



# Enabling Consumers to Adopt Reusable Packaging Systems in FMCG Products: An Application of the Behavior Change Wheel and Customer Journey Mapping

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Enabling Consumers to Adopt Reusable Packaging Systems in FMCG Products: An Application  
of the Behavior Change Wheel and Customer Journey Mapping

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A Thesis in the Field of Sustainability  
for the Degree of Master of Liberal Arts in Extension Studies

Harvard University

May 2024



## Abstract

Fast-moving consumer goods (FMCG) products contribute to plastic waste since they are designed for single use and disposal, and reusable packaging is part of the solution to eliminate plastic waste pollution (EMF, 2019). Reusable packaging systems (RPS) can help reduce single-use packaging and transition to circular consumption, but their success depends on new business models and innovations. Incumbent and challenger companies have different approaches to implementing RPS due to their size, operations reach, ability to embed sustainability in their business models, and agility to change to incorporate circularity. However, a common challenge is that low consumer adoption of reusable packaging is a key barrier for companies to offer more RPS.

How are businesses helping consumers adopt sustainable consumption behaviors such as RPS? Most research has focused on consumers' barriers to adopting RPS and on applying information and technology tools to support consumer purchasing decisions. However, it remains unclear how businesses can improve the overall customer experience of RPS, which is key to enabling reuse behaviors, increasing consumer demand, and achieving scalability. A key aim of this thesis was to examine and highlight the ways FMCG businesses incorporated effective interventions in the customer journey to allow consumers to adopt reusable packaging and contribute to reducing plastic pollution.

My research compared how incumbent and challenger companies influence consumer behavior in their customer journey design. For the sample, I selected 10 incumbent and 10 challenger RPS products sold online in the UK. The reuse models in

scope are refill at home, return from home, and return on the go, as those can be purchased online. This research applied a novel approach that involved creating a scorecard using a combination of customer journey mapping (CJM) and the behavior change wheel (BCW) framework, which was used to evaluate how companies enable consumers to switch to their RPS products.

The scorecard results showed that RPS products from challenger companies performed better than RPS from incumbent companies. The products were then evaluated according to five factors that influence RPS consumer engagement: Understanding of RPS benefits, convenience, affordability, hygiene, and infrastructure accessibility. Most products addressed the understanding of the RPS benefits and convenience. However, gaps in the CJM included affordability, hygiene, and infrastructure accessibility. Additionally, findings showed that companies mainly applied RPS interventions in the pre-purchase and purchase stages of the customer journey. In contrast, fewer interventions were used in the post-purchase stage, which could hinder consistent RPS product adoption. Regarding the BCW, results show that not all the COM-B components of capability, opportunity, and motivation are addressed in the sample products through the interventions found in the CJM and surprisingly, motivation was the least addressed area. Finally, across the 35 interventions identified in the CJM, the most addressed intervention functions are education (30%), enablement (22%) and persuasion (15%).

This thesis concludes with a guideline for companies to evaluate their RPS offerings and identify improvement areas. The results of this work contribute to research on the effective implementation and scalability of RPS in the transition to a circular economy and can help businesses identify how to improve the customer journey design.

## Dedication

“You cannot get through a single day without having an impact on the world around you. What you do makes a difference, and you have to decide what kind of difference you want to make” – Jane Goodall.

## Acknowledgments

I would like to express my deepest gratitude to my Thesis Director, Elizabeth Keenan, for her encouragement, guidance, and invaluable insights throughout the entire process of conducting this research. Also, I would like to thank my Research Advisor and professor, Dr. Mark Leighton, for his expertise and help in shaping my research and setting me up for success through the thesis preparation.

I extend my sincere appreciation to the faculty and staff of the Harvard Extension School for fostering a culture of excellence in research and scholarship and for creating a space for learning and continued inspiration on Sustainability. Furthermore, to my classmates, whom I like to refer to as changemakers, it was a joy and an honor to study alongside you and learn together and from each other.

My heartfelt thanks go to my family and close friends for their unwavering love, encouragement, and support throughout this journey. They were there to listen to the exciting new learnings of the week and to encourage me when trying to balance it all. This achievement would not have been possible without your constant support, strength, and motivation throughout these past five years!

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## Chapter I

### Introduction

Plastic packaging pollution has become a pressing environmental issue (UNEP, 2023). Around 141 million tons of plastic packaging are produced yearly, and their lifecycle contributes to 1.8 billion tons of carbon emissions annually. Approximately one-third of all plastic packaging in the global market leaks into the environment (WRAP UK, n.d.), causing significant negative impacts on ecosystems and human health (UNEP, 2021b). One source of plastic packaging waste comes from Fast-Moving Consumer Goods (FMCG) (UNEP, 2021b), which are typically designed for single use and disposal (Zeeuw van der Laan & Aurisicchio, 2019). The circular economy (CE) offers a potential solution to this issue by focusing on redesigning to eliminate waste, circulate products and materials at their highest value, and regenerate nature (EMF, n.d.-b). Due to their dependence on single-use packaging, FMCG products need to be redesigned to support the transition towards a CE for plastics (Zeeuw van der Laan & Aurisicchio, 2019), which includes the switching from single-use toward reusable packaging (EMF, 2022).

Reusable packaging systems (RPS), such as refillable or returnable products, can reduce plastic packaging waste (EMF, n.d.-a; Greenwood et al., 2021). RPS reduces the need for single-use plastic packaging (EMF, 2022) and typically has a lower environmental impact than single-use products (UNEP, 2021a). However, the successful implementation of RPS encounters many challenges, including consumer adoption of reuse systems (Greenwood et al., 2021; Long et al., 2022). In RPS, consumers take an active role as they decide if the empty packaging becomes waste or gets reused (Zeeuw

van der Laan & Aurisicchio, 2019). Companies designing for RPS should take a consumer-centric approach to make these solutions accessible and easy to use (WRAP UK, 2021). It is crucial to design behavior change interventions to achieve the targeted behavior (Michie et al., 2011). After all, creating an RPS solution that consumers are unwilling to engage with would not deliver the expected environmental impact (Greenwood et al., 2021). Thus, companies should apply behavior change interventions across the customer journey to help consumers adopt RPS.

How do FMCG companies design the customer journey of RPS products to enable sustainable consumption behaviors? There is extensive research on consumer barriers to adopting sustainability behaviors (Allison et al., 2022; Camacho-Otero et al., 2020; Charnley et al., 2022; Jannah et al., 2022), on the application of information and technology tools to support consumer purchasing decisions (Charnley et al., 2022; Di Iorio et al., 2023; Testa et al., 2020), and on how companies and governments affect consumption behavior (EMF, 2022; WEF, 2021; Zucchella et al., 2022). However, it remains unclear how customer journey design choices from FMCG companies motivate sustainable consumption behaviors in their customers.

### Research Significance and Objectives

My research examined how FMCG companies incorporate interventions to encourage consumers to adopt reuse behaviors in the customer journey for RPS products. I analyzed the UK market since the UK aims to make all plastic packaging recyclable, reusable, or compostable by 2025 (DEFRA, 2018), and the UK Plastics Pact brings together public and private stakeholders to achieve this goal (WRAP UK, 2023c). For this research, I used customer journey mapping (CJM) to analyze the customer

experience when purchasing RPS products online, and the behavior change wheel (BCW) to identify interventions that could influence consumers to switch to RPS products. I then combined the CJM and BCW frameworks to create a scorecard to evaluate whether some companies are better at designing customer journeys to help consumers adopt reusable behaviors. My research capitalized on ongoing research on the intention-action gap, the BCW framework, the barriers to adopting sustainable consumption behaviors, and the importance of information and technology to enable behavior change towards CE. To my knowledge, this is the first time an attempt has been made to systematically identify interventions in the customer journey of RPS products and how those could influence consumer behavior change.

The results could advise effective implementation and scale-up of RPS in transitioning to a CE. It could also help businesses identify how to improve the customer journey design for RPS products and enable consumers to adopt these solutions, thus reducing plastic waste. Additionally, this research provides a basis for experimental manipulation of interventions across the customer journey of RPS products, paving the way for companies to include more effective interventions in the customer journey design. Finally, this research could be replicated in the context of other countries to identify barriers and enablers of consumer adoption of RPS, considering the consumer profile, policies, and company offerings in those countries.

Key objectives for this research were to:

- Investigate how FMCG companies design the customer journey of RPS products to enable sustainable consumption behaviors.

- Evaluate the current status of interventions set by FMCG companies to help consumers adopt reusable consumption behaviors using the BCW and CJM.
- Compare the customer journey of similar FMCG products in incumbent (i.e., Colgate-Palmolive, Unilever, etc.) and challenger or start-ups (i.e., Bower Collective, Ocean Saver, etc.) companies offering reusable packaging.
- Identify gaps where companies can improve the customer journey by applying interventions more likely to enable reusable consumption behaviors.

## Background

The circular economy (CE) can effectively tackle plastic pollution (Bradley & Corsini, 2023) by eliminating plastic items, innovating towards reusable, recyclable, or compostable plastic, and circulating the plastic for longer in the economy (EMF, n.d.-b). It is essential to redesign how we use and reuse plastic packaging (EMF, n.d.-b). Reuse should be prioritized where possible because recycling and reducing alone cannot solve the plastic issue (EMF, 2022; Long et al., 2022).

A reuse system requires the involvement of consumers, businesses, and governments to scale and create long-lasting systemic change (WEF, 2021). Policy frameworks and business practices have historically prioritized changes in production over consumption (Camacho-Otero et al., 2020; Charnley et al., 2022). However, addressing changing consumption patterns and consumer demand is important (UNEP, 2017). Although all stakeholders need to drive the shift towards reuse, consumers' behavior and preferences towards sustainability are the primary driving force behind this transition (WEF, 2021). Today, consumers are actively changing their behavior to

consider the environmental impact of their actions, including demanding reduced packaging, recycled materials, or refilling containers (WEF, 2021).

### Reusable Packaging Systems (RPS) in Fast-Moving Consumer Goods

Reusable packaging is “packaging which has been conceived, designed, and marketed to carry out multiple trips in its lifetime by being refilled or reused for the same purpose for which it was conceived” (Publications Office of the European Union, 2020). Reusable packaging is a product-service system (PSS) that offers a service to the customers instead of just selling a product (Coelho et al., 2020). The success of RPS relies on consumer adoption, policy changes, and infrastructure (Muranko et al., 2021; WEF, 2021; Zeeuw van der Laan & Aurisicchio, 2019). The transition to RPS is still in the early stages, but there are signs of progress and interest (WEF, 2021).

Consumers mainly focus on reducing single-use plastic in FMCG products, such as grocery shopping, household items, and personal care products (Deloitte, 2022). FMCGs are designed to use the consumables and discard the packaging, causing environmental pollution. FMCG needs to be redesigned for circular consumption (Zeeuw van der Laan & Aurisicchio, 2019). In RPS, consumers become the resource owners of the empty packaging and decide if the empty packaging becomes waste or is reused (Zeeuw van der Laan & Aurisicchio, 2019). Companies need to engage with consumers to enable reuse behaviors (Long et al., 2022; Zeeuw van der Laan & Aurisicchio, 2019) and rethink how they interact with consumers to transition to circular business models (Zucchella et al., 2022). Reusing packaging in FMCG products is a relevant solution, but how companies engage consumers to make them active participants in RPS remains a knowledge gap.

## Characteristics of Reusable Packaging Systems

The RPS system can be classified based on three reuse frameworks described below: the reuse models from EMF (2019), the types of reusable packaging from Coelho et al. (2020), and the reuse system elements from Muranko et al. (2021). Hesseling (2022) combined these frameworks to provide a more comprehensive understanding of RPS. Using these frameworks helps identify characteristics in the RPS solutions that can influence consumer behavior and their interaction with the RPS system.

*Reuse models.* EMF (2019) proposed four business-to-consumer (B2C) reuse models based on packaging ownership and reuse location (Figure 1).

