risk of breakage or spillage low.• Apparel has the highest return rate compared to other categories at 21% in 2020.¹⁴	Trial reusable packaging to avoid e-commerce packaging waste.
ELECTRONICS AND MEDIA 	<ul style="list-style-type: none">• Some companies are adopting “naked” product delivery.• Shrink-wrap may still be used to prevent dents to the product box.• E-commerce packaging is also influenced by marketplaces, where a large share of online sales comprises electronic products.¹⁵	Encourage naked packaging by eliminating the need for additional e-commerce packaging. Marketplaces could give guidance on when naked and lighter e-commerce packaging is feasible.
GROCERIES 	<ul style="list-style-type: none">• The packing process for groceries is complex due to different product types and storage requirements (e.g. personal care is not stored with frozen fresh goods at the warehouse).• Packaging requirements are also varied within each order (e.g. temperature control vs. ambient).• Sizes of packages also vary due to different product shapes and sizes.	Major grocery retailers can further drive continuous improvement initiatives to optimize packaging, and assess opportunities to implement returnable e-commerce packaging (e.g. gel ice packs).

Figure 4: Suitability for reusable packaging by retailers

The **fashion and apparel** category is considered ideal to introduce reusable packaging, given the relative ease in handling the products and possible standardisation of pack sizes of e-commerce packaging across retailers.

Many retailers and logistics providers have also incorporated reverse logistics processes into the fashion and apparel supply chain, due to the high return rates in this category (20–30% globally).

¹² Report: Statista Digital Market Outlook Singapore 2021; Refer to Appendix D

¹³ Initial interviews with fashion retailers

¹⁴ <https://savemycent.com/e-commerce-return-rate-statistics/>

¹⁵ <https://www.jtexpress.sg/insights/what-are-the-best-selling-products-on-lazada-2019>



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SECTION 2: KEY CONSIDERATIONS AND CASE STUDIES

Lists critical considerations in implementing reusable packaging in Singapore from the perspectives of different stakeholders, and presents case studies of reusable packaging implemented around the globe.

2.1. KEY ASPECTS OF REUSABLE PACKAGING IMPLEMENTATION

Four key aspects that influence reusable packaging implementation have been identified.



2.2. FRICTIONLESS CUSTOMER JOURNEY

It can feel unpleasant to see how much packaging is used while unboxing an e-commerce parcel. In a study done by Accenture and WWF-Singapore, consumers expressed their desire for greener and less packaging in e-commerce, followed closely by larger selections of sustainable choices and recyclable packaging.¹⁶ However, it is a fleeting feeling and many customers have accepted that this is simply the reality of purchasing products online.

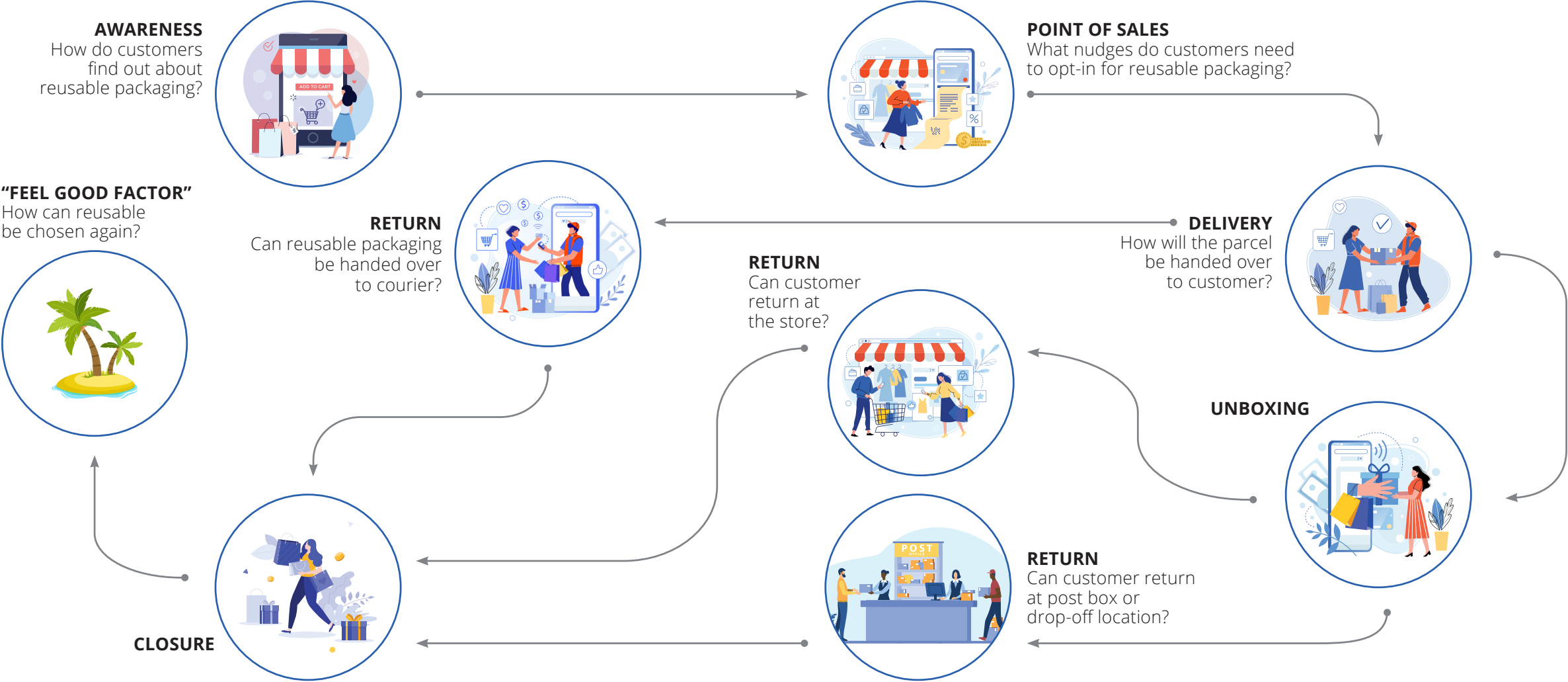
Imagine a circular economy around packaging waste in Singapore, which allows customers to return e-commerce packaging to be re-used multiple times. Customers play a pivotal role in making this a reality. A key aspect in making reusable packaging feasible is establishing a frictionless process for customers to use and return the packaging. Return rates influence the sustainability of reusable packaging as well. Hence, a frictionless customer journey will also impact how sustainable reusable packaging can be in Singapore.

Figure 5 details the customer journey when purchasing products in reusable packaging. Critical steps in the customer journey are described in further detail, starting from awareness.



¹⁶ https://www.asia.awsassets.panda.org/downloads/sustainability_in_singapore_wwf_accenture.pdf

Figure 5: Customer journey





AWARENESS: HOW DO CUSTOMERS FIND OUT ABOUT REUSABLE PACKAGING?

Building awareness before launch can help generate interest in and educate customers about the reusable journey. Increasing usage of reusable packaging is as much a marketing effort as it is a supply chain re-design effort.

Reach the right demographics by leveraging brands and products that speak to the environmentally conscious audience.

Implement a fitting marketing strategy to raise awareness with the identified audience, for example by leveraging unboxing events by social media influencers to raise awareness of reusable packaging.

Customers have also become increasingly concerned about health and hygiene since the start of the COVID-19 pandemic. As such, it may be beneficial to communicate cleanliness and hygiene measurements enforced for reusable packaging.

The awareness phase ensures that reusable packaging is well-understood before customers move to the point of sale, which is the next step in the customer journey.

“

Customers have just a few seconds to decide what to do when they are checking out their online cart. Education and awareness of reusable packaging options is required prior to customer's online purchase.

”

Ben Gesing, Global Head of Trend Research, DHL

“

You are creating a new relationship with your customers when you want them to use and return a new type of packaging.

”

Michael Newman,
Founder and CEO, Returnity



POINT OF SALE: WHAT NUDGES DO CUSTOMERS NEED TO CHOOSE REUSABLE PACKAGING?

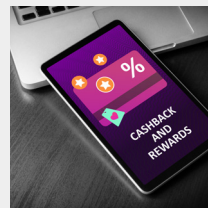
At the point of sale, reusable packaging could be optional. This would ensure that only customers willing to commit to the reusable customer journey opt for reusable packaging. The right nudges, such as discounts or awarding loyalty points, can encourage customers to choose reusable packaging.

NUDGES TO MAKE CUSTOMERS CHOOSE REUSABLE PACKAGING



COMMUNICATE

the positive
environmental
impact



AWARD

loyalty points/
discounts



GAMIFY

(e.g. growing a
virtual garden with
every sustainable
choice)

“ *Four out of five (Singaporean) consumers (80%) said they care about the environment. A third (32%) of consumers added that they would make most purchasing decisions based on product sustainability and environmental impact.* ”

2021 study by Accenture and WWF-Singapore

¹⁷ Report: IPC CROSS-BORDER E-COMMERCE SHOPPER SURVEY 2020;

Refer to Appendix D

¹⁸ Report: Statista Digital Market Outlook Singapore 2021

¹⁹ <https://www.sciencedirect.com/science/article/pii/S2590289X20300086>

Another potential nudge is **communicating the positive environmental impact** of reusable packaging to the customers, such as sharing the amount of carbon emission the customers are saving when they opt for reusable packaging. The amount of carbon emission can also be compared to an activity in their daily lives, to give customers a clear connection as to how their decision is bringing about a positive impact.

Creating a **gamification experience** to make customers feel rewarded for reusable packaging may also lead to higher adoption of reusable packaging.

Customer opt-in rates and return rates may be influenced by deposits and charges imposed by retailers on packaging. While passing such costs to the customer may ease the financial burden on retailers, it could reduce customer opt-in or impact return rates.

In a survey conducted by IPC, **only 11% of customers who were offered sustainable packaging paid for it.**¹⁷ Furthermore, one of the key reasons **Singaporeans do not complete their online purchases is due to additional logistics charges.**¹⁸

Deposits have **supported higher return rates** for packaging such as glass bottles and reusable cups in some countries.¹⁹ Deposits could also cushion against inventory and cash flow risk related to returnable packaging. However, deposits may deter customers from choosing reusable packaging.

Nudges and penalties will influence opt-in and return rates for reusable packaging. During implementation, it is important for retailers to **experiment with different mechanisms to determine the extent of the impact it has on customer behaviour.**

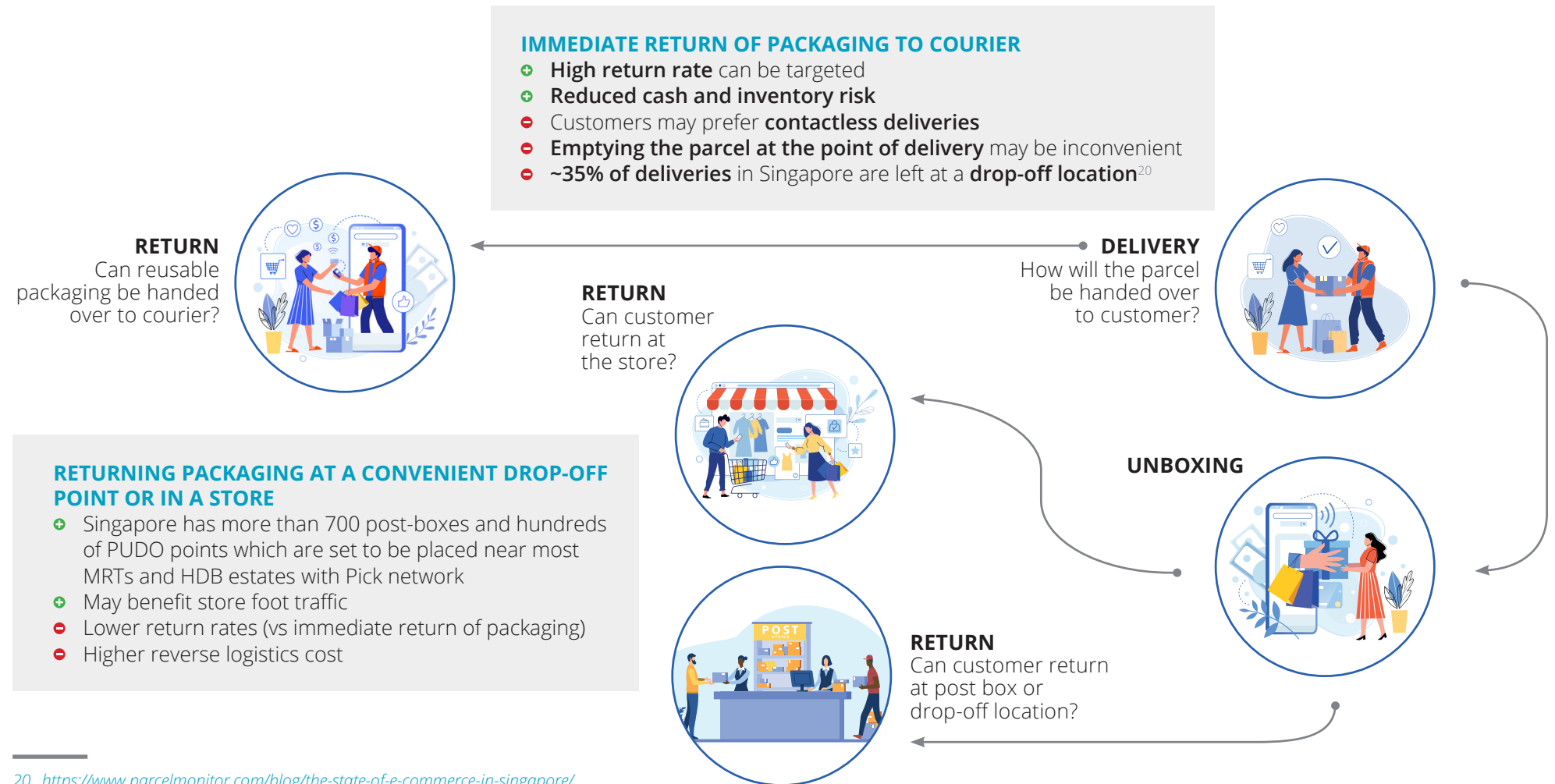
Providing convenient return options will also be an important factor in persuading customers to return the reusable packaging.



DELIVERY AND RETURNS: CONVENIENCE IS KEY TO MAXIMISING RETURN RATES

Highly convenient options to return reusable packaging should be offered to customers. Key options include immediate return of packaging to the courier and returning packaging at a convenient drop-off point or in-store.

Once the customer has returned the reusable packaging, a closure that makes the customer feel good at the end of this journey may be an important factor in increasing the adoption of reusable packaging.





CLOSURE WITH “FEEL-GOOD FACTOR”: HOW CAN REUSABLE PACKAGING BE CHOSEN AGAIN?

“FEEL GOOD FACTOR”

How can reusable packaging be chosen again?



CLOSURE

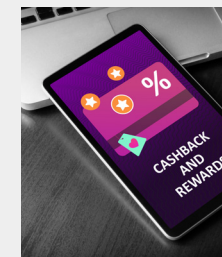
How the customer feels towards the end of this journey could determine if they become **part of the reusable eco-system**.

Considerations for retail would be to:



ACCEPT

pre-loved clothes
donation with
the parcel



AWARD

loyalty points/
discounts



GAMIFY

(e.g. growing a virtual
garden with every
sustainable choice)



thredUP's 2021 resale report estimates that the secondhand clothing market will double in the next five years, reaching USD 77 billion.



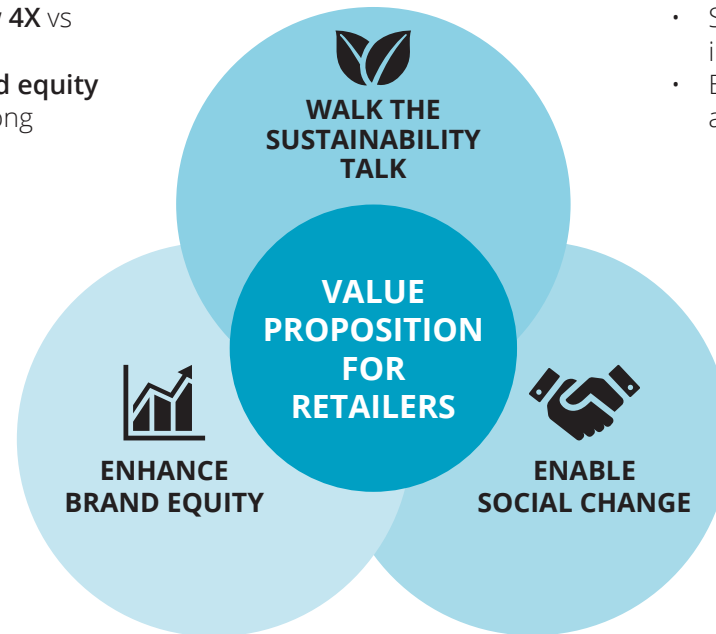
Sustainable Brands report on circular apparels market

In addition to rewarding customers at the point of sale, retailers can consider using reusable packaging to collect back old clothes for donation or resale. This is a novel way in which packaging and old unused clothes can be reused or upcycled.

Reusable packaging options need to be viable for retailers as well. It is up to retailers to introduce reusable packaging concepts to their customers. Therefore, the next aspect of addressing the value proposition for retailers is essential.

2.3. POSITIVE VALUE PROPOSITION

- Niche sustainable brands **grow 4X** vs other brands²¹
- Sustainability to enhance **brand equity**
- Create a **strong following** among customers already demanding sustainable solutions



- Spearhead **tangible initiatives** in sustainability
- Be a **role model** for other retailers to adopt a reusable packaging model
- Enable other **social change** such as collecting back pre-loved items for donation and recycling

Reusable packaging gives retailers a unique opportunity to introduce a new experience for customers to make environmentally conscious decisions. It can help retailers meet their corporate sustainability goals and enhances brand equity among customers who are looking for environmentally sustainable options, thereby reaching out to those who would otherwise, avoid purchasing online.

By implementing this concept, brands can also create opportunities to enable social change, such as collecting pre-loved items for donations and resale along with reusable packaging. thredUP's 2021 *Resale Report* estimates that the second-hand clothing market will double in the next five years, reaching \$77 billion. Policy incentives to end fast fashion production and disposal would fuel the movement.²²

²¹ *Business of Fashion* article; *E-Commerce Is Helping Fashion But Hurting the Planet*

²² <https://sustainablebrands.com/read/waste-not/report-circular-apparel-market-projected-to-reach-77b-by-2026>

COST OF IMPLEMENTING REUSABLE PACKAGING

Key costs incurred for e-commerce are last-mile delivery, e-commerce secondary packaging and product returns.

In an alternative scenario in which reusable packaging is used, packaging costs will increase due to the higher initial cost of reusable compared to single-use. Furthermore, the return cost of empty reusable packaging also needs to be considered. Figure 6 compares the costs of e-commerce deliveries using single-use and reusable packaging.

However, in the long term, **higher volumes will translate to reduced cost** of packaging and returns as retailers negotiate a better rate with suppliers. Furthermore, packaging design can influence the size and dimensions of reusable packaging, which could also influence return charges. The concept will be new to Singapore. Retailers can make choices that leverage Singapore’s strengths and learn from best practices across the globe.

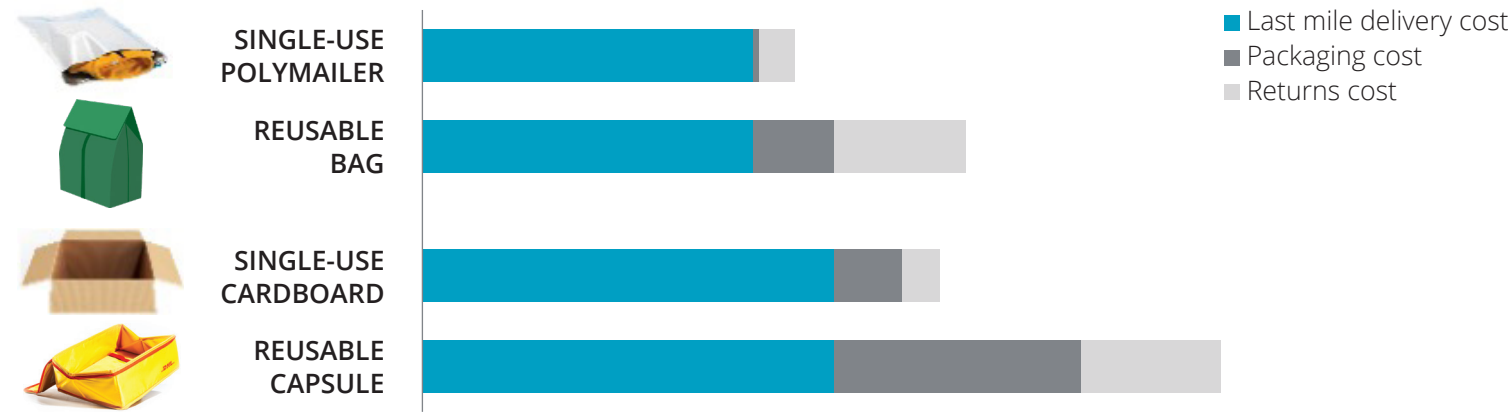
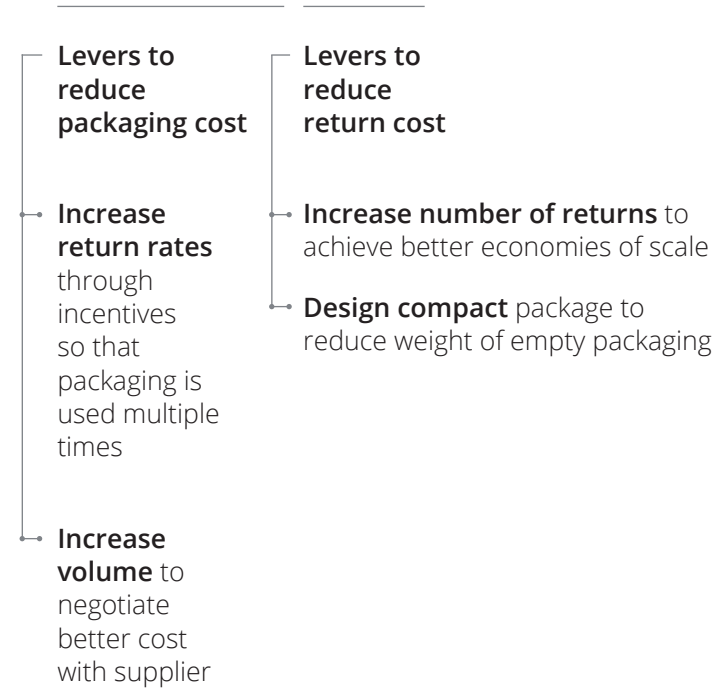


Figure 6: Cost comparison of single-use versus reusable packaging



2.4. SEAMLESS OPERATIONAL PROCESS

A seamless operational process that is easy for consumers and retailers is crucial for a circular sustainable packaging system. Specific considerations for Singapore need to be taken into account to assess operational feasibility.