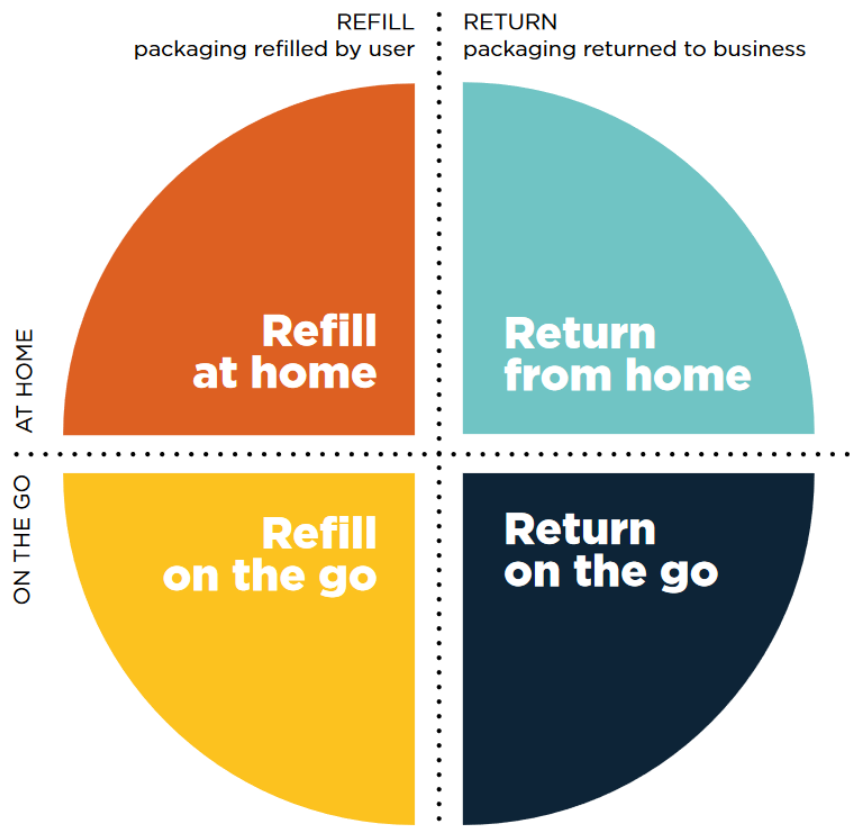


Figure 1. Business-to-consumer reuse models (EMF, 2019).

In refill at home, consumers refill their reusable containers at home. In refill on the go, consumers refill their reusable containers at a store via a dispensing system. In return from home, reusable packaging is collected from the consumer's home by a pick-up service. In return on the go, consumers return the reusable packaging at drop-off points (EMF, 2019).

In both refill models, the consumer is responsible for cleaning and refilling the packaging. In both return models, the consumer returns the packaging for companies to clean and refill (EMF, 2019). At-home models require less behavioral change from consumers than on-the-go models due to effort and adjustment in consumption habits (WEF, 2021). Since refill on the go requires a physical store, this model is out of scope for this thesis as the focus is on online retail. Figure 2 shows how the in-scope reuse models operate, including the expected activities for consumers and companies.



Figure 2. Representation of how the reuse models work (EMF, 2019).

Implications when scaling these models (EMF, 2019; WEF, 2021) are:



- Refill at home model is considered more accessible as refills can be purchased in existing channels. Consumers could benefit from lower pricing of refills compared to standard products and from subscriptions. However, the refills often come in disposable packaging, thus not fully addressing plastic waste. Companies should provide refills in reusable, recyclable, or compostable packaging.
- Return from home model can be convenient when the collection of empty packaging is combined with a new delivery. Consumers should be incentivized to return empty packaging, via deposit and reward schemes. However, companies need the logistics infrastructure to handle collection, cleaning, and refilling.
- Return on the go model is challenging for consumers to adopt since it also requires high effort for travel and education, in addition to accessibility to drop-off points for returning products. Like in the return from home model, companies must handle the reverse logistics and consumer return rates.

*Types of reusable packaging.* Coelho et al. (2020) introduced a classification of RPS based on the types of packaging (Table 1):

- Refillable by bulk dispenser is related to refill on the go model.
- Refillable parent packaging consists of refillable containers and refills, which are attractive for companies due to reduced material use and transport costs.
- Returnable packaging can be applied with deposit systems for returns. The products in returnable packaging can be more expensive due to packaging material, collection, and cleaning costs.
- Transit packaging is used more B2B than B2C.

Table 1. Types of reusable packaging (Coelho et al., 2020).

Type of packaging	Packaging description
Refillable by Bulk Dispenser	Customers use their packaging or brand's refillable packaging in-store or at a mobile truck, making the use of further packaging unnecessary.
Refillable Parent Packaging	<b>Bottle, container, pouch, pod, tablet, powder</b> The refill packaging is made with less material than parent packaging. Parent packaging can be refilled by: <ul style="list-style-type: none"> <li>- pouring product inside parent packaging;</li> <li>- placing container inside of parent packaging;</li> <li>- diluting concentrated product in water inside parent packaging.</li> </ul>
Returnable Packaging	<b>Container, bottle, cup, plate, bowl,...</b> Customers return empty packaging which will be cleaned and refilled for future use by the retailer/producer (can be combined with a deposit system to provide a financial incentive).
Transit Packaging	<b>Boxes, containers, soft packages</b> Customers receive the product in reusable packaging which is returned by door delivery/pick up, or through the post office. <b>Crates, pallets, wrappers</b> Customer reuses packaging multiple times before being returned to the producer or disposed of.

One product could be delivered using a combination of types of reusable packaging. Implementing reusable packaging is a system change for companies, retailers, and consumers due to changes in the supply chain and reverse logistics. Changing to reusable packaging needs to be adequately managed to avoid negative impacts from increased use of unrecyclable refill packaging, transportation and logistics complexity, and cleaning processes (Coelho et al., 2020).

*Reuse system elements.* Companies could provide consumers with multiple ways to access the reusable product. Muranko et al. (2021) identified three reuse system elements after analyzing 92 reuse FMCG products:

- Reuser behavior: Describes how consumers interact with RPS. It can be either exclusive reuse (the consumer keeps the reusable product) or sequential reuse (the consumer returns the reusable product and shares it with successive consumers).

- Reusable product: This is the RPS alternative to the regular FMCG product. The reusable product can be either consumer-owned or company-owned, giving consumers access to the product.
- Reuse-enabling infrastructure: This refers to the infrastructure for preparing and recovering reusable products. Preparation involves refilling the reusable product with a consumable. Recovery is performed post-consumption to clean and reinstate the product to a reusable condition.

In exclusive reuse behavior, consumers prepare, use, and recover the products themselves, which gives them control over the conditions of the product. However, these products require more effort from consumers compared to single-use products, where products are ready to consume and easily disposable. Consumer perception towards the effort involved can influence their intention to use reusable packaging. The exclusive reuse model is attractive for consumers who value ownership, can invest effort and time, and want more control over the reuse system (Muranko et al., 2021).

Sequential reuse models involve the flow of reusable products from one consumer to the next via the provider, and consumers are offered temporal access to the product. The company takes responsibility for preparation and/or recovery, thus reducing consumer effort. The return methods can be low effort when returning from home and high effort when returning to drop-off points, depending on location and accessibility. However, consumers can have negative perceptions of sequential reuse models regarding cleanliness and quality of packaging, which can influence the intention to switch to RPS. Sequential reuse is attractive for consumers who prefer access and value convenience when using reusable products (Muranko et al., 2021).

*Combining the reuse frameworks.* Effective consumer engagement is critical for the success of RPS implementation and for achieving benefits from reusable products (Muranko et al., 2021). The combination of the three frameworks (Hesseling, 2022) assists in analyzing RPS characteristics affecting consumer behavior, infrastructure needs, and roles of consumers and companies. Figure 3 shows the interconnection between these frameworks, further referenced in this thesis.

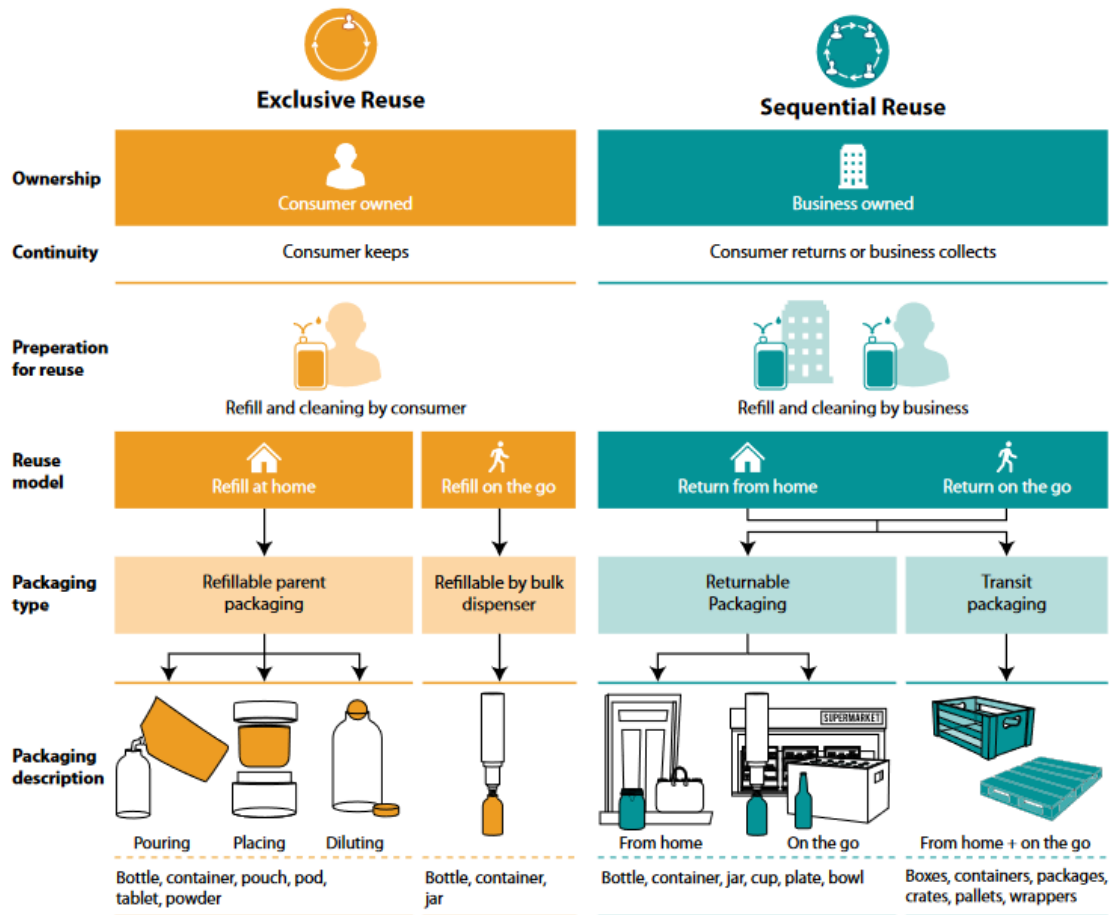


Figure 3. Combined reuse frameworks.

*Combined reuse frameworks consolidated by Hesseling (2022) and based on EMF (2019), Coelho et al. (2020) and Muranko et al. (2021).*

## Economic, Environmental, and Social Factors of RPS

The reuse system must demonstrate that it delivers positive economic, social, and environmental outcomes relative to disposable alternatives so that at scale, RPS promotes efficient and sustainable resource consumption (Muranko et al., 2021; WEF, 2021).

*Economic factors.* RPS should deliver positive benefits on cost, revenue, and growth potential for all stakeholders (WEF, 2021). Replacing 20% of single-use plastic packaging with RPS is a 10 billion USD market opportunity (EMF, 2019). The long-term growth potential of RPS is key to attracting investment and scale (WEF, 2021). The main challenge for companies is restructuring their business model and adapting their business practices (Coelho et al., 2020). The RPS economies of scale are affected by materials, infrastructure, operational costs, policy impact, costs from sorting, cleaning, and maintenance, and customer retention. A poorly designed supply chain can further increase operating costs (Bradley & Corsini, 2023).

Developing convenient incentive schemes can encourage customers to return the packaging in good condition and promptly, improving return rates and turn-around times (Coelho et al., 2020). Low return rates result in failed business cases and deter further investment in RPS (Bradley & Corsini, 2023). Thus, the economic success of RPS depends on consumers understanding how to use the system properly.

*Environmental factors.* RPS often have a lower environmental impact than single-use products due to circular design and prolonged use (UNEP, 2021a). If 10% to 20% of all packaging is reusable by 2030, then 7-13 million tons of plastic packaging would be

shifted to reusables. This would represent 45-90% of annual plastic ocean waste and 10-25% of annual plastic landfill waste (WEF, 2021).

The sustainability impact of RPS is affected by multiple factors, such as material selection and production, usage volumes, transportation and logistics, shrinkage, return rates, and end-of-life scenarios. RPS lifecycle analysis should consider energy consumption, water usage, and greenhouse gas emissions, as the new processes and need for reverse logistics may incur an increase in energy and input materials (Bradley & Corsini, 2023; Coelho et al., 2020; WEF, 2021).

Consumer education is needed to achieve environmental benefits. Consumer behavior and end-of-life options impact RPS environmental effectiveness. Thus, this requires integration into existing lifecycle assessments (LCA) (Coelho et al., 2020; UNEP, 2021a). LCAs show that the more times a product is used, the lower the negative environmental impact compared to single-use products. It is critical to address consumer behavior to increase reuse rates and sustain reuse habits (UNEP, 2021a).