Singapore has a well-developed logistics network. As a small country, reusable packaging only has to travel a short distance to return to the point of origin. Furthermore, the country aims to have a locker station located within a five-minute walk of each public housing estate. Support from government institutions in the form of education campaign partnerships or grants are also accessible to private businesses.

Public institutions can also support the standardisation of logistics processes and systems for multiple companies. The government and the Infocomm Media Development Authority (IMDA) supports the implementation of Pick, a network of PUDO points enabled by an IT platform, for various logistics providers to use.²³ With the government's support, a central asset recovery IT tool accessible to multiple last-mile providers, third-party logistics and retailers can potentially be implemented for reusable packaging in the future. Partnering government institutions will help reach more Singaporeans to educate them about reusable packaging, and to set the process standards for a scalable offering.

Learnings from current sustainability initiatives can be used for change management. An example would be the goal to reduce single-use plastic at supermarkets, which gives insight into the Singaporean consumer's behaviour. A 2019 survey revealed that just 9% of Singaporeans supported a plastic bag ban, while another 21% supported supermarkets charging for plastic bags.²⁴ While customer convenience is paramount, education campaigns to change user preferences towards sustainable options is important. Financial incentives also influence customer behaviour. Since 2019, NTUC FairPrice has imposed a plastic bag charge at 25 outlets. About 7 in 10 customers who shopped at those outlets chose to use their own bags or refused plastic bags.²⁵

Currently, 65% of total e-commerce sales are domestically fulfilled.²⁶ Retailers that manage their fulfilment operations within Singapore are more suited for reusable packaging operations as the products only have to travel a short distance from customers to the point of reuse.

²³ <https://www.imda.gov.sg/news-and-events/Media-Room/Media-Releases/2021/Nationwide-Parcel-Locker-Network-Launched>

²⁴ <https://www.channelnewsasia.com/news/commentary/singapore-plastic-bag-charge-ban-waste-recycle-reuse-pollution-12989408>

²⁵ <https://www.straitstimes.com/singapore/environment/singapore-to-work-on-a-charging-model-for-disposable-bags-in-supermarkets>

²⁶ Report: Statista Digital Market Outlook Singapore 2021

2.4.1. CASE STUDY: RETURNITY

COMPANY

RETURNITY

- Established in USA and expanded to other markets
- Serves e-commerce companies that have circular supply chain (e.g. rental, subscription business)
- Also has product offering for other logistics operations

VALUE CHAIN



Returnity primarily serves a niche market that has naturally closed loops in the supply chain, for example apparel rentals. The company has a high-quality product that can last several uses, and hence it can reduce packaging waste and overall packaging costs.²⁷

Emerging subscription model businesses should pursue reusable packaging since the return rates tend to be maximum in such cases.

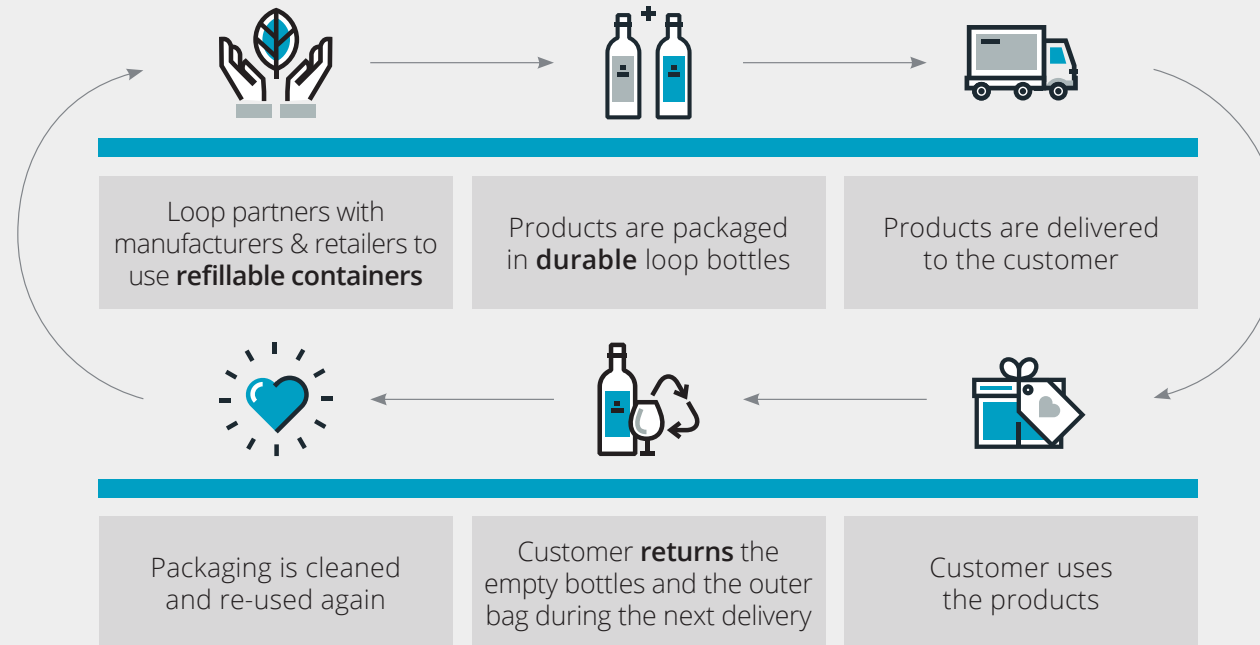
2.4.2. CASE STUDY: LOOP

COMPANY

LOOP

- Pilot scheme launched in **Tesco in UK** and **Woolworth in Australia**
- Aims to make **refillable containers become a standard part** of the weekly food shopping

VALUE CHAIN



Loop partners with manufacturers to provide subscription services for food and personal care products.²⁸ It eliminates single-use primary packaging by directly partnering with grocery retailers and manufacturers.

However, this model is limited to a niche segment of customers, and hence in the short term, it is not easy to achieve a wider outreach for such a solution.

²⁸ <https://theecobahn.com/packaging/loop-reusable-packaging-multi-use-grocery-packaging/>

2.4.3. CASE STUDY: EASYGREEN BY DHL

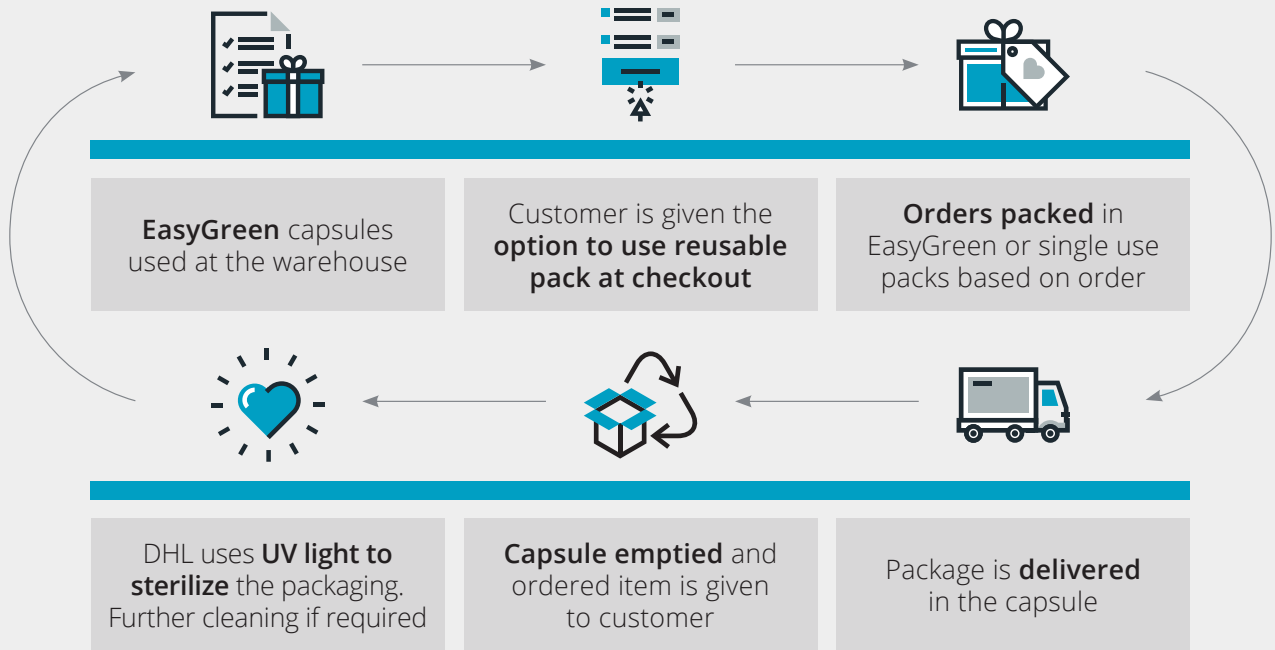
COMPANY

DHL

- Pilot has been conducted in **Europe** for **fashion category**
- Product has been developed in consultation with **packaging and productivity** experts
- DHL branded **EasyGreen** capsules used for delivery



VALUE CHAIN



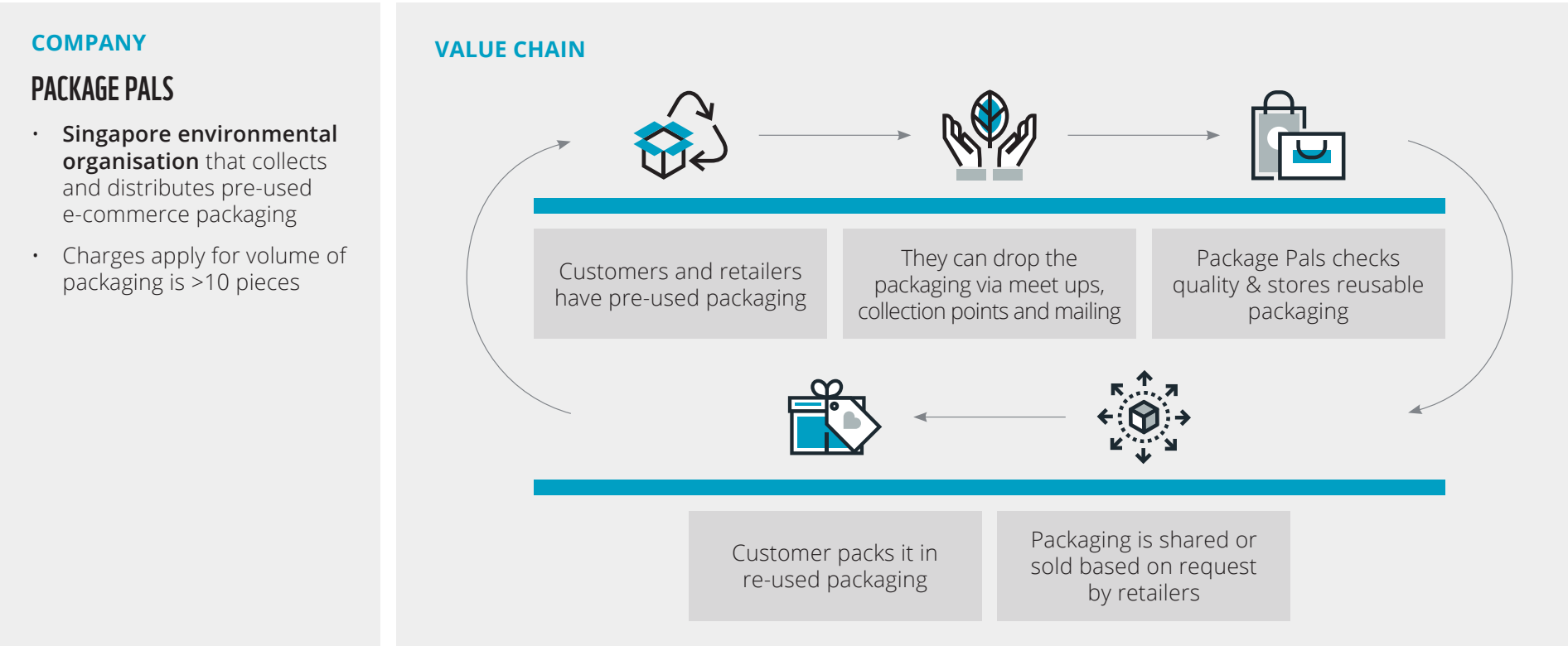
DHL has piloted EasyGreen packaging in some European countries. The key benefit of the model is that return rates are maximised as the packaging is returned immediately after delivery.

There is no dependence on the customer to return the packaging. Another benefit of the model is that last-mile costs remain low as the return leg of delivery is utilised to return empty parcels. This works in a scenario where nearly all deliveries are to the customer's door, and customers receive packages in person. Given that around 35% of deliveries in Singapore are to drop-off points, it will be challenging to roll out such a programme in the country.

2.4.4. CASE STUDY: PACKAGE PALS

Package Pals is a Singapore-born circular packaging initiative that seeks to extend the life of packaging through a new collection-distribution model. The ground-up initiative collects e-commerce packaging (poly mailers, envelopes, bubble wrap) from the public and distributes them back to businesses looking for eco-friendly options.

Currently, Package Pals has over 5,000 social media followers who support sustainable packaging solutions. As the vision of Package Pals is to create a wasteless postal system, educating the public on the issue is key to achieving its goal.²⁹



Package Pals is looking forward to the emergence of circular solutions for packaging in the private sector. This would align it with the government's vision set out in the Green Plan 2030, which focuses on the circular economy. Such solutions could include community initiatives, or packaging designed for long-term reuse, as in the cases of Returnity and Loop. The final aspect that needs to be considered for implementation is the actual packaging itself for which critical requirements are discussed in the next section.

29 Interview with Package Pals

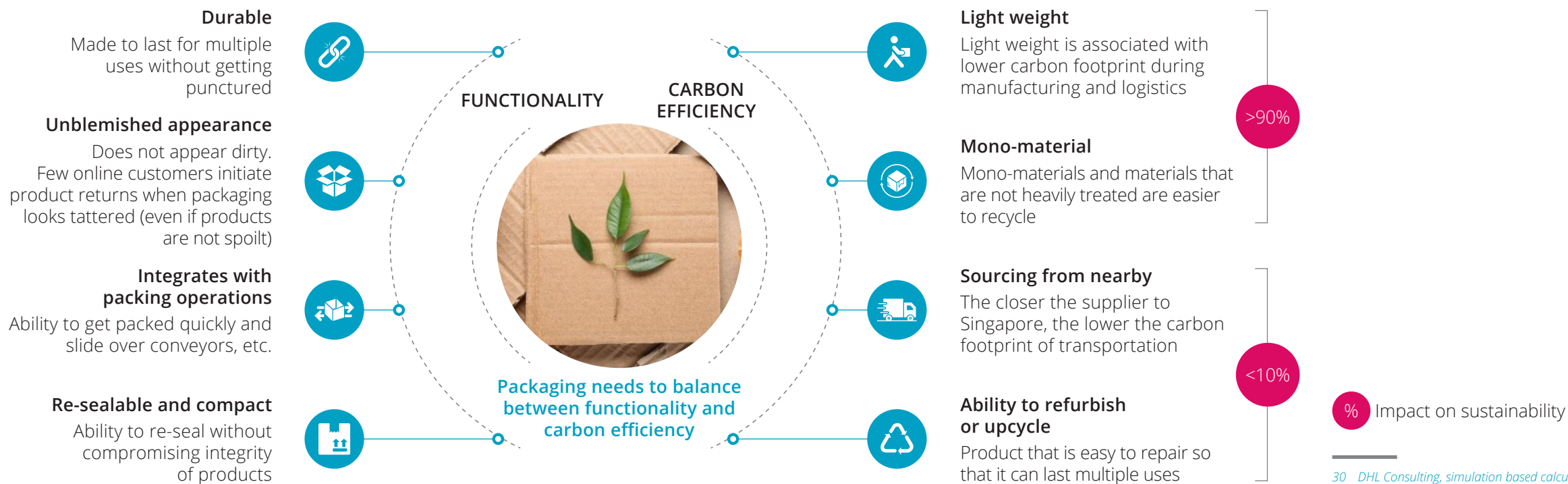
2.5. THOUGHTFULLY DESIGNED PACKAGING

Reusable packaging should strike a balance between durability and carbon efficiency.

The primary purpose of reusable packaging is to be environmentally sustainable while ensuring no damage to goods as they move through the supply chain. Its environmental impact is highly dependent on the number of uses. Packaging design needs to be functional, as well as sustainable after a few uses.

The package has to meet functional requirements such as durability and retain an unblemished appearance. It should be able to flow smoothly through the supply chain, such that it can slide through conveyors at sorting centres and be easily packed. It should also be resealable and tamper-proof to prevent product theft.

On the other hand, key drivers of carbon efficiency are divided based on the material used and other drivers, such as where the product is sourced and how it will be disposed of or recycled at the end of life. Based on internal calculations,³⁰ the main contributor to the impact on sustainability varies from country to country. In Singapore's context, over 90% of carbon emissions is dependent on the type and weight of material used to manufacture the reusable packaging.





SECTION 3: NEXT STEPS

Outlines the approach for a pilot and identifies actions required from various stakeholders in Singapore to implement reusable packaging successfully.

3.1. PILOT APPROACH

This study looks at opportunities for piloting reusable packaging solutions for retailers in the fashion and apparel sector. However, there are also huge opportunities for other sectors to participate in similar pilot programmes.

There are two operational models that can be considered for implementation in the fashion and apparel sector (Figure 7) and the choice ultimately depends on factors such as the retailer's e-commerce monthly sale volume and its existing logistics arrangement.

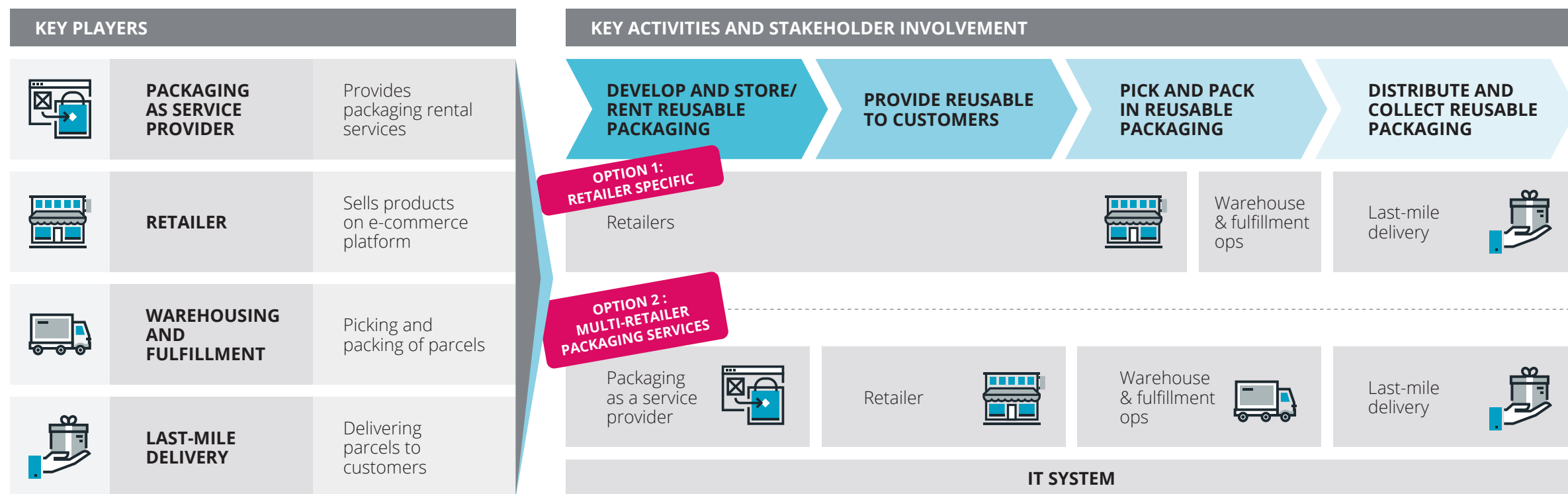


Figure 7: Operational model options

The first option is a **retailer-specific solution**, where each retailer develops and provides reusable packaging options for its customers. The second is developing a **multi-retailer packaging service solution**. For the latter, a packaging service provider would rent out reusable packaging to retailers. Each operational model has its pros and cons.