*Social factors.* The social sustainability of RPS is affected by convenience, usability, awareness, consumer perception, customer behavior, and consumer characteristics (Bradley & Corsini, 2023). Convenience refers to both the use and accessibility of the RPS system (Bradley & Corsini, 2023). Consumer perception is influenced by the RPS packaging design and the customer experience (Bradley & Corsini, 2023). Consumers' awareness of RPS solutions can influence uptake (Bradley & Corsini, 2023). However, their familiarity with recycling may reduce RPS adoption (Greenwood et al., 2021).

## Plastic Packaging Policies in the United Kingdom

In the UK, around five million metric tons of plastic are used annually, almost half of which is plastic packaging (Smith, 2022). The 2018 UK Resources and Waste Strategy (DEFRA, 2018) seeks to accelerate the transition to a circular economy (CE). Two ambitions of the strategy are: (1) to work towards all plastic packaging in the market being recyclable, reusable, or compostable by 2025, and (2) to eliminate avoidable plastic waste by 2042. Accelerating policy efforts to stimulate reuse models, create necessary conditions, and remove barriers for all stakeholders is essential to transition to a CE for plastics (EMF, 2022).

The UK government plans to address the lack of incentives for reusable or recyclable products through policy reforms (DEFRA, 2018). The Plastic Packaging Tax, introduced in April 2022, levies taxes on imported or manufactured plastic packaging containing less than 30% recycled content used in the supply chain or single use by consumers (Dobson, 2022; Recycle Now, n.d.-a). The Environment Act 2021 includes provisions for policies such as introducing a deposit return scheme (DRS), ensuring consistency of household recycling, and reforming the extended producer responsibility (EPR) system. There is strong stakeholder support for these policies, but further regulations before implementation are required (Recycle Now, n.d.-a; Smith, 2022).

### Household Recycling

In 2021, the UK's recycling rate for all waste from households (WfH) was 44.6% from a total of 27.65 million metric tons. England represents ~85% of total WfH in the UK (DEFRA, 2023b), and waste is managed independently by its 333 local authorities (DEFRA, 2023a). Their recycling rates vary from 17.7% to 63.5%, attributed to factors

such as the quantity of organic waste collected, service operator changes, or recycling collection rules (DEFRA, 2023a).

The recycling system is complex for citizens. As of 2021, 100% of local authorities collected plastic bottles, and 83% collected pots, tubs, and trays (WRAP UK, 2023b). Recycling take-back schemes are available for citizens for items not accepted in home recycling, with nationwide solutions like soft plastic recycling in supermarkets (Recycle Now, 2023b; Smith, 2022) or beauty product recycling in retail stores (Recycle Now, 2023a). Additionally, Recycle Now provides information per postcode to help people understand what can and cannot be recycled in their area (Recycle Now, n.d.-a).

The Simpler Recycling policy aims to achieve consistency of recycling among all local authorities (DEFRA, 2023c; WRAP UK, 2023c). Under the new policy, plastic materials that all local authorities must collect include plastic bottles, pots, tubs and trays, cartons for food and drinks, and plastic film packaging. Recyclable plastic materials, except plastic film, should be collected consistently by 2026. For plastic film, this target has been pushed back to 2027 (DEFRA, 2023c) due to recycling difficulties. In the meantime, the supermarket take-back scheme can recycle these materials (Recycle Now, 2023b; Smith, 2022). Simpler Recycling will incentivize the recycling industry and encourage the value chain towards recycling (WRAP UK, 2023c).

### Extended Producer Responsibility

The Producer Responsibility Obligations (Packaging Waste) Regulations require in-scope companies to ensure a portion of the packaging they generate and place on the market is recycled. In 2021, approximately 1.12 million metric tons of plastic packaging, or 44.2% of plastic packaging waste, was recycled (DEFRA, 2023b). The recycling rates



have remained relatively unchanged since 2016 (DEFRA, 2023b). The recycling rates of plastic packaging by 2030 are estimated to reach 62% with the implementation of proposed policies to encourage CE for plastics (Smith, 2022).

The EPR scheme is being reformed after criticism in 2017/2018 due to a lack of assurance, businesses reliance on export recovery, and taxpayers covering ~90% of the cost of plastic packaging disposal (Smith, 2022). The introduction of new fees from the new EPR scheme has been delayed until 2025, but organizations are still expected to comply with reporting and contribute any fees from prior regulations (DEFRA, 2023d).

#### International Outlook

The United Nations has set up an intergovernmental negotiating committee to develop an international legally binding instrument on plastic pollution, with negotiations expected to end in late 2024 (UNEP, 2023). This is a unique opportunity to set a clear direction and goals globally by developing policy and governance structure towards a CE for plastics (EMF, 2022). The treaty aims to address the plastics lifecycle, tackle plastic pollution, implement CE solutions (including RPS), and promote sustainable production and consumption of plastics (UNEP, 2022).

The EMF (2023a) suggested the treaty sets a time-bound objective to ensure all plastic packaging is designed for CE, so packaging is reusable, recyclable, or compostable in a scalable way, and RPS is prioritized. Policymakers could develop mandatory obligations on reusable packaging, especially in the FMCG industry, where current pilots could be turned into scalable solutions. EPR schemes can help fund the necessary infrastructure and design standards for CE in plastics (EMF, 2023d). Similarly, the WWF (2022a) suggested policymakers could implement measures like mandating

minimum recycling content and reuse targets on companies and developing system and product standards to enable reuse and recycling.

The global treaty is an opportunity to develop international regulations and standards to drive CE for plastics, reduce plastic pollution, and implement scalable solutions at lower costs (EMF, 2023d). Policy can help enable CE for plastics, promote RPS systems, and provide a framework for businesses. Still, consumer adoption remains a barrier to the success of the scalable implementation of RPS.

### Companies' Approach to Reusable Packaging Solutions

Introducing reusable packaging is a system change for producers, retailers, and consumers (Coelho et al., 2020). Businesses are confronted about the plastic waste generated by their operations and products (Zucchella et al., 2022), so they should rethink their use of disposable packaging (EMF, 2019). When implementing RPS, companies must restructure their business models to incorporate reverse logistics and new product designs (Coelho et al., 2020). A successful reuse system would include an efficient delivery model, excellent customer experience, technology applications to enable adoption, and demonstration of positive impact. These would be supported by regulation that incentivizes reuse and a cultural shift towards reusables (WEF, 2021). The transition towards a CE is a discovery-driven approach with experimentation and pilots. Companies either innovate or take inspiration from other companies (Frishammar & Parida, 2019).

Incumbent companies and challengers or start-ups have distinct ways to transition to RPS, with different barriers and strengths. Incumbent companies tend to resist change and focus more on reuse pilots, so reuse is a small part of their business but incurs high marketing costs and communication efforts (Charnley et al., 2022; Zucchella et al.,

2022). In contrast, challenger companies leverage their change agility to embed circularity and have purpose-driven business models (Charnley et al., 2022; Zucchella et al., 2022). Strong leadership is crucial in implementing CE for plastics, and collaboration between incumbents and challengers can also facilitate the shift to a CE (Zucchella et al., 2022). However, there is a lack of research on how the different approaches from incumbent and challenger companies impact the customer journey design and how they help consumers adopt RPS.

#### Transition to CE in Plastic Packaging for Incumbent Companies

Many incumbent companies are adopting CE to promote sustainability and to respond to increased stakeholder pressure, upcoming regulations, and threats to new entrants, among other factors. Transforming business models from product-oriented to solution-provider is challenging and involves significant changes in how the company creates, delivers, and captures value. While incumbent companies may face criticism for moving slowly in pursuing sustainability practices, they make a significant impact due to their large market share (Frishammar & Parida, 2019).

Some incumbent companies are joining voluntary commitments like the Global Commitment on Plastics, the UK Plastics Pact, or the ReSource Footprint Tracker. Their reported progress shows that FMCG incumbent firms struggle to move from pilots to scalable solutions on RPS (EMF, 2022; WRAP UK, 2022b; WWF, 2022b).

The Global Commitment on Plastics has over 100 business signatories representing 20% of the plastic packaging market and working towards a common vision of CE for plastics (EMF, 2019, 2022). One of their targets is to achieve 100% reusable, recyclable, or compostable plastic packaging by 2025. Progress for this target was 65.4%

in 2021. Although 58% of the signatories reported reuse models in place or to be launched, their share of reusable plastic packaging by total weight remains low at 1.2% in 2021. Signatories lack explicit reuse targets, and RPS are not yet embedded in their business models (EMF, 2022).

In the UK, managing plastic packaging is a priority as it accounts for 70% of plastic waste (WRAP UK, n.d.). The UK Plastic Pact, led by WRAP UK (2023c) with UK government support (DEFRA, 2018), is a key initiative bringing together public and private stakeholders across the plastics value chain. Its members represent 60% of plastic packaging in the UK, including major retailers and brands. One of their targets is that 100% of plastic packaging is reusable, recyclable, or compostable by 2025. However, reuse models remain exploratory and in pilots, representing 0.2% in weight of all packaging by members (WRAP UK, 2022b). More industry effort is needed to set specific reuse targets and develop action plans to scale RPS (EMF, 2022). Although the UK Plastic Pact has influenced significant progress, its targets are hindered by delays in policy measures like consistency in recycling and the EPR scheme (WRAP UK, 2023c).

#### Transition to CE in Plastic Packaging for Challenger Companies

Incorporating circularity into their operations is a key strength of challenger companies. These companies prioritize sustainability and have purpose-driven business models, such as those certified as B-Corps or part of the EMF Circular Startup Index. (B Lab, n.d.; Charnley et al., 2022; EMF, 2023a; Zucchella et al., 2022). Unlike incumbents, these companies are innovators and incorporate circularity in their business models.

BCorp Certified companies get a certification from BLab to show that their business model addresses social and environmental challenges. They are part of a

movement for an inclusive, equitable, and regenerative economy. These companies make a legal commitment that their corporate governance structure is accountable to all stakeholders (B Lab, n.d.). The EMF Circular Startup Index is a library for innovative businesses pursuing CE principles (EMF, 2023a).

An example is Beauty Kitchen, a start-up focused on the return, refill, and repeat model. They are BCorp certified, part of the EMF Circular Startup Index, and their brand of products is Cradle-to-Cradle Certified. (EMF, 2023b). Another example is the Bower Collective, founded to tackle the plastic waste crisis by offering an online RPS subscription to natural household products. Their packaging is tracked across its lifecycle and is designed to be reused multiple times (EMF, 2023c). They are BCorp-certified and part of the EMF Circular Startups Index. They report to have avoided 44 tons of plastic from landfills (Bower Collective, n.d.-a).

### The Role of Consumers in Reuse Solutions for Plastic Packaging

In reuse models, customers are not just buyers but also part of the value chain that creates closed-loop systems (Zucchella et al., 2022). Consumers have an active role in RPS as they own the empty packaging and decide if it becomes waste or gets reused (Zeeuw van der Laan & Aurisicchio, 2019). RPS systems with either refill or return options can potentially reduce single-use plastic waste. However, consumers' willingness to engage with RPS needs to be carefully considered (Greenwood et al., 2021).

Companies should help customers adopt the reuse behaviors before, during, and after purchase. Reuse solutions result in increased touchpoints between companies and their customers. Any interactions are opportunities to enable sustainable behaviors and

provide a better customer experience (Camacho-Otero et al., 2020; EMF, 2019; Zeeuw van der Laan & Aurisicchio, 2019; Zucchella et al., 2022).

### UK Consumers of Reusable Packaging Systems

Two in three UK citizens consider plastic waste a significant personal issue. Recycling is an established behavior in the UK, hindering the adoption of reuse behaviors (WRAP UK, 2021). Although consumers are motivated to engage in reuse behavior, they often struggle to turn these intentions into action. When addressing this intention-action gap, it is important to examine if consumers have the opportunity to engage with RPS (Greenwood et al., 2021). Thus, it is imperative to encourage more consumers to adopt reuse behaviors and improve the frequency of such behaviors (WRAP UK, 2021).

*Recycling behavior.* In the UK, 90% of citizens recycle regularly. However, there is room for improvement in the effectiveness of recycling among citizens (WRAP UK, 2023a). As the refill-at-home model relies on refillable packaging that should be reusable, recyclable, or compostable (EMF, 2019; WEF, 2021), it is important to consider recycling behavior for RPS.

According to the 2023 WRAP recycling tracking survey (WRAP UK, 2023a), over half of UK citizens dispose of recyclable items in the general waste bin. For instance, 27% of UK citizens missed capturing recycling one or more plastic items. Moreover, 81% of UK citizens put items into recycling that are not accepted in the household recycling collection, leading to contamination. Regarding recycling performance, each citizen incorrectly disposed of 5.4 items on average in March 2023, which has improved from 6.1 in March 2021. While 29% of UK citizens dispose of less

than two items incorrectly (high performers), 16% of UK citizens dispose of more than ten items incorrectly (low performers). The survey also revealed that 20% of UK citizens recycle soft plastics at supermarkets, a significant increase from 13% in 2021. People with good recycling performance are more likely to go to supermarkets for recycling (WRAP UK, 2023a).

*Reuse behavior.* Greenwood et al. (2021) surveyed UK consumers to understand their willingness to reuse packaging. Participants preferred recycling empty packaging (53%), followed by disposing in the bin (34%) and reusing the packaging (13%). Willingness to reuse packaging was split into a higher preference for refilling (6%) or repurposing (6%) than for returning packaging (1%) (Greenwood et al., 2021). This result highlights challenges with scaling consumer adoption of RPS products.

Wrap UK (2021) surveyed UK citizens to understand their behaviors towards plastics, using a sample to match the UK population profile. According to the research, refill or return products had lower adoption (20-32% of UK citizens) compared to more common reuse behaviors like using reusable water bottles (68%). However, there is potential to expand the behaviors to more consumers, as 45-47% of UK citizens would be receptive to using RPS (Figure 4). Moreover, there is scope to improve the consistency of RPS use. For example, from the 32% of UK citizens who reported purchasing refills at home for laundry or cleaning products in the last three months, 12% said they bought regularly for multiple products, 11% said regularly for 1 or 2 products, and 9% said they had purchased, but not regularly. Of the 20% of people who brought recycling for beauty

products to retailers, only 2% said they do the behavior regularly, 8% had done it a few times, and 11% dropped recycling to the take-back scheme for the first time.

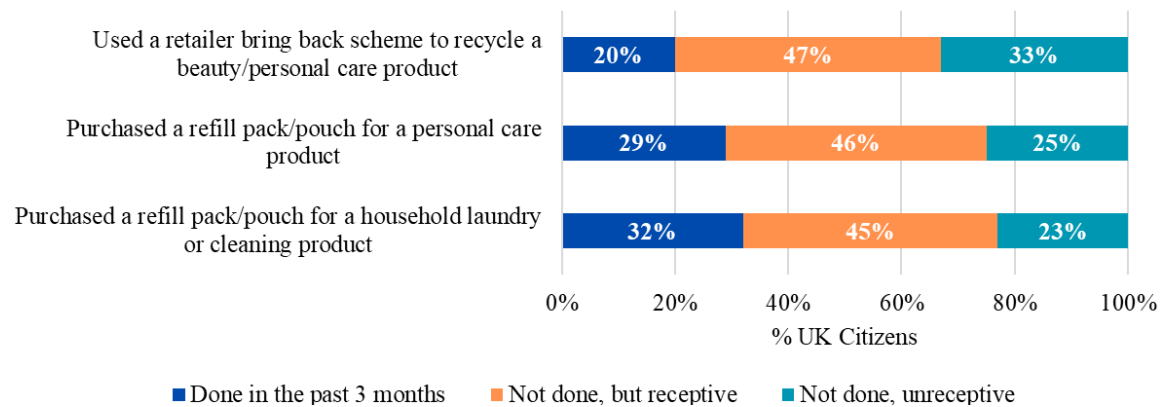


Figure 4. Adoption of behaviors related to reusable packaging systems.

*UK citizens (%) who did each behavior at least once in the past three months and those who can and cannot see themselves doing this in the future. (WRAP UK, 2021).*

In conclusion, consumers need to improve maintaining consistency when adopting new behaviors for the long-term, even though they have already started to adopt the target behavior. The private sector and the government must address the RPS barriers to consumer adoption to enable the reuse behavior (WEF, 2021).

*Consumer profile.* The Wrap UK (2021) survey identified UK consumer profiles for early adopters and potential future adopters of reuse behaviors. Early adopters are more likely to be 18-34 years old, have young children, live in a city or large town, and do at least half of their shopping online. Although motivated by environmental concerns, convenience, price, and social influences, also play a vital role in shaping their shopping habits (WRAP UK, 2021). Potential future adopters are more likely to be 35+ years old



and live on the outskirts of a city or large town or in small cities and rural areas. They prefer to do most of their shopping in-store. They are concerned about the environment, but they may consider reuse as inconvenient (WRAP UK, 2021).

### Consumer Engagement Factors for RPS

The effectiveness of RPS solutions to lower packaging waste depends on consumer adoption (Miao et al., 2023). Zucchella et al. (2022) suggested looking at customer engagement from a system perspective when designing and implementing circular initiatives to mitigate the risk of consumers not performing their expected actions. Zeeuw van der Laan and Aurisicchio (2019) recommended companies design processes to reduce the effort on consumers to complete their actions in RPS to work. They found that companies commonly overlook key activities for consumers to engage with circular packaging when designing the customer journey.

Based on common themes across the literature, I consolidated five main factors associated with consumer adoption and engagement of RPS: Understanding of RPS benefits, convenience, affordability, hygiene, and infrastructure accessibility. I focused on barriers to buying online for the reuse models of refill at home, return from home, and return on the go (EMF, 2019).

*Understanding of RPS benefits.* Lack of information is a significant barrier to adopting sustainable behaviors. Providing contextual information on the circular economy can stimulate customer interest and encourage them to participate actively. It is important to balance the amount of information provided, as too little or too much can undermine decision-making confidence. Consumer acceptance can improve when they learn of RPS

products that are convenient and affordable (WEF, 2021). Raising awareness of environmental issues can influence attitudes, but it alone may not change behavior (Di Iorio et al., 2023; Kirchherr et al., 2018).

Companies need to improve communication with consumers about the benefits of buying RPS (EMF, 2019) and the difference their efforts can make (Long et al., 2022). Consumers also need to learn under which conditions the environmental benefits of RPS are achieved compared to other options, as sometimes their perception of what is sustainable is not always correct (Miao et al., 2023). Consumers often consider third-party certifications or self-declared product claims to evaluate the company's or product's environmental impact. Third-party certifications can enhance reliability and help compare against other products (Di Iorio et al., 2023). Motivation is crucial to changing consumers' consumption patterns, and highlighting the environmental benefits of RPS can be an effective way to improve the adoption of RPS (Long et al., 2022).

*Convenience.* Convenience is an important consideration in RPS consumer adoption (WEF, 2021). Consumers can perceive RPS as inconvenient because of the extra effort and time needed to operate them (Miao et al., 2023). Changing consumption habits is also perceived as extra effort by consumers (Charnley et al., 2022). Since recycling is a normalized behavior in the UK, it affects consumers' willingness to engage in reuse behaviors (Greenwood et al., 2021; WRAP UK, 2023a). Due to the nature of reuse, customers also need to adjust to differences in packaging characteristics compared to regular products (Miao et al., 2023). For example, consumers could be less attracted to refill packaging, which is smaller than full-sized products (EMF, 2019). So, companies

should aim to support customers' decision-making and acceptance of RPS (Miao et al., 2023). Reuse model adoption might be affected by a lack of opportunity to access RPS (Greenwood et al., 2021). Consumers consider the lack of availability of RPS an issue, as they feel that RPS products are difficult to find or that there are no RPS alternatives in their preferred brands (WRAP UK, 2021).

RPS requires consumers to carry out additional activities compared to single-use alternatives (Long et al., 2022; WEF, 2021; Zeeuw van der Laan & Aurisicchio, 2019), such as preparation and recovery processes, which are critical to all reuse models (Muranko et al., 2021). The effort invested in the different activities for the RPS depends on factors such as planning, travel distance, frequency of visits, space required to stock products, and responsibility for cleaning, refilling, and maintaining the reusable packaging (Muranko et al., 2021; Zeeuw van der Laan & Aurisicchio, 2019).

So, it is crucial to reduce the effort required to engage with RPS (Miao et al., 2023; Zeeuw van der Laan & Aurisicchio, 2019). Consumers need to learn how to use the RPS, therefore companies should provide tools to assist them in this process, such as easy-to-understand instructions or customer support (Long et al., 2022). Subscriptions and automatic reordering can increase convenience for consumers (EMF, 2019) but should be simple and user-friendly to create a positive experience (Long et al., 2022).

*Affordability.* Customer affordability is critical for adoption (WEF, 2021). RPS products can be affected by circular premiums, which are the price differences between reuse products and their single-use alternatives. Although some consumers are willing to pay more for sustainable products, the circular premium may negatively affect the adoption of

RPS and their sustainability impact (Bradley & Corsini, 2023). The costs associated with RPS can act as a barrier to consumer engagement (Miao et al., 2023; WRAP UK, 2021). Consumers may not be aware of the cost savings associated with RPS, or they may prefer to purchase the cheapest format available (WRAP UK, 2021).

Financial benefits, such as incentives, deposit schemes, and subscriptions, are important for consumer motivation (Long et al., 2022; Muranko et al., 2021). These mechanisms are particularly relevant for return models, as companies can improve customer loyalty and packaging returnability, which can help scale up RPS and improve affordability (EMF, 2019; Muranko et al., 2021).

Incentive schemes can be effective drivers for reuse (Muranko et al., 2021). Companies can provide explicit or implicit rewards. Explicit rewards include discounts, vouchers, and loyalty points, among others. Implicit rewards evoke positive feelings from using the RPS. If companies don't provide incentives, they rely on consumers' intrinsic motivation to engage with RPS (Zeeuw van der Laan & Aurisicchio, 2019).

Deposits are a way to create an early commitment to the RPS (Zeeuw van der Laan & Aurisicchio, 2019) and encourage customers in sequential reuse models to return the packaging (Long et al., 2022; Muranko et al., 2021). Companies can either charge customers a refundable deposit after return or apply a penalty system for delayed returns (Long et al., 2022). But deposits may discourage customers due to extra costs (Long et al., 2022; Miao et al., 2023). Instead, companies could offer complimentary reusable packaging to help consumers establish the new reuse behavior (Miao et al., 2023).

Additionally, companies could offer subscriptions or pay-as-you-go models (Long et al., 2022). Subscriptions can enhance consumer adoption of RPS (Muranko et al.,

2021), although consumers could also perceive subscriptions as a commercial strategy to spend more or may not want to commit to an unfamiliar service. Pay-as-you-go can be a good option for consumers who are hesitant about subscriptions, as it offers more flexibility (Long et al., 2022).

*Hygiene.* Consumers' perception of the hygiene standards of the RPS could influence adoption (Long et al., 2022; Miao et al., 2023). Although hygiene concerns are not the most frequently mentioned barrier to adoption, they can be critical to engagement with RPS (Long et al., 2022) by hindering acceptance or triggering earlier packaging replacement (Miao et al., 2023).

Consumers use packaging to evaluate a product (Miao et al., 2023), so the packaging presentation and packaging usability can impact their willingness to engage with RPS (Greenwood et al., 2021). For instance, consumers may become concerned due to sharing packaging with others or noticing contamination cues after multiple uses (Miao et al., 2023). This concern became especially acute after the COVID-19 pandemic (Long et al., 2022; WEF, 2021). RPS packaging should be used the minimum expected number of times to achieve environmental benefits while remaining in good condition and usability (Greenwood et al., 2021; Miao et al., 2023).

Companies should help eliminate concerns about the hygienic conditions of RPS by effectively communicating about standards and processes to keep RPS clean (Long et al., 2022). In return models, companies should be careful about the return or collection touchpoints, as this could also trigger consumer hygiene concerns about how packaging is cleaned and maintained in good condition (Long et al., 2022). In refill models,

consumers could also get worried about potential messiness when refilling at home (WRAP UK, 2021). Addressing these issues requires consumer education about the hygiene standards of RPS (WEF, 2021).

*Infrastructure accessibility.* Lack of access to reuse-enabling infrastructure for drop-off or collections can limit consumer action (Miao et al., 2023). Consumers are motivated to return packaging for reuse or recycling schemes if this action helps reduce environmental impact and ensures the packaging is placed in a trustworthy route to recovery (Long et al., 2022; WRAP UK, 2021). However, customers must overcome barriers such as extra effort to transport items to drop-off points, lack of awareness of locations, and difficulty maintaining this habit (WRAP UK, 2021).

In return from home, the following delivery can be combined with empty packaging collection, increasing consumers' convenience. Still, this service could be limited to urban areas or areas with reduced travel distances. Companies should optimize by using shared logistics and third-party providers (EMF, 2019).

In return on the go, customers need accessible and convenient locations, so companies should focus on increasing the number of drop-off locations (EMF, 2019). In the UK, companies rely on third-party logistics networks, such as the Post Office or Collect+ in UK. In 2022, there were 11,635 post office branches, which are highly accessible as 90% of the UK population live within one mile of their nearest post office (Booth, 2023). Also, there are over 115,000 postboxes in the UK, with 98.3% of all addresses less than half a mile from a postbox (Royal Mail, n.d.). Collect+ has over 10,000 locations in its store network, offering convenience for click-and-collect and

return services. Collect+ provides coverage for 94% of the urban population living within a mile of a store and 90% of the rural population living within five miles of a store (Collect+, n.d.). Overall, there are accessible network options for UK companies to operate reverse logistics.