<div>OPTION 1: RETAILER SPECIFIC</div> <div>(Retailer to develop and manage their own packaging)</div>	<div><div><div></div><div>Can contain retailer’s branding</div></div><div><div></div><div>Fewer stakeholders</div></div><div><div></div><div>Higher upfront investment from retailer</div></div><div><div></div><div>Higher inventory risk for retailer</div></div><div><div></div><div>May not be able to leverage economies of scale</div></div><div><div></div><div>Cannot be immediately scaled if a new retailer wants to come on board</div></div></div>
<div>OPTION 2: MULTI-RETAILER PACKAGING SERVICES</div> <div>(A central packaging as a service provider to develop and rent packaging to multiple retailers)</div>	<div><div><div></div><div>Ability to leverage economies of scale by getting multiple retailers on board</div></div><div><div></div><div>Inventory risk is pooled with different retailers. Retailers have lower investment and risk due to rental model</div></div><div><div></div><div>Suited for industries like fashion and apparel since packaging sizes are standardized</div></div><div><div></div><div>Brand neutral — challenging to have retailer specific branding</div></div><div><div></div><div>Might take longer to implement as it will be ideal to have multiple retailers on board</div></div></div>

The retailer-specific model can be piloted quickly to test how reusable packaging performs with customers and across the supply chain. Concurrently, a multi-retailer option should be explored, even though it involves more stakeholders and would take longer to implement. This would allow retailers to leverage economies of scale to bring down the cost of reusable packaging and return logistics in the long run.

Figure 8 summarises the key tasks that can be incorporated into the playbook for the proof-of-concept, while taking reference from the four key success factors discussed in section 2.





KEY SUCCESS FACTORS		OBJECTIVES	KEY TASKS
	FRICTIONLESS CUSTOMER JOURNEY	Maximize opt-in and return rate	<ul style="list-style-type: none"> • Select target customer based on purchase data e.g. customer who buy sustainable products • Finalize ways in which customer can return the parcel e.g. via store drop off or post box • Test incentives and its impact on opt in and return rate such as discounts, gamification, etc. • Test penalties and its impact on opt-in such as customer deposits, payment for reusable pack
	SEAMLESS OPERATIONAL PROCESSES	Establish seamless operational processes	<ul style="list-style-type: none"> • Amend point of sales process for the customer to give option for reusable packaging • Create a new SKU for reusable packaging that needs to be managed at the warehouse via systems e.g. Warehouse Management System (WMS) • Create Standard Operating Procedures for reusable packaging receipt and sanitization
	THOUGHTFULLY DESIGNED PACKAGING	Select a reusable packaging that is sustainable, durable and functions well	<ul style="list-style-type: none"> • Select pack size to trial reusable packaging e.g. select the highest volume packaging (For example 42X32 cm poly mailer) • Partner with reusable packaging suppliers and prepare a catalog for retailers • Procure and test selected packaging
	POSITIVE VALUE PROPOSITION	Enhance brand equity and meet sustainability targets	<ul style="list-style-type: none"> • Quantify sustainability impact based on selected reusable pack and volumes • Initiate marketing campaign that increases awareness about reusable packaging

Figure 8: Key tasks for the playbook


















Four options have been identified based on the stakeholders that could initiate and drive this solution.

1. **Sector or industry driven**, where a consortium of retailers fund a cross-industry solution. An example is the private sector backed and not-for-profit Dansk Retursystem, which provides a deposit and collection scheme in Denmark for glass bottles and cans.
2. **Logistics provider driven**, where the provider offers packaging as a service. For example, DHL provides the EasyGreen solution in parts of Europe to its customers to reduce e-commerce packaging waste.
3. **Independent supplier driven**, where an independent supplier such as Returnity or Package Pals offers their services in the market.
4. **Government driven**, where the government supports the establishment of a new enterprise, such as with Pick Network in Singapore, to offer parcel lockers to logistics companies.

An entrepreneurial mindset could be adopted with flexibility towards all options as the project progresses to the implementation phase.



In Singapore, key stakeholders have to work together to implement and increase the uptake of reusable packaging in the long term. Government institutions, retailers and logistics providers will need to collaborate to implement and promote reusable packaging systems and make reusable e-commerce packaging a reality.

		EDUCATION	POLICY CHANGES	FINANCING	PACKAGING DESIGN	OPERATIONAL SETUP
	GOVERNMENT INSTITUTION	 Educational campaigns for consumers	 Encourage sustainable businesses	 Subsidize packaging solutions		 Support infrastructure enhancement
	RETAILER	 Reach out to customers via brands		 Fund Pilot & Finance PaaS company	 Give input on design requirements	 Implement IT system & adapt storefront
	WAREHOUSING & FULFILLMENT				 Test feasibility of design	 Adapt IT and warehousing processes
	LAST-MILE DELIVERY			 Discount reverse logistics cost	 Test feasibility of design	 Implement IT system & use as-is network

3.2. SUSTAINABLE PACKAGING ALTERNATIVES

While on the reusable packaging journey, other opportunities with medium to short-term benefits can be leveraged in parallel.

Several alternative ideas to reusable e-commerce packaging have emerged throughout this project (Figure 9).

Reusable packaging implementation will be a high-effort and long-term journey that requires multiple retailers and stakeholders to collaborate. However, these actions have the highest impact in terms of using less resources and creating a circular economy. Retailers could independently initiate and drive other big bets and iterate ideas that are feasible in the short to medium term. Refer to Appendix C for details of the listed ideas 3 to 8.

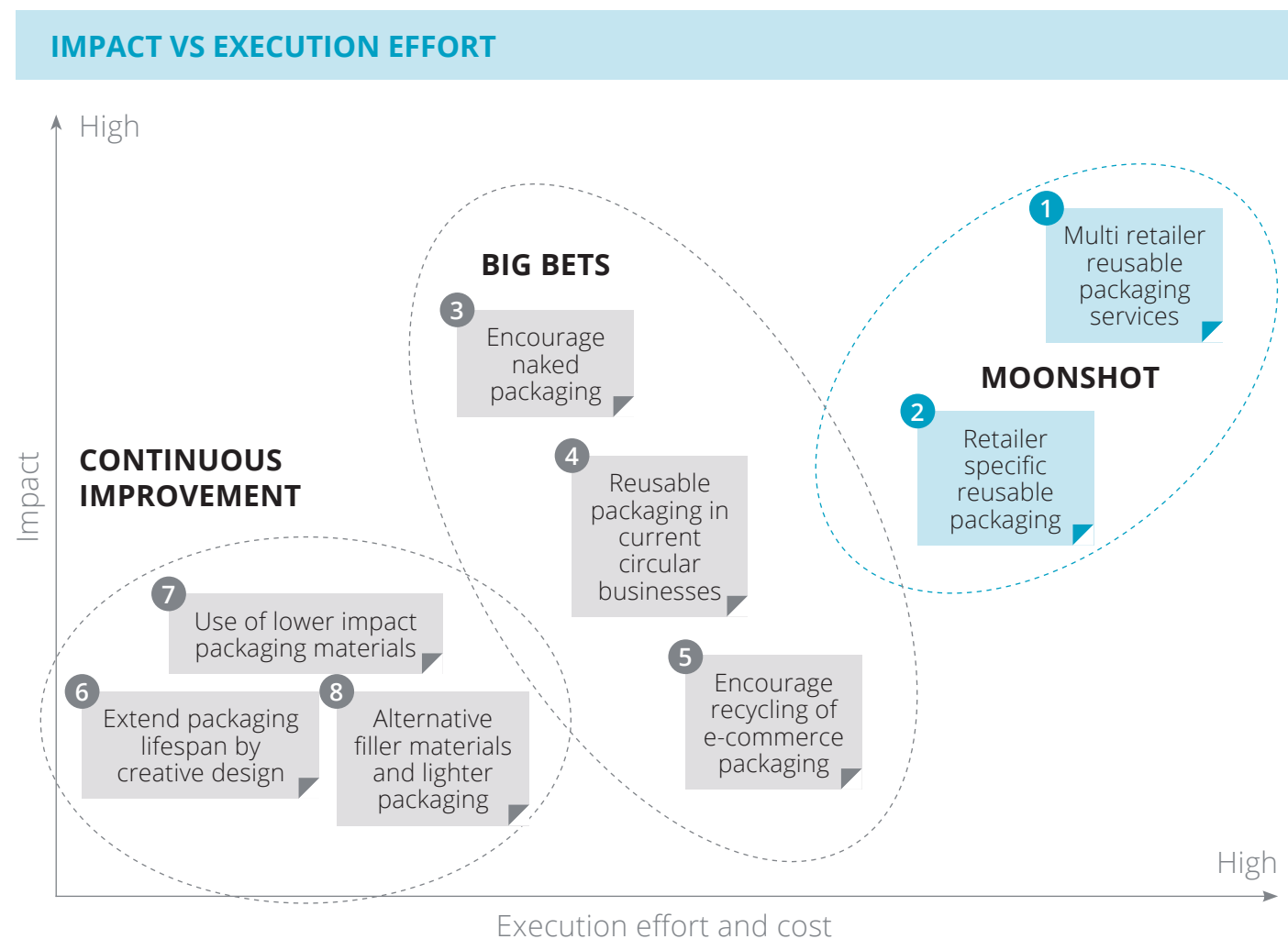


Figure 9 Sustainable packaging alternatives

KEY FINDINGS

Reusable packaging is a promising concept that can reduce waste generated by the e-commerce sector in Singapore.

For it to be sustainable, **two critical drivers of sustainability** need to be addressed:

- 1) **Return rate** of packaging must be **greater than 75%**.
- 2) Package design must **balance between functionality and sustainability**.

Critical considerations for implementing reusable e-commerce packaging are:

- 1) **Frictionless customer journey:** Designing a customer journey that maximises opt in and return rates.
- 2) **Positive value proposition:** Creating a compelling value proposition for retailers to invest in reusable packaging capability.
- 3) **Seamless operational process:** Creating processes that leverage opportunities in Singapore (e.g. existing logistics networks).
- 4) **Thoughtfully designed packaging:** Packaging that balances durability, cost and carbon footprint.

An iterative approach to implementing reusable packaging should be considered. Fashion retailers can be a testbed for this concept by experimenting with various drivers such as customer discounts and packaging styles to determine what works best. Additionally, **retailers can come together to establish industry-wide standards**, which can be used by packaging service providers to serve multiple retailers and leverage economies of scale. Finally, **multi-stakeholder collaboration is essential**, including the support of the government and the participation of retailers and logistics providers.

“
At SingPost, we are keen to explore how our well-developed postal network can be used to create a positive change in society.