Another critical consideration is closing the loop of materials as packaging could be reused, recycled, composted, or discarded by the consumer (EMF, 2019; Muranko et al., 2021). Sequential reuse models have greater chances to close the loop than exclusive reuse or linear models. In sequential reuse models, consumers return empty packaging to the company, which can decide if the packaging is reused or recycled due to reaching the end of life. Thus, companies are more likely to dispose of packaging correctly for recovery (Muranko et al., 2021). Exclusive reuse models may offer a take-back scheme for recycling or allow consumers to decide how to dispose of waste at home. However, challenges for recycling at home or accessing recycling locations can lead to consumers disposing of the packaging incorrectly (Muranko et al., 2021).

#### Improving RPS Adoption With Customer Journey Mapping and Behavior Change Wheel

Combining the methods of service experience designers and behavioral scientists has led to a new approach to solving complex problems in consumer behavior. Customer journey mapping (CJM) is a visualization technique to analyze how customers interact with a company, identify gaps, and capture the relationship between business value and customer experience. The behavior change wheel (BCW) is a framework to understand behaviors in context, which helps identify interventions likely effective at changing the target behaviors (Elizarova & Kahn, 2018). The benefit of combining both methods is to analyze the gaps and opportunities in the customer journey in a temporal way, aligning

adoption barriers to behaviors. This leads to designing more effective behavior change interventions in the customer journey (Elizarova & Kahn, 2018).

### Customer Journey Mapping

Customer experience is a priority for businesses as it has the potential to drive profitability, improve customer loyalty, become a catalyst for innovations, and increase convenience (Charnley et al., 2022; Jannah et al., 2022). In the *World's Simplest Brands* report that surveyed 15,000 consumers across eight countries, 57% of consumers would pay more for simpler experiences, and 76% of consumers are more likely to recommend a brand that provides a seamless experience (Siegel+Gale, 2022).

CJM is a task analysis technique that breaks down a person's experience with a product or service into steps. Each step is represented in sequence, sometimes including loops or branches. The main stakeholder in CJM is the customer. CJM is used to identify friction points, and these gaps can be opportunities to improve the customer's experience (Elizarova & Kahn, 2018; Zeeuw van der Laan & Aurisicchio, 2019).

CJM is divided into pre-purchase, purchase, and post-purchase phases, but this can be adapted depending on the scope of analysis. In pre-purchase, customers recognize a need and consider purchasing a product. During purchase, the customer selects, orders, and pays for a product or service. Post-purchase involves product use, feedback, repair, end-of-life management, and repurchase decisions (Jannah et al., 2022). CJM has been used to understand how to improve customer engagement with circular solutions (Charnley et al., 2022; Zeeuw van der Laan & Aurisicchio, 2019).

Zeeuw van der Laan and Aurisicchio (2019) consolidated the customer journey map of 18 product-service systems in the FMCG sector to identify customers' key



activities when reusing packaging (Figure 5). They determined that companies should focus on those key activities to facilitate customer adoption of RPS, reduce customers' efforts, and deliver a better customer experience.

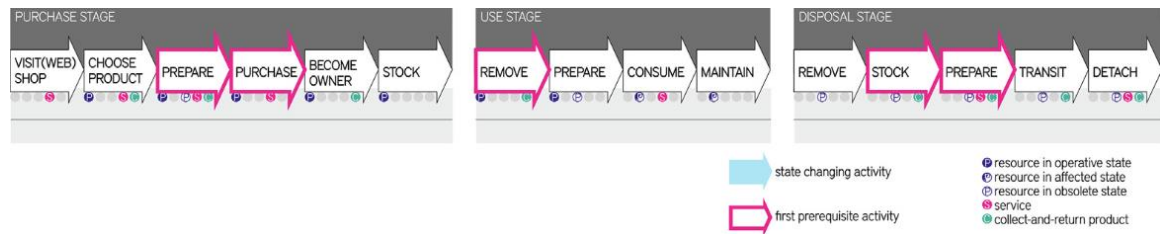


Figure 5. Customer journey map (Zeeuw van der Laan & Aurisicchio, 2019).

*Impact of technology on the customer journey.* Digital technologies and innovations can help accelerate the transition to a circular economy (CE) and facilitate customer engagement with circular solutions (European Commission, 2020). Jannah et al. (2022) emphasized the importance of integrating technology into the business model to create a great customer experience. Technological progress has given customers new ways to experience purchasing and impacts the customer journey as technology changes how customers search for information, evaluate alternatives, and make purchase decisions.

Exploring the customer journey helps identify what interventions are in place to allow the customers to adopt circular behaviors. Charnley et al. (2022) found a lack of research linking companies' approach to CE, consumer barriers to adoption, and the customer journey design in second-hand fashion online platforms. They learned that although companies are implementing digital tools, the digital tools alone did not fully address barriers to the adoption of this reuse model.

*Impact of information on the customer journey.* How companies present information to consumers can complement technical solutions. Di Iorio et al. (2023) found that sustainability information can increase consumer curiosity, drive engagement, and encourage consumers to adopt CE solutions. However, unclear or excessive information can be overwhelming and confusing to customers, risking their engagement with sustainable behaviors (Di Iorio et al., 2023).

Testa et al. (2020) argued that companies should provide consistent information about circular packaging characteristics, as packaging is part of the purchase decision-making. Environmentally conscious consumers typically do extra research to understand the environmental benefits of the packaging. The lack of information on circular packaging can lead to a poor customer experience and limit efforts to reduce environmental impact (Testa et al., 2020).

Rausch and Kopplin (2021) found that greenwashing can affect customers' decision-making before purchasing. Greenwashing is related to the trustworthiness of information, which can make customers suspicious of environmental claims. Although their research focused on sustainable clothing, their findings could be applied to other sustainable offerings. They recommended companies implement high transparency standards and well-established certificates to improve information transparency.

#### The Behavior Change Wheel (BCW)

Behavioral science can help establish evidence-based strategies to promote sustainable behavior change. Any behavior change needs to be analyzed as part of complex systems involving multiple stakeholders and operating individually or collectively at various levels (e.g., local and governmental) (Allison et al., 2021).

The BCW is a method for characterizing problems in behavioral terms and designing behavior change interventions to achieve a targeted behavior (Allison et al., 2021, 2022). The BCW was developed by Michie et al. (2011) based on 19 frameworks of behavior change interventions. Their purpose was to build a systemic method that combines the understanding of the target behavior with the characterization of behavior change interventions. The BCW helps assess under what circumstances different interventions are more or less likely to be effective in addressing the behavior change.

The BCW consists of three parts: the sources of behavior, the intervention functions, and policy categories (Figure 6). At the core of the BCW are three sources of behavior: capability, opportunity, and motivation, or COM-B, which helps analyze behavior and its context. Capability is a person's physical and psychological ability to engage in an activity. Motivation is what energizes and directs behavior. Opportunity refers to the external factors or context that enable the desired behavior. The absence of at least one source of behavior could cause an intention-action gap (Michie et al., 2011). The COM-B model acknowledges that behavior is part of a complex system and suggests that changing behavior consists of changing one or more of these components to modify the system and sustain the desired behavior. Additionally, the BCW identifies nine intervention functions that can be applied to change the sources of behavior and policies to deliver those interventions (Michie et al., 2014).

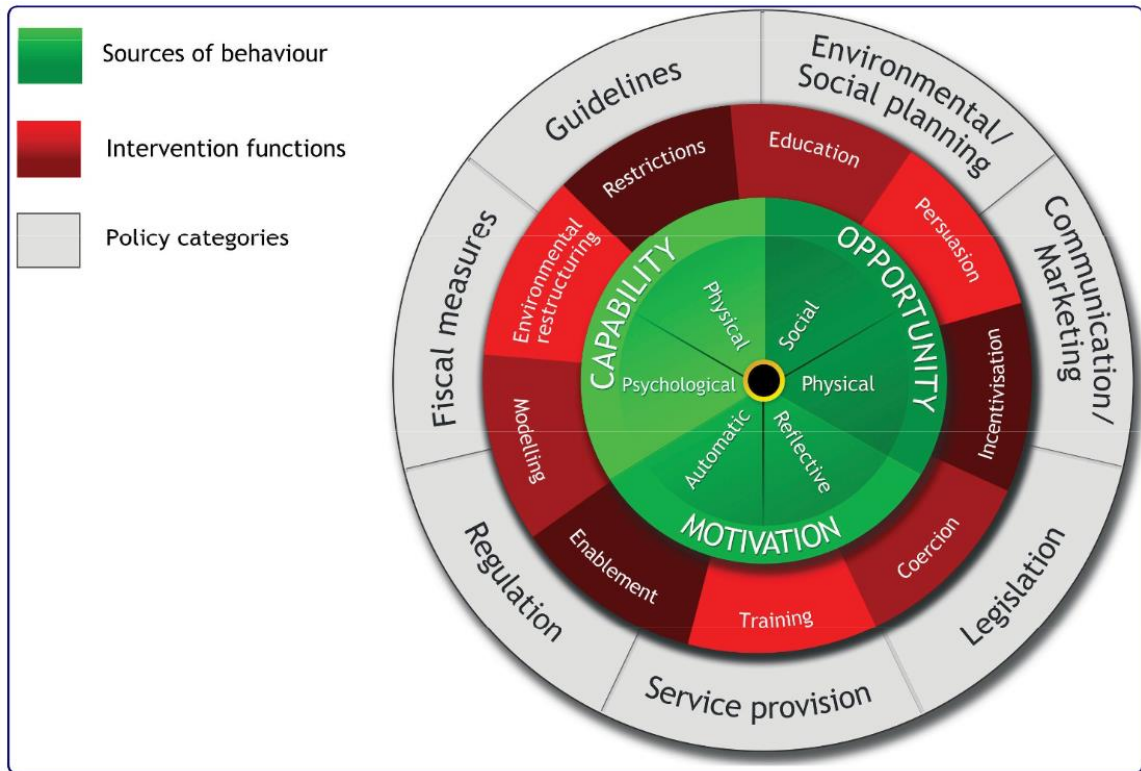


Figure 6. Behavior change wheel (BCW) (Michie et al., 2011).

Even though the BCW is used in intervention design, it can also be applied to evaluate interventions and characterize context (Michie et al., 2014). The BCW is mainly applied in health research but can be applied to different domains of behavior change, such as sustainability, social behavior, and policy implementation (Michie et al., 2014).

*Application of BCW in reusable packaging systems.* The BCW has limited application in sustainability research despite many sustainability problems requiring behavior change (Allison et al., 2022). Examples of prior applications of BCW or COM-B in sustainability include compostable packaging disposal (Allison et al., 2022), reusable cup use (Allison et al., 2021), plant-based diet adoption (Graça et al., 2019), sustainable food choices (Ran et al., 2022) and household water conservation (Addo et al., 2018).

In 2022, Unilever and Asda piloted refill on the go and return on the go models in the UK and used the BCW to identify interventions to improve customer adoption through the pilot. A key finding was that continued engagement is required to ensure sustained adoption of reuse behaviors, as consumers purchased more RPS products during the intervention implementation period. The return on the go model seemed more convenience for customers, but they still needed to understand the value of reusable packaging and the importance of returning the empties promptly (WRAP UK, 2022a).

Ran et al. (2022) examined factors influencing consumers' capability, opportunity, and motivation to adopt sustainable food choices during grocery shopping and how information interventions could support behavior change. They recommended combining the BCW and CJM to understand the chronological progression and factors that affect consumers' decision-making, so proposed interventions are more likely to be effective.

### Research Questions, Hypotheses, and Specific Aims

The research focus of this thesis was how FMCG companies enable sustainable consumption behavior with RPS products through the customer journey. I analyzed how interventions in the customer journey could enable consumers to switch their FMCG products to PRS and explored the main gaps in the customer journey that prevent consumers from taking an active role in RPS. Since incorporating circularity is a key strength and differentiator in challenger companies, this thesis explored the differences in the customer journey design of RPS products between incumbents and challenger FMCG companies. The research question and hypotheses were tested using a novel scorecard created based on the combination of customer journey mapping (CJM) and the behavior change wheel (BCW).

Q1: How do FMCG companies enable sustainable consumption behavior by using reusable packaging in the customer journey?

H1: RPS products from challenger FMCG companies are better (higher scorecard rating) than RPS products from incumbent companies at enabling consumers to adopt reuse behaviors.

H2: RPS products with lower scorecard ratings miss addressing one or more engagement factors (understanding of RPS benefits, convenience, affordability, hygiene, and infrastructure accessibility).

H3: RPS products with higher scorecard ratings are linked to companies implementing interventions across all customer journey stages (before, during, and after purchase), particularly in post-purchase when consumers decide if packaging becomes waste or gets reused.

H4: Regarding behavior change, RPS products with higher scorecard ratings are linked to companies addressing all COM-B components (capability, opportunity, and motivation) instead of only focusing on motivation.

H5: Education, persuasion, incentives, and enablement are the most common behavior change intervention functions applied by FMCG companies in the customer journey of RPS products.

### Specific Aims

Completing the research required that I:

1. Define a sample from incumbent and challenger companies working on reusable packaging solutions in the FMCG sector.

2. Map the current customer journeys of the selected samples by examining online and coding the interventions in place that help consumers adopt RPS.
3. Identify the target behavior to change and what needs to change for the target behavior to occur, following the Behavior Change Wheel (BCW).
4. Create a scorecard based on combining the CJM and BCW methods.
5. Prepare a framework and recommendations for how businesses can improve the customer journey design to support customers adopting reusable packaging.

## Chapter II

### Methods

This research evaluated how companies enable consumers to switch to RPS products by comparing how FMCG incumbent and challenger companies influence consumer behavior in their customer journey designs. To do so, I analyzed company RPS products using customer journey mapping (CJM) and analyzed target behavior with the behavior change wheel (BCW). Data on the customer journey and current interventions for selected sample products were collected using online research. Then, I applied a novel method in the sustainability context of creating a scorecard based on a combination of CJM and the BCW. The scorecard was used to evaluate how companies enable consumers to switch to RPS alternatives and to identify the main gaps in the customer journey that could prevent consumers from adopting RPS.

### Data Selection

Products were selected to create two sample groups for comparison and evaluation. The first sample group included RPS products from incumbent companies, and the second group included RPS products from challenger companies. Each group contained ten replicate observations based on the rule of ten (Gotelli & Ellison, 2004). An observation was defined as a product with reusable packaging offered by a company via a digital sales channel. The observations were paired by choosing products covering a similar function, e.g., hand soap from each company.



The selected sample companies and products comply with the following criteria:

1. UK companies in the FMCG market selling directly or via retailers to consumers.
2. RPS products must be available on a digital channel for consumers to engage with and purchase them since the research was conducted online.
3. RPS products can be classified as refill at home, return from home, and return on the go (EMF, 2019). When a product was offered in many reuse models (Muranko et al., 2021), one model was selected based on similarity between pairs.

First, the incumbent companies and products were selected and then matched to challenger companies and products. The incumbent companies were chosen from the Global Plastic Commitment (EMF, 2022b) signatories list, which was filtered on packaged goods companies with reported reuse models for consumer-facing products or packaging. Then, a search was conducted to find RPS products available online and sold in the UK by each company. The result was a list of selected incumbent companies and their RPS products. The matching challenger companies were selected by searching online for sustainable brands that sold similar RPS products as the incumbents. Keywords used were product type (example: hand soap) combined with B-Corp, sustainable, start-up, reusable, refill, refillable, eco refill, reuse, or reusable.

The 20 RPS products selected were analyzed based on the online information available from companies' websites, product pages, dedicated pages on their RPS programs, and FAQs. These sources of information were chosen since companies commonly use them to inform consumers of the RPS products and the required consumer activities. Other communication channels could also cover similar functions, but these were discarded to focus on the digital customer journey. Table 2 shows the information

collected to analyze and characterize the sample. This categorization was done to investigate how the RPS products operate and expected consumer activities.

Table 2. Information collected from selected RPS products.

Variable	Values
1. Company Name	Company name
2. RPS Product	Product description
3. Company Type	Incumbent, Challenger (Charnley et al., 2022; Zucchella et al., 2022)
4. FMCG product category	Food & beverages, personal care, baby care, and home care (Muranko et al., 2021; Zeeuw van der Laan & Aurisicchio, 2019)
5. FMCG product type	Product type description (ex. Hand soap)
6. Reuse Model	Refill at home, Refill on the go, Return from home, Return on the go (EMF, 2019)
7. Types of reusable packaging	Refillable by bulk dispenser, Refillable Parent Packaging (by pouring, placing, or diluting), Returnable Packaging, and Transit Packaging (Coelho et al., 2020)
8. Reusable Packaging Description	Reusable packaging description (ex. Bottle dispenser)
9. Refill Packaging Description	Refill packaging description when applicable (ex., Refill pouch)
10. Refill method	Pouring, placing, or diluting inside of parent packaging (Coelho et al., 2020)
11. Refill packaging disposal	Recycle at home, recycle out of home (Recycle Now, n.d.-b), Returnable refill.
12. Reusable packaging design	Bespoke or Generic, inspired by EMF (2023)
13. Ownership of reusable packaging	Company or consumer-owned (EMF, 2019; Muranko et al., 2021)
14. Ownership of refill packaging	Company or consumer-owned
15. Reuse behavior for reusable packaging	Sequential reuse or Exclusive reuse behavior (Muranko et al., 2021)
16. Disposal behavior for refill packaging	Single-use recycling, Single-consumption, or Sequential reuse behavior

Variable	Values
17. Consumer responsibility	Cleaning and/or refilling (EMF, 2019)
18. Company responsibility	Cleaning and/or refilling (EMF, 2019)
19. Reverse Logistics Infrastructure	Dedicated home delivery and collection, drop off in Post Office, or drop off in Collect+ stores.
20. Regular & RPS version	RPS only, both
21. RPS sold via	Company, retailer, both
22. RPS research based on	Company, retailers, both
23. RPS research done at	Company and/or retailer name

*Compiled by author.*

### Application of the Customer Journey Map and the Behavior Change Wheel

I first performed the CJM analysis, then analyzed the target behavior with the BCW, and finally combined both frameworks. Although the methods in this research are presented in a linear way, multiple iterations going back and forth between CJM and BCW were required to ensure the information was captured systematically.

### Customer Journey Mapping

Each observation was analyzed with CJM, so a total of 20 CJM were elaborated for this research. While the terminology on CJM varies among marketing literature (Charnley et al., 2022; Lemon & Verhoef, 2016), for this research, pre-purchase includes the consideration stage, then comes the purchase stage, and finally, post-purchase consists of the use stage, the disposal stage, and loyalty stage. Once the CJM analysis was completed, critical activities and interventions in the customer journey were identified. These interventions were later evaluated with the BCW.

*Building the customer journey maps.* The CJM in this thesis expanded on the work of Zeeuw van der Laan and Aurisicchio (2019), who mapped 18 product-service systems, including FMCG products (Figure 5), to analyze what activities consumers were required to execute during purchase, use, and disposal stages. Due to the scope of this research, I added the consideration stage, when the consumer evaluates the product, and the loyalty stage, when the consumer decides to repurchase the RPS product (Figure 7). Although all the products were analyzed with the same activities, the sequence had to be adjusted in some cases. Table 3 shows the description of the activities in the CJM model.

When a product could be purchased via a company or retailer’s website, preference was given to the company website since the company would have more control over the customer journey. When the product could be purchased on multiple channels, preference was given to purchase online and home delivery instead of click & collect or in-store purchase.

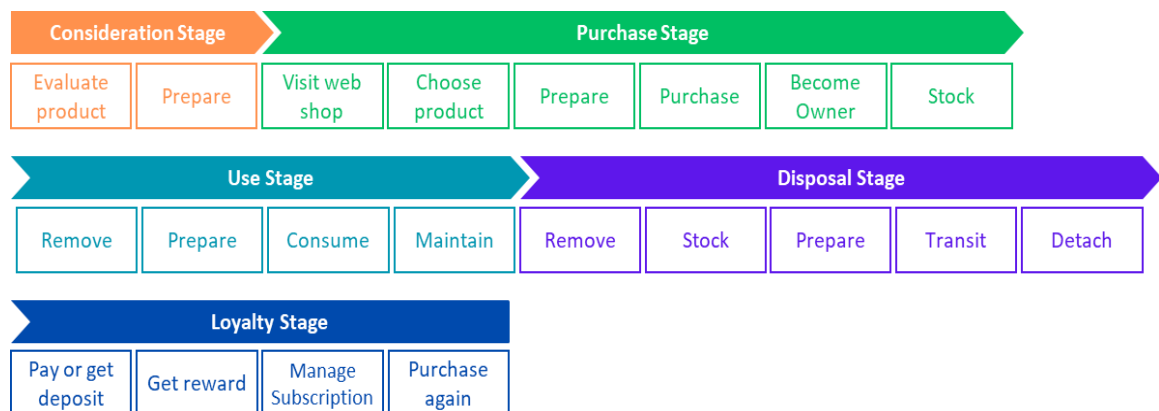


Figure 7. Customer journey map with stages and activities.

*Prepared by author. CJM model expanded from Zeeuw van der Laan & Aurisicchio (2019) by adding consideration and loyalty stages and their corresponding activities.*

Table 3. Activities required from consumers in RPS.

Activity	Description
<b>1 - Consideration Stage</b>	
Evaluate product	Evaluate the product to decide on purchase by researching online.
Prepare	Confirm systems in place at home to enable RPS.
<b>2 - Purchase Stage</b>	
Visit web shop	Visit or access online to purchase
Choose Product	Select FMCG from the online offering.
Prepare	Add complementary products (return envelope, dispenses, etc.)
Purchase	Make payment.
Become Owner	Delivery of FMCG products in RPS format
Stock	Keep inventory of operative resources.
<b>3 - Use Stage</b>	
Remove	Unpack for consumption
Prepare	Assemble RPS or refill consumables.
Consume	Deplete consumable components.
Maintain	Extend the lifetime of affected resources.
<b>4 - Disposal Stage</b>	
Remove	Disassemble and remove residue consumables
Stock	Keep inventory of obsolete resources.
Prepare	Assemble parcels of obsolete resources and/or plan and remember to take them into transit.
Transit	Move obsolete resources to designated locations.
Detach	Drop or abandon obsolete resources.
<b>5 - Loyalty Stage</b>	
Pay or get deposit	Get the deposit repaid (return on time) or charged (late return).
Get reward	Gain rewards (discounts, points, benefits).
Manage subscription	Keep, edit, or cancel subscription.
Purchase again	Decide to purchase RPS again or not.

*Prepared by the author, expanded from Zeeuw van der Laan & Aurisicchio (2019) and adjusted the activities to fit the online retail customer journey.*

After building the 20 CJMs, I consolidated the CJM based on three RPS characteristics: reuse model, reuse behavior, and refill method, because I noticed commonalities in their CJM. This resulted in 6 consolidated CJMs, which helped better analyze the customer journeys moving forward. If an activity in the CJM was not applicable or applicable in some cases, this was marked accordingly. I also identified when an activity was critical to customer experience due to high effort (i.e., activity takes time or requires planning) or high risk of RPS system failure if the activity is not carried out correctly (i.e., not leaving empties out for collection).

*Identifying interventions in the customer journey maps.* The CJM interventions were categorized into technical interventions, including technology and processes, and information interventions, including instructions and communication. Thirty-five interventions (Appendix 1) were identified by analyzing companies' and retailers' websites. The result was the count of interventions per customer journey stage and sample product. The purpose was to identify when interventions apply in CJM, which is important for driving change at the right time (Elizarova & Kahn, 2018).

#### Behavioral Analysis With the Behavior Change Wheel

Following the BCW guide from Michie et al. (2014), I completed five steps to understand the target behavior and identify the intervention functions. I defined the problem in behavioral terms, selected the target behavior, specified the target behavior, identified what needs to change in terms of the COM-B model (opportunity, capability, and motivation), and finally identified the intervention functions. This analysis was based on the literature review and results from the characterization of RPS products and CJM.

The application of the BCW was an iterative process. It required multiple revisions to fine-tune the scope of the behavioral analysis. Michie et al. (2014) advised being flexible in applying the BCW and revising between steps to improve the analysis.

The first step was to define the problem in behavioral terms, which involves being specific about the target audience, where the behavior occurs, and the behavior that needs to be changed to address the problem (Michie et al., 2014).

The second step was to select the target behavior. Behaviors are part of a system and occur in the context of other behaviors from the same person or other people. Each behavior may have a different behavioral analysis in terms of COM-B, so selecting the target behavior helped define the scope of the behavioral intervention. When selecting the target behavior, it was important to consider the potential impact of changing the behavior, the likelihood that the behavior can be changed, and the likelihood of a positive or negative spillover effect toward other behaviors (Michie et al., 2014).

The third step was to specify the target behavior. This involved detailing the target behavior by specifying who needs to perform the behavior, what needs to be done differently to achieve the desired change, and when, where, how often, and with whom the behavior should be done (Michie et al., 2014). I used the worksheet provided by Michie et al. (2014) to specify the target behavior.