”
*Michelle Lee, Head of Sustainability,
Singapore Post Limited*

ACKNOWLEDGEMENTS

This report was prepared in conjunction with research partner DHL Consulting. As an independent entity within the DPDHL Group, DHL Consulting was selected to carry out this feasibility study due to its experience in specialised logistics, with a dedicated team looking into transport, warehousing and packaging sustainability across the value chain.

RESEARCH PARTNERS

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SUPPORTING PARTNER UNIQLO (SINGAPORE) PTE. LTD.

We would like to thank the following organisations for their participation in this study, and for providing valuable inputs and insights

MANUFACTURERS AND RETAILERS IN SINGAPORE

Love, Bonito
ECCO Shoes Singapore
IKEA Singapore
Alps Group (Cloversoft)
L'Oréal
Nestlé
LYRECO
Sustenir Group

REUSABLE PACKAGING PROVIDERS

The Better Packaging Co.
Returnity
Package Pals
DPDHL Group (DHL EasyGreen team)

LOGISTICS COMPANIES

Singapore Post Limited
Ninja Van Singapore
DPDHL Group

GOVERNMENT AGENCIES

Economic Development Board (EDB)
National Environment Agency (NEA)



APPENDIX

A. GLOSSARY

E-commerce: Includes products ordered using the internet via any device, regardless of the method of payment or fulfilment; excludes travel, online services and event tickets.

E-commerce reusable packaging: Packaging used specifically for goods that are purchased online. Excludes primary packaging (e.g. the box in which electronic devices are packed after manufacturing).

Naked e-commerce packaging: Implies that no additional e-commerce packaging was used during the e-commerce transaction and delivery, e.g. products were delivered in the primary packaging.

Third-party logistics (3PL): The outsourcing of logistics processes to a third party business, including inventory management, warehousing and fulfilment.

Last-mile logistics: The final step of the delivery process from a distribution centre to the end-user or a drop off point, which is accessed by the end-user.

Pick-Up and Drop-Off (PUDO) point: A location (e.g. mom-and-pop store or retail outlet) that offers a parcel pick up and drop off service as part of a wider network of PUDO points.

SKU (Stock Keeping Unit): A distinct type of product for sale, and all attributes associated with the product that distinguish it from other items.

B. SUSTAINABILITY MODEL ASSUMPTIONS

System boundaries used to compare the difference in carbon dioxide equivalent (CO2e) for single-use and reusable packaging:

- 1) **Manufacturing of the packaging:** Global averages are taken depending on the material used.
- 2) **Transport into Singapore:** It was assumed that all the transportation is from China into Singapore via sea freight.
- 3) **Reverse logistics transportation:** Reverse logistics in the case of reusable packaging per delivery was also accounted for.
- 4) **Disposal:** Disposal of packaging for reusable or single-use packaging was not considered as the focus of the study is on the carbon footprint of transportation. Furthermore, incorporating high level end of life disposal calculations did not significantly change the number of reuses required for reusable packaging to be sustainable.

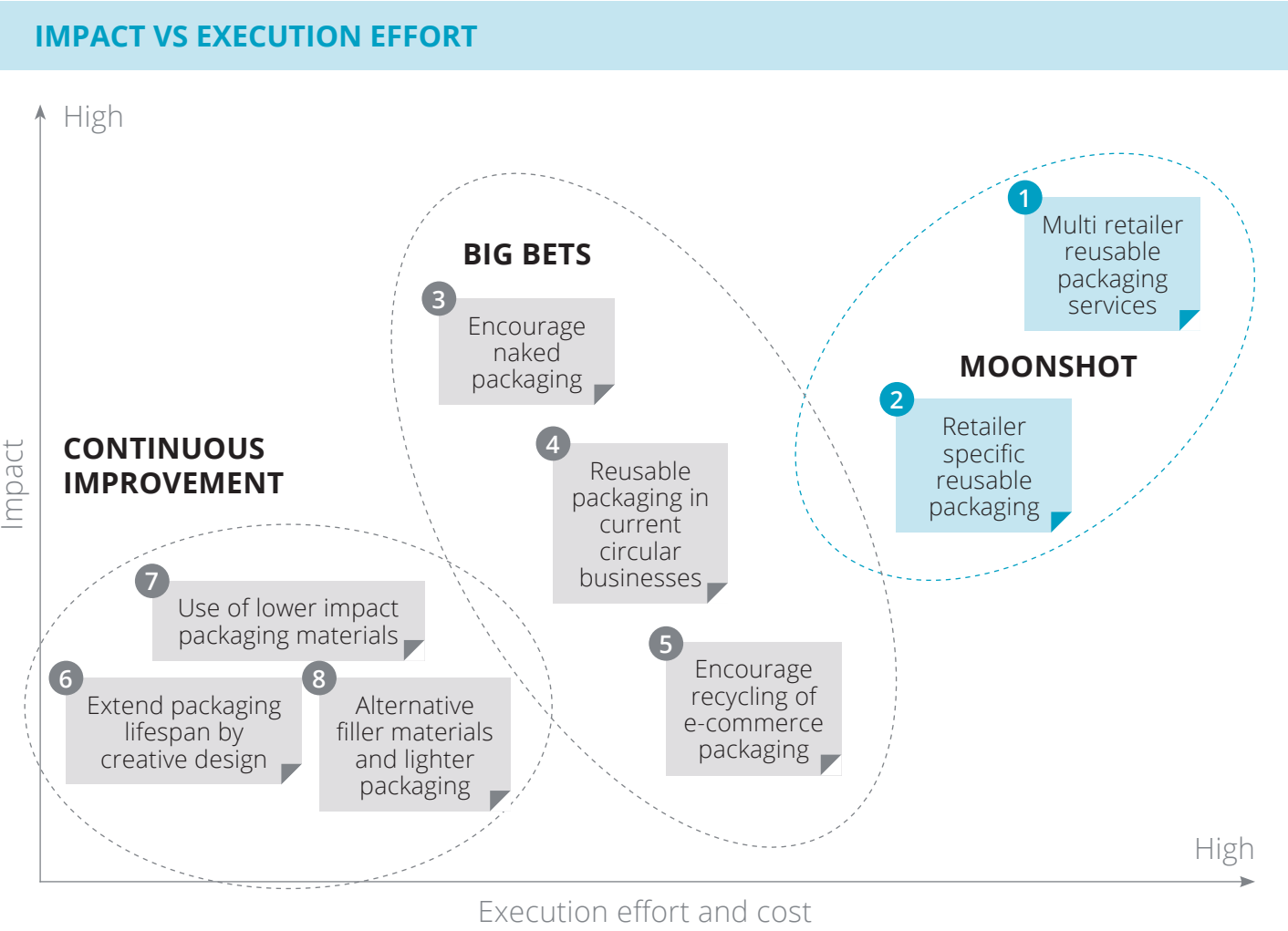
PACKAGING OPTION		SINGLE USE PLASTIC (CURRENT)	REUSABLE PP BAG (REPLACE BAG)	CARDBOARD	REUSABLE PACKAGING (REPLACE CARDBOARD)
Material type		LDPE	PP	Paper	Paper + PP
Manufacturing ¹	Weight of packaging assumed based on benchmark provided in interview	0.060 kg CO ₂	0.190 kg CO ₂	0.230 kg CO ₂	1.371 kg CO ₂
Transportation ²	Ship from Shenzhen, China to Singapore by sea	0.001 kg CO ₂	0.003 kg CO ₂	0.007 kg CO ₂	0.029 kg CO ₂
Reverse logistics Singapore	Assume 22km travelled in reverse logistics leg	-	0.001 kg CO ₂	-	0.008 kg CO ₂
Total/delivery (assuming 4 uses)	Single use : Mfg.+ Transport reusable : (Mfg.+Transport)/4+Rev.log	0.061 kg CO ₂	0.050 kg CO ₂	0.237 kg CO ₂	0.358 kg CO ₂
Total/delivery (assuming 6 uses)	Single use : Mfg.+ Transport reusable : (Mfg.+Transport)/6+Rev.log	0.061 kg CO ₂	0.033 kg CO ₂	0.237 kg CO ₂	0.241 kg CO ₂

Figure B1: Calculation table with assumptions


1 Carbon emissions during production taken based on global average in paper from *Evaluation of life cycle inventory data for recycling systems, Brogaard, Line Kai-Sørensen; Damgaard, Anders; Jensen, Morten Bang; Barlaz, Morton; Christensen,Thomas Højlund, 2014;
2 DHL Carbon calculator

C. SUSTAINABLE PACKAGING IDEAS


A SPECTRUM OF IDEAS TO ALTERNATE E-COMMERCE PACKAGING HAVE EMERGED THROUGH THE STUDY THAT CAN BE CONSIDERED BY RETAILERS IN THE SHORT TERM



CLASSIFICATION



IMPACT — Determined by 1) potential share of deliveries and 2) Packaging reduction potential per delivery



EFFORT — Based on 1) Change in current customer behavior, 2) Change in operational process, 3) Cost

HIGHLIGHTS

Implementation of reusable packaging will be a long journey and requires coordination with multiple players.

While on that journey, retailers can consider implementing other short-term ideas that may be suited towards their sectors.

Refer to the following pages for details.

3 COMPANIES COULD COMPLETELY ELIMINATE E-COMMERCE PACKAGING WHERE THE PRODUCT PACKAGING IS ALREADY STURDY AND SAVE ON COSTS

DESCRIPTION AND USE CASES

Avoidance of additional e-commerce packaging where product or appliances have a sturdy and easy to handle packaging. E.g. home appliances, ready to assemble furniture etc.

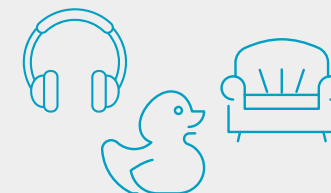


NEXT STEPS

- **Marketplaces and delivery companies** can guide companies on instances where additional e-commerce packaging is not required
- **Consumers** to be made aware on importance of reducing packaging for e-commerce

APPLICABLE CATEGORIES

- Electronics
- Furniture
- Toys, Equipment and DIY



BENEFITS

- + Low investment idea and will result in cost savings for the retailer
- + Easy to implement — no additional operational complexity

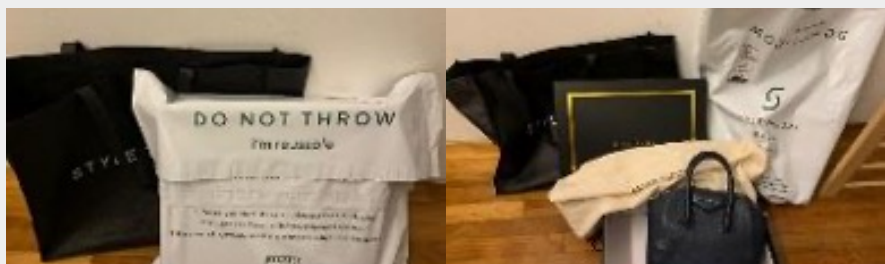
DRAWBACKS

- Might impact the overall customer experience (e.g. cosmetic packaging needs to look unblemished upon delivery)
- Certain products require outer packaging to protect the products or facilitate returns (e.g. shoes)

4 REUSABLE PACKAGING CAN BE SEAMLESSLY INTEGRATED INTO CIRCULAR BUSINESSES' OPERATIONS AND COMPANIES CAN EXPECT HIGH RETURN RATES OF THE PACKAGING

DESCRIPTION AND USE CASES

Circular businesses concepts such as “Rent the Runway” have enjoyed high growth over the last decade. Such businesses are likely to see increased adoption and they offer a unique opportunity for returnable packaging. Such companies could focus on increasing the durability of their returnable packaging to become even more sustainable.