The fourth step was to identify what needs to change for the target behavior to occur. The COM-B model is the starting point for understanding the target behavior in the BCW. Changing consumer behavior involves changing one or more of the components of capability, opportunity, and motivation with respect to the target behavior or competing behaviors (Figure 8) (Michie et al., 2014). I used the COM-B behavioral

diagnosis worksheet provided by Michie et al. (2014) for this step. I identified 17 behavioral requirements on what needs to happen for the target behavior to occur. Table 4 displays the definitions of each COM-B component used for the behavioral analysis. I additionally mapped the five factors associated with RPS consumer engagement.

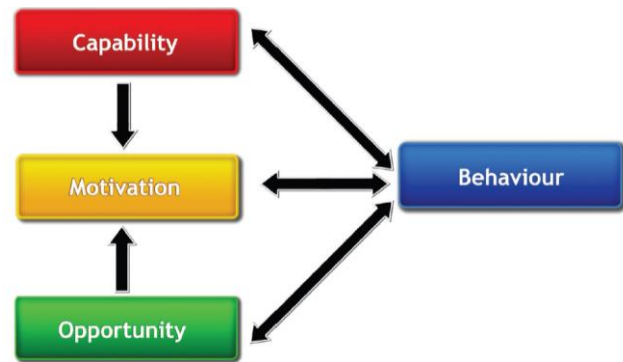


Figure 8. COM-B model (Michie et al., 2014).

Table 4. COM-B component definition (Michie et al., 2014).

COM-B subcomponent	Definition
Physical Capability	Having the physical skills, strength, or stamina to perform the behavior
Psychological Capability	Having the knowledge, psychological skills, strength, or stamina to perform the behavior
Physical Opportunity	Physical opportunity for the behavior to occur regarding what the environment allows or facilitates in terms of time, triggers, resources, locations, physical barriers, etc.
Social Opportunity	Social opportunity for the behavior to occur regarding interpersonal influences, social cues, and cultural norms.
Automatic Motivation	Involves wants and needs, desires, impulses, and reflect responses.
Reflective Motivation	Involves self-conscious planning, evaluations, and beliefs about what is good or bad.



The fifth and final step was identifying the intervention functions. The intervention functions are broad categories that describe how an intervention can change behavior. One intervention can have multiple intervention functions (Michie et al., 2014). Table 5 shows the definitions of the intervention functions. For each COM-B component identified as relevant to bringing change to the target behavior, Table 6 shows which intervention functions are likely to be effective in bringing change (Michie et al., 2014). For example, education is expected to change psychological capability as people are educated about ways to perform the desired behavior or avoid competing behaviors (Michie et al., 2014). Table 7 summarizes how the information gathered was organized and how the results from the analysis are presented.

Table 5. Intervention function definitions (Michie et al., 2014).

Intervention function	Definition
Education	Increasing knowledge or understanding
Persuasion	Using communication to induce positive or negative feelings or stimulate action
Incentivization	Creating an expectation of reward
Coercion	Creating an expectation of punishment or cost
Training	Imparting skills
Restriction	Using rules to reduce the opportunity to engage in the target behavior (or to increase the target behavior by reducing the opportunity to engage in competing behaviors)
Environmental restructuring	Changing the physical or social context
Modelling	Providing an example for people to aspire to or imitate
Enablement	Increasing means or reducing barriers to increase capability (beyond education and training) or opportunity (beyond environmental restructuring)

Table 6. Matrix linking COM-B and intervention functions (Michie et al., 2014).

COM-B components	Intervention functions								
	Education	Persuasion	Incentivisation	Coercion	Training	Restriction	Environmental restructuring	Modelling	Enablement
Physical capability									
Psychological capability									
Physical opportunity									
Social opportunity									
Automatic motivation									
Reflective motivation									

Table 7. Data gathered in the behavioral analysis.

Variables	Definition
COM-B	Capability, Opportunity, Motivation (Michie et al., 2014)
COM-B components	Physical Capability, Psychological Capability, Physical Opportunity, Social Opportunity, Automatic Motivation, Reflective Motivation (Michie et al., 2014)
Behavior requirements	What needs to happen for the target behavior to occur? Based on analysis
Is there a need for change	Yes / No, complemented by reasoning.
Consumer engagement factor	Understanding of RPS benefits, convenience, affordability, hygiene, and infrastructure accessibility. As applicable per behavior requirement.
Intervention Function	Education, persuasion, incentivization, coercion, training, restriction, environmental restructuring, modeling, and enablement (Michie et al., 2014). As applicable per behavior requirement and COM-B component.

*Prepared by author.*

## Combining the Frameworks

After using CJM and BCW, Elizarova and Kahn (2018) recommended analyzing how the interventions across the customer journey enable or hinder behavior change.

*Coding interventions into intervention functions.* Based on Michie et al. (2014), I coded the interventions identified in the CJM against the behavior change techniques (BCT) and the intervention functions from BCW.

The BCTs offer a standardized language to classify and describe the content of interventions. These BCTs are observable, replicable, and can be used individually or combined with other BCTs (Michie et al., 2014). Michie et al. (2014) provided a list of 93 BCTs; of those, 23 BCTs were identified in this research. Additionally, they provided a list of the most appropriate BCTs for each intervention function. The definitions of the BCTs applicable to this research and their associated intervention functions can be found in Appendix 2. Table 8 shows the summary of the information gathered at this stage.

Table 8. Data gathered in the intervention analysis.

Variables	Definition
Intervention	Interventions as identified in CJM, complete list in Appendix 1
Type	Information or Technical
BCT Number	BCT list in Appendix 2 (Michie et al., 2014)
BCT Label	BCT list in Appendix 2 (Michie et al., 2014)
Intervention Function	Education, persuasion, incentivization, coercion, training, restriction, environmental restructuring, modeling, and enablement (Michie et al., 2014).
Consumer engagement factor	Understanding of RPS benefits, convenience, affordability, hygiene, and infrastructure accessibility. As applicable per BCT.

*Prepared by author.*

*Scorecard to evaluate RPS products.* The final step was to link the 17 behavior requirements from the BCW to the 35 interventions in the CJM to build the scorecard to evaluate which products are better at enabling consumers to switch to RPS products. I used the intervention functions and consumer engagement factors identified in the behavioral (Table 7) and intervention analysis (Table 8) to match the interventions to the behavior requirements. This reduced the risk of allocating an intervention where not appropriate or relevant.

Since this research aimed to identify which products were better at enabling behavior change, a higher score was given to products with more interventions from CJM supporting the behavior requirements. A lower score means there are gaps in the CJM to address change due to the lack of interventions. To ensure a fair assessment during the scoring, I distinguished when an intervention was needed or not for a sample product, based on the RPS characteristics and CJM analysis (Appendix 1). Figure 9 shows an example of the allocation logic between interventions and behavior requirements.

Once the allocation was completed, I calculated how many interventions were applied per behavior requirement and the result per behavior requirement per product. The numerator was the number of interventions found, and the denominator was the number of applicable interventions in that behavior requirement. The maximum score is 1, meaning the product has applied all the interventions to address that behavior requirement. Table 9 shows the scoring for two products, following the example from Figure 9. This evaluation was performed for the 17 behavior requirements identified in the BCW.

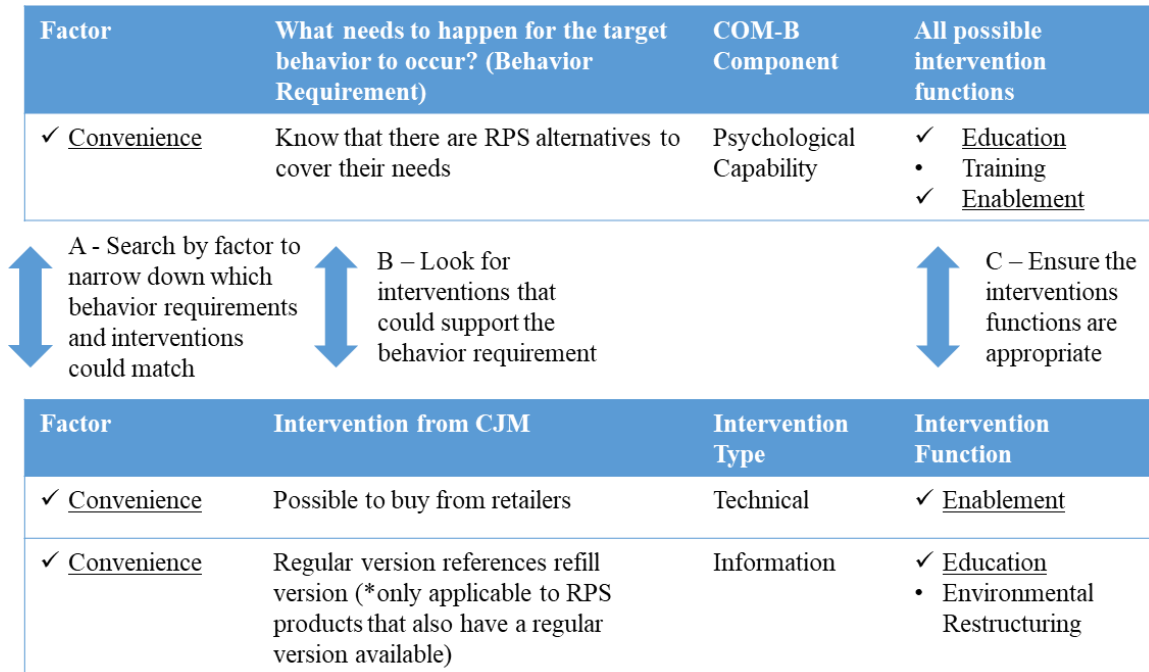


Figure 9. Example of allocation logic.

*Prepared by author. The top table shows the information from the BCW, and the bottom table from the CJM. The arrows show how the evaluation was done to ensure the allocation is appropriate and relevant for each behavior requirement.*

Table 9. Example of evaluation logic per behavior requirement.

What needs to happen for the target behavior to occur? (Behavior Requirement)	Intervention from CJM	2I - Nescafe Refill (Count for intervention)	2C - Worship Instant Coffee Jar (Count for intervention)
Know that there are RPS alternatives to cover their needs	Possible to buy from retailers	1	1
	Regular version references refill version (*only applicable to RPS products that also have a regular version available)	0 – has regular version, but does not reference refill version	N/A – No regular version available
	# interventions found	1	1
	# interventions applicable	2	1
	Result for behavior requirement	0.5	1

*Prepared by author.*

Finally, to build the scorecard rating for each product, the sum of the result per behavior requirement was divided by the 17 behavior requirements. The only exception was 10C - Ocean Saver Kitchen Cleaner Ecodrop, as this is the only product where infrastructure accessibility was not applicable since the refill gets dissolved in water. In that case, the sum of the result per behavior requirement was divided by the 14 behavior requirements applicable for 10C. Since the COM-B component and the factor associated with RPS consumer engagement were unique to each behavior requirement, it was possible to see how each contributed to the score per product.

#### Research Method Limitations

My methods were limited by the availability of information from online sources. The results could be affected by the company and sample RPS product selection; however, careful pairing was done on the company and product levels to ensure a suitable comparison between incumbent and challenger companies. The CJM was done via online observation as I reviewed the websites of selected companies to map the key activities, potential barriers, and interventions available. It is possible that not all the interventions from the company were captured, as there could be interventions present in other channels not explored in this research (i.e., social media and third-party retailers).

The BCW analysis was also based on online observation, and while the utmost care was taken to align with the definitions in the BCW, personal interpretation can affect the classification of interventions. The BCW encourages the exploration of a range of interventions. As Michie et al. (2014) highlight, the BCW is not a blueprint for behavior change but a systematic way to analyze and evaluate the most promising interventions to achieve change.

## Chapter III

### Results

The results of this research are presented in four parts: First, the characterization of the RPS products in the sample to better understand how the reuse models operate, as this influenced the customer journey and behavioral analysis. Second, the customer journey mapping (CJM) for the 20 sample products was consolidated into six CJM models based on the similarities in the characteristics of the RPS products and customer journey activities. Third, the behavioral analysis from applying the behavior change wheel (BCW). And finally, the results from combining the CJM and BCW, including the analysis for the hypotheses.

#### Fast-Moving Consumer Goods in Reusable Packaging Systems

The ten pairs of RPS products selected covered different types of FMCG: food and beverages (2), personal care (6), and home care (2). The sample was categorized based on three reuse frameworks: the reuse model from EMF (2019), the types of reusable packaging from Coelho et al. (2020), and the reuse system elements from Muranko et al. (2021). The RPS characteristics influence consumer behavior and their interaction with the RPS system. Figure 10 introduces the sample RPS products and the identifier code used in this research. The number refers to the pair number; the letter relates to I for Incumbent companies and C for Challenger companies.





