Images from Singapore based, Style Theory's bag rental delivery

NEXT STEPS

- Circular businesses can offer higher durability returnable packaging instead of materials that can be used only a few times

APPLICABLE CATEGORIES

All subscription based categories (e.g. fashion, groceries)



BENEFITS

- + Will likely result in cost savings due to multiple usage of product
- + Easy to implement — no additional operational complexity and no change in consumer behavior

DRAWBACKS

- Initial investment might be high for retailer to invest in more expensive packaging
- Limited to very niche market and cannot be adopted mainstream

DESCRIPTION AND USE CASES

Recycling rates in Singapore tend to be poor due to little consumer awareness on waste segregation. E-commerce packaging waste has little food contamination and has higher potential for recycling. Appropriate government nudges by placing recycling bins strategically and offering incentives for recycling.

NEXT STEPS

- Government institutions or private led initiative to further evaluate a proof of concept that can influence the consumers into the habit of recycling

APPLICABLE CATEGORIES

All



BENEFITS

- + Increased recycling rate for typically less contaminated e-commerce packaging
- + Will lead to stronger recycling culture in Singapore

DRAWBACKS

- Doesn't avoid waste but just encouraged better management of it — hence impact is limited
- Will require education and investment to integrate with recycling infrastructure in Singapore

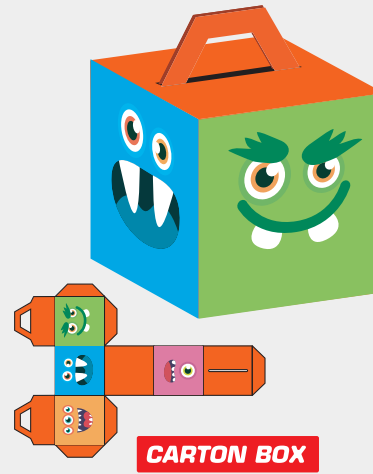
6 COMPANIES CAN ENCOURAGE CUSTOMERS TO INCREASE PACKAGING LIFESPAN BY CREATIVE DESIGN

DESCRIPTION AND USE CASES

Packaging can be given a new life after its use so that it may serve different purpose before being recycled / disposed.



The Better Packaging Co's reusable eCommerce satchel which can be reused as gift wrapping for the holiday season



Initiative with recyclable delivery boxes with a built-in play factor

APPLICABLE CATEGORIES

- Fashion
- Groceries



BENEFITS

- + Ensures some packaging will be used for other purpose and will increase the lifespan of packaging
- + Easy to integrate with current operations
- + Good for company branding

NEXT STEPS

- Bring design thinking into packaging so that it can be repurposed afterwards

DRAWBACKS

- Doesn't reduce waste; it is just a better way of managing waste
- More expensive since additional printing required
- Customers might not re-use all the packaging they purchase

7 VARIOUS ALTERNATIVE PACKAGING MATERIALS ARE NOW AVAILABLE IN THE MARKET. END TO END CARBON FOOTPRINT OF PACKAGING NEEDS TO BE EVALUATED BEFORE IMPLEMENTATION

DESCRIPTION AND USE CASES

Alternative packaging materials that have lower carbon footprint is being evaluated



Companies are researching dissolvable plastic materials that can be disintegrated at home and doesn't end up in landfill

Ninja Van is offering home compostable polymailers, Eco Ninja Packs, as an alternative.

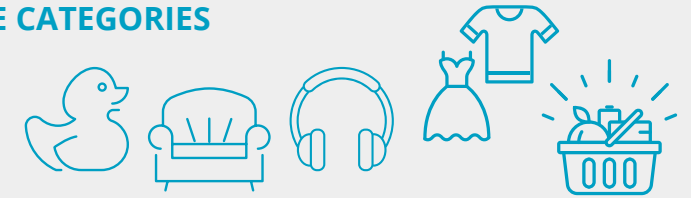


NEXT STEPS

- Companies with financial appetite to investigate use of alternative materials in their packaging

APPLICABLE CATEGORIES

All



BENEFITS

- + Easy to integrate with current operations
- + Good for company branding

DRAWBACKS

- Doesn't reduce waste; it is just a better way of managing waste
- Typically more expensive for the retailers
- End to end carbon impact needs to be studied prior to execution

8 ALTERNATIVE FILLER MATERIALS CAN BE USED TO PACK ODD-SHAPED OR COLD ITEMS TO REDUCE THE COST AND CARBON FOOTPRINT

DESCRIPTION AND USE CASES

There are multiple ways in which categories that are relatively difficult to pick and pack (e.g. groceries) can work on continuously improving how goods are packed and where packaging materials can be made lighter



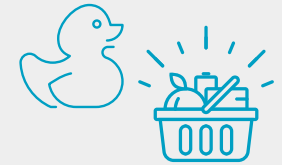
Potential to reuse
Ice Gel packs



Shredded cardboard used as padding to
protect fragile products & fill spaces in parcels.
Previously this cardboard would go into landfill

APPLICABLE CATEGORIES

- Toys, equipment and DIY
- Groceries



BENEFITS

- + Lower implementation effort
- + Progress can be made by each stakeholders individually

NEXT STEPS

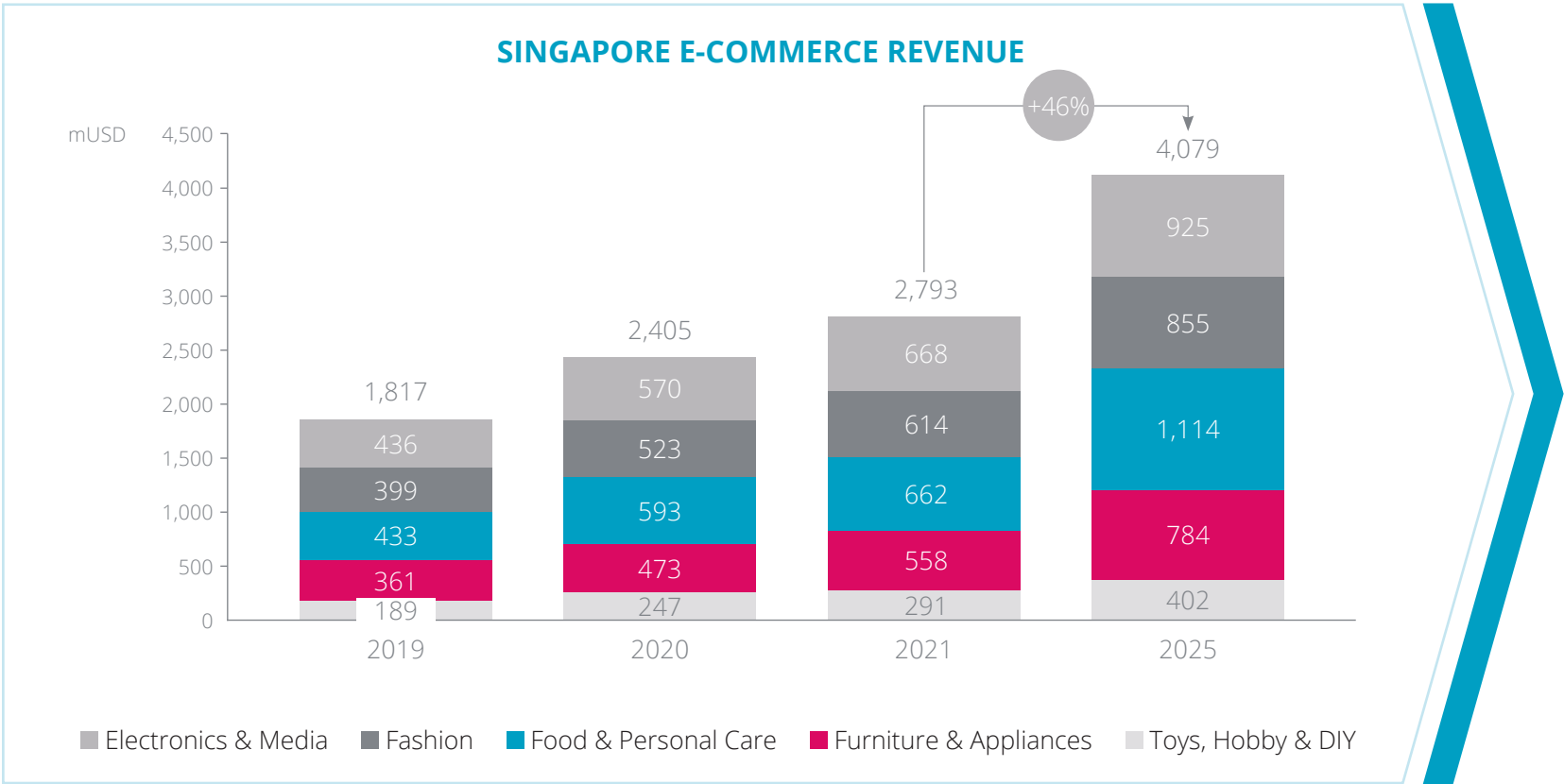
- Retailers and logistics providers to spearhead mini initiatives to reduce packaging in supply chain
- Recognition and best practice sharing will create a good knowledge

DRAWBACKS

- Has incremental/marginal benefits only
- Each implementation will become a mini project

D. E-COMMERCE STATISTICS

KEY CATEGORIES PURCHASED IN SINGAPORE ARE ELECTRONICS AND FASHION



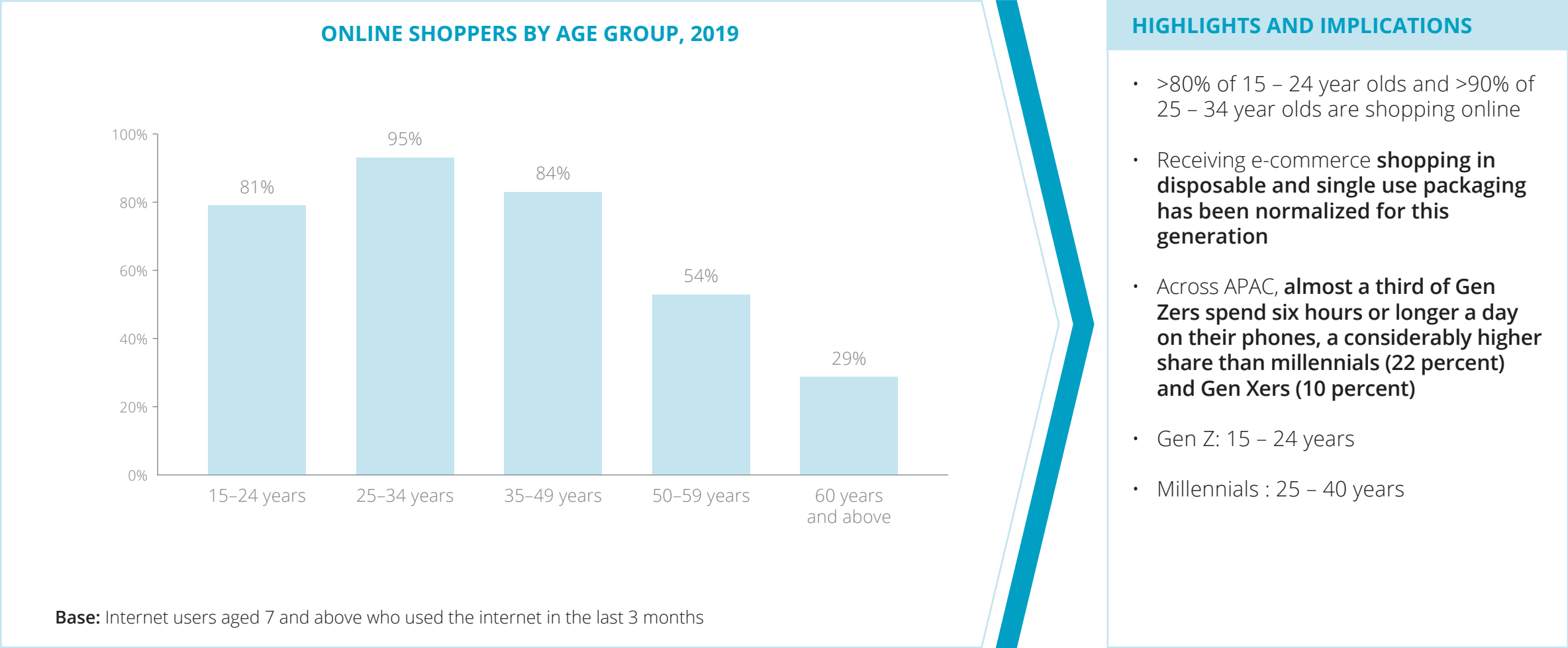
IMPLICATIONS

- Singapore's e-commerce market will grow by 46% over next 4 years from **USD 2.7B to USD 4.1B**
- Top categories of **electronics & media, fashion and food & personal care** will cover ~70% of this market
- **Apparels remains the top category purchased by individuals.** 68% of individuals purchased apparels online in 2019 in Singapore

Sources: DHL Consulting; Statista; Singapore IMDA

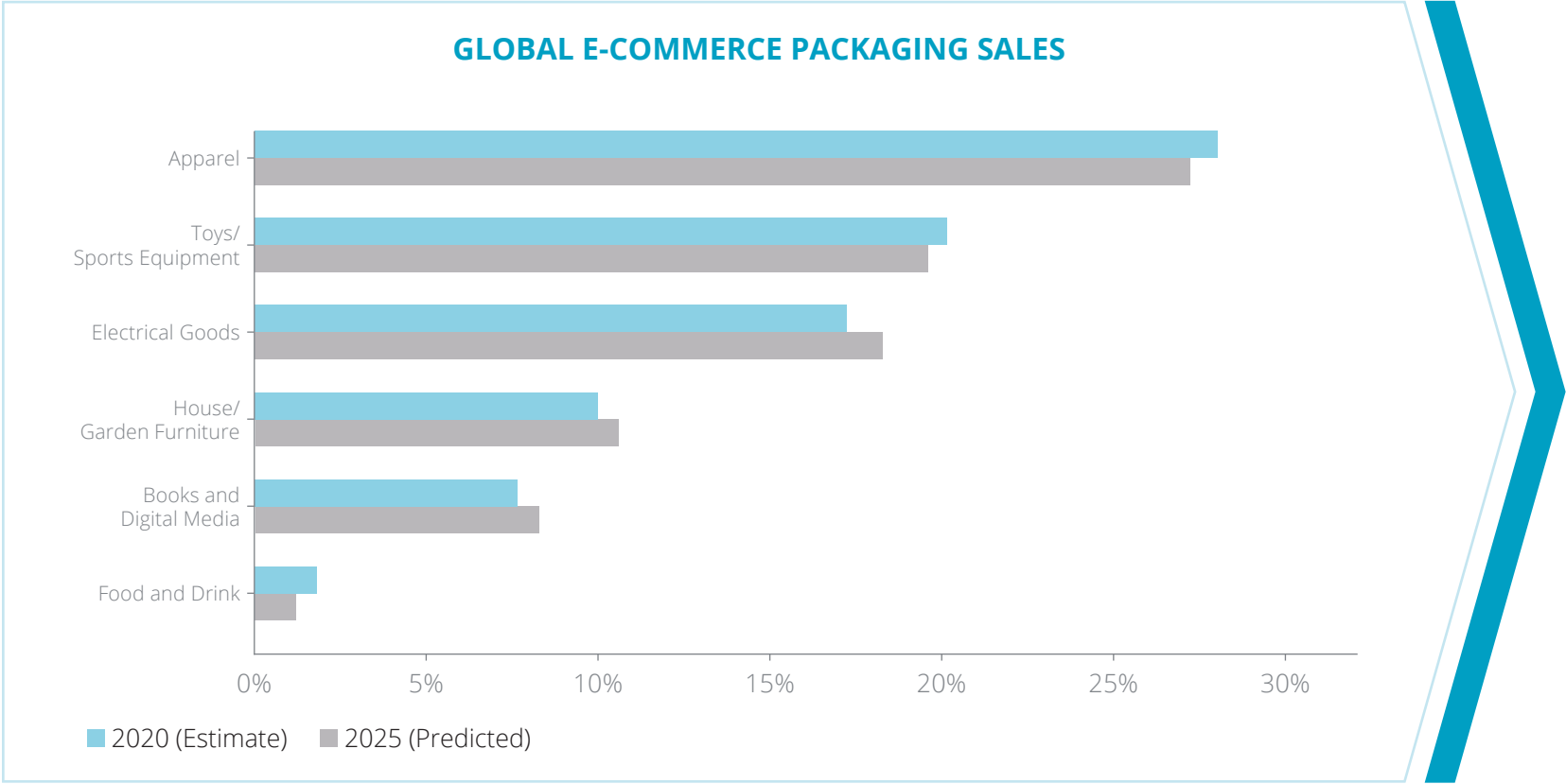
Figure D1: E-commerce market outlook Singapore

MILLENNIALS AND GEN Z ARE INCREASINGLY FORMING A LARGER SHARE OF ONLINE SHOPPERS



Sources: DHL Consulting; IMDB survey 2019; McKinsey
Figure D2: E-commerce shopper demographics in Singapore

APPARELS CATEGORY CONTRIBUTES THE MOST TO E-COMMERCE PACKAGING SPEND.
ADDITIONALLY THIS PACKAGING TENDS TO BE MORE STANDARDIZED THAN OTHER CATEGORIES



Sources: Smithers

Figure D3: E-Commerce global packaging share by category

IMPLICATIONS

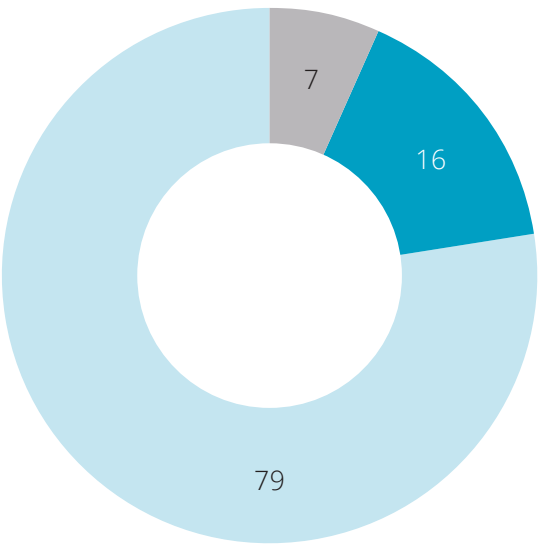
- Apparels e-commerce packaging contributes to **highest % global spend**. Typical packaging used by apparels industry is **corrugated board for footwear and flexible polyethylene bags for apparels**

WHILE MOST CUSTOMERS GLOBALLY WANT TO HAVE SUSTAINABLE PACKAGING SOLUTIONS,
FEW ARE WILLING TO PAY EXTRA FOR IT IF GIVEN THE CHOICE

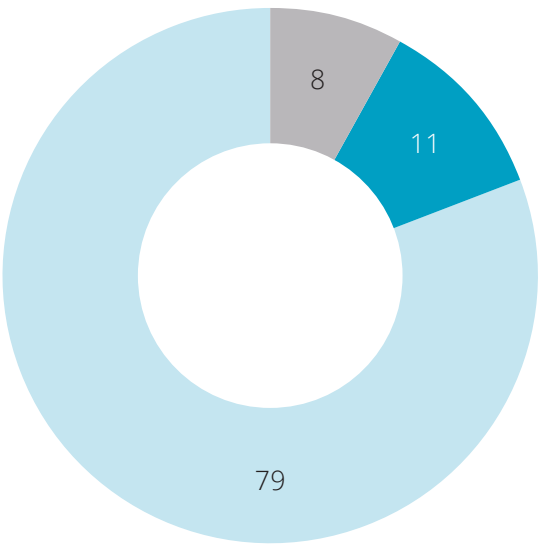
SUSTAINABLE DELIVERY ACTIONS

16% have been offered sustainable packaging, and 11% of them paid extra for it

Ever been offered sustainable packaging



(If offered) ever paid extra for packaging



■ Yes ■ No ■ Don't Know

HIGHLIGHTS AND IMPLICATIONS

- Only 11% of consumers paid extra (when offered) for sustainable packaging
- Customers are more cost sensitive to deliveries and **many consumers do not complete online purchases when charged additional for delivery**
- **A solution that doesn't pass any additional cost onto the customers should be designed**

Sources: DHL Consulting; IPC Global survey on packaging 2020 (excluding Singapore); interviews with retailers in Singapore

Figure D4: IPC survey on sustainable packaging



**A BUSINESS INITIATIVE THAT AIMS TO REDUCE WASTE
AND MOVE TOWARDS A CIRCULAR ECONOMY.**

To find out more about PACT,
please contact markets@wwf.sg or visit plastic-action.asia