FMCG Product Category & Type	Incumbent Company, RPS Product & Reuse Model	Challenger Company, RPS Product & Reuse Model
Food & Beverages: <b>Sparkling Water</b>	1I  PepsiCo SodaStream Cylinder Gas Refill <b>Return on the go</b>	1C  Belu Sparkling Water Returnable Bottle <b>Return from home</b>
Food & Beverages: <b>Instant Coffee</b>	2I  Nestle Nescafe Refill <b>Refill at home</b>	2C  Worship Coffee Instant Coffee Jar <b>Return from home</b>
Personal Care: <b>Night Face Cream</b>	3I  Beiersdorf Eucerin Night Cream Refill <b>Refill at home</b>	3C  UpCircle Beauty Return + Refill Night Cream <b>Return on the go</b>
Personal Care: <b>Hand Soap</b>	4I  Colgate-Palmolive Palmolive Ecorefill Hand Soap <b>Refill at home</b>	4C  Bower Collective Bower Natural Hand Wash Refill <b>Return on the go</b>
Personal Care: <b>Baby Shampoo</b>	5I  Kenvue / J&J Johnson's Baby Shampoo Ecorefill <b>Refill at home</b>	5C  Naif Shampoo for Baby and Kids Refill <b>Refill at home</b>
Personal Care: <b>Shower Gel</b>	6I  L'Occitane Shower Gel Refill <b>Refill at home</b>	6C  Beauty Kitchen Body Wash <b>Return on the go</b>
Personal Care: <b>Perfume</b>	7I  L'Oreal Lancome Refillable Perfume <b>Refill at home</b>	7C  EPC Experimental Perfume Club Perfume Refill <b>Refill at home</b>
Personal Care: <b>Lipstick</b>	8I  Natura & Co The Body Shop Lipstick Bullet Refill <b>Refill at home</b>	8C  Zao Make Up Refill Matt Lipstick <b>Refill at home</b>
Home Care: <b>Liquid Laundry Detergent</b>	9I  SC Johnson Ecover Laundry Liquid 5L Refill <b>Refill at home</b>	9C  Miniml Laundry Liquid Bulk Refill <b>Return on the go</b>
Home Care: <b>Kitchen Cleaner Spray</b>	10I  Unilever Cif Kitchen Spray ecorefill <b>Refill at home</b>	10C  Ocean Saver Kitchen Cleaner Ecodrop <b>Refill at home</b>

Figure 10. Selected RPS products from incumbent and challenger companies.

*Pictures were taken from companies' or retailers' websites. (Amazon, n.d.; Beauty Kitchen, n.d.-b; Bower Collective, n.d.-d; Ecover, n.d.-c; Eucerin, n.d.; Experimental Perfume Club, n.d.-a; Johnson's, n.d.-b; Lancôme UK, n.d.; L'Occitane, n.d.-a; Milk & More, n.d.-b; Miniml, n.d.-c; Notino, n.d.; OceanSaver, n.d.-b; Palmolive, n.d.-b; Peace With The Wild, n.d.; SodaStream, n.d.-b; Tesco, n.d.-a; The Body Shop, n.d.-c; The Modern Milkman, n.d.-c; UpCircle Beauty, n.d.-d).*



## Reuse Model in the Sample

The sample included 13 products with refill at home, two with return from home, and five with return on the go models (Figure 11), classified based on the Reuse Model from EMF (2019). RPS products from incumbent companies relied more on refill at home model, while RPS products from challenger companies used different models.

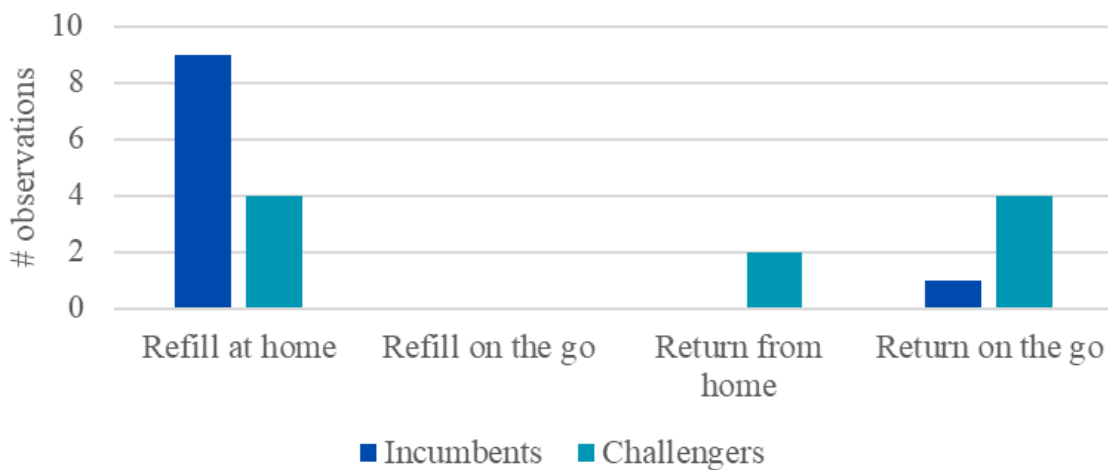


Figure 11. Reuse model for sample RPS products by company type.

Although only one reuse model was selected per product, some companies offered multiple reuse models for the sample product, showing flexibility in providing multiple options to reach consumers. L'Occitane Shower Gel Refill (6I), EPC Perfume Refill (7C), Ecover Laundry Liquid 5L Refill (9I), and Miniml Laundry Liquid Bulk Refill (9C) had more than one reuse model available. Consumers could search online for where to buy the RPS product and decide which reuse model to purchase. This decision point for consumers was noted later in the customer journey mapping.

## Types of Reusable Packaging in the Sample

Based on Coelho et al. (2020), there are four types of reusable packaging. From the sample, 15 products were refillable parent packaging, which uses refillable containers and refills, and five products were returnable packaging (Figure 12). The other two types were not identified in the sample, as refillable by bulk dispenser corresponds to refill on the go model, and reusable transit packaging was not provided in the sample products.

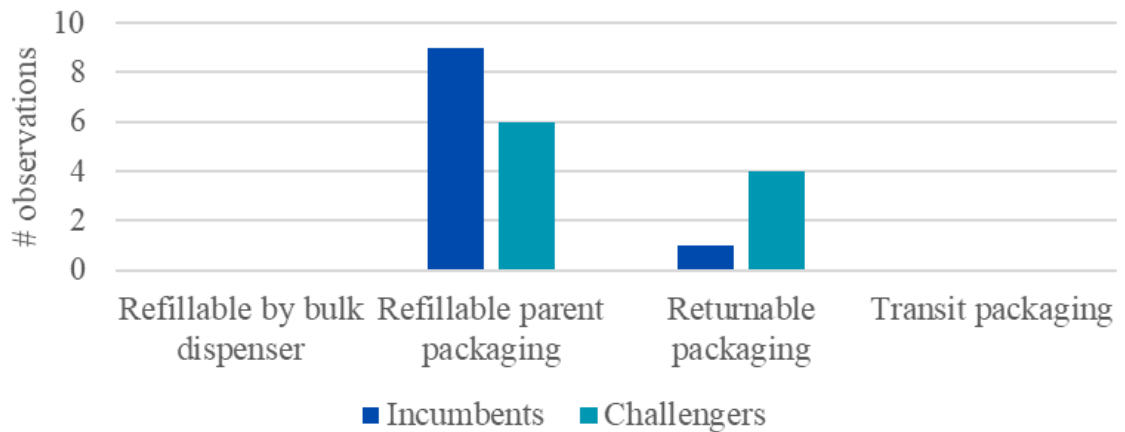


Figure 12. Type of reusable packaging for sample RPS products by company type.

Figure 13 connects the reuse model from EMF (2019) with the type of reusable packaging and refill methods. Most incumbent RPS products used the refill at home model, thus they also used refillable parent packaging. Challenger RPS products used both types of reusable packaging. Although return models are commonly linked to returnable packaging, this research saw the application of refillable parent packaging in return on the go, where the refill packaging is returnable and reusable. Appendix 3 has the detailed categorization information per RPS product in the sample.

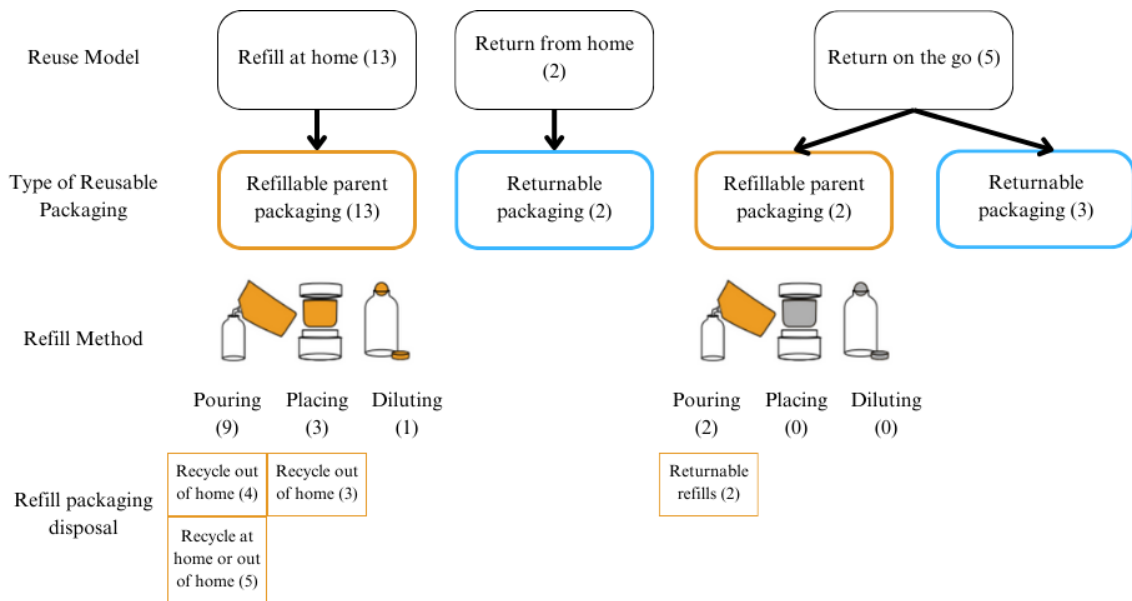


Figure 13. Types of reusable packaging in the sample RPS products.

*The numbers in brackets are the number of observations in each category (Coelho et al., 2020; EMF, 2019; Hesseling, 2022; Recycle Now, n.d.-b).*

*Refillable parent packaging.* A challenge with refill at home is ensuring the refill packaging is reusable, recyclable or compostable (EMF, 2019). From the sample, all refill at home products were identified as recyclable (Recycle Now, n.d.-b). However, the action of recycling depends on consumers' understanding of how to recycle each refill packaging. L'Occitane (6I) was the only incumbent company in refill at home, which offered customers the option to add a free return envelope for recycling when buying products (L'Occitane, n.d.-c). The consumer decision about how to discard the refill could impact consumer experience when switching to refill at home models.

An emerging trend identified in the sample was the introduction of return on the go models with returnable refill packaging, where both the parent and refill packaging are reusable. Bower (4C) and Miniml (9C) offer customers pouches and containers which can be returned for either reuse or recycling by the company (Bower Collective, n.d.-d;

Miniml, n.d.-c). This shows innovation from challenger companies towards closed-loop systems in RPS. 4C and 9C were classified as refillable parent packaging because the consumer still needs to refill the parent packaging to use the consumables and because returnable packaging refers to the parent packaging being returned to be cleaned and refilled by the company (Coelho et al., 2020; EMF, 2023e).

*Returnable packaging products.* The return from home model was offered via specialist retailers Milk & More (1C - Belu) and The Modern Milkman (2C – Worship Coffee) for the returnable packaging products. These specialist retailers operate almost nationally on milk round models, make weekly deliveries of returnable items (among other groceries), and collect them on the next delivery. Both retailers seek to work with companies to enable the reuse model by offering the infrastructure and reverse logistics (Milk & More, n.d.-d; The Modern Milkman, n.d.-e).

The return on the go models with returnable packaging was offered by SodaStream (1I), UpCircle Beauty (3C), and Beauty Kitchen (6C), which relied on consumers taking the packaging to a drop-off point for return. Additionally, SodaStream (1I) also offered their customers returnable packaging in return on the go operated via selected stores, instead of online, thus providing customers with different choices for their convenience.

*Reusable packaging design.* The customer experience could be influenced by the packaging design. Figure 14 shows the sample results from combining the types of reusable packaging (Coelho et al., 2020) with packaging design as either bespoke or

generic. From the sample, returnable packaging was all bespoke design, which could hinder progress on B2C return models. The refillable parent packaging was split between bespoke (6) and generic (9).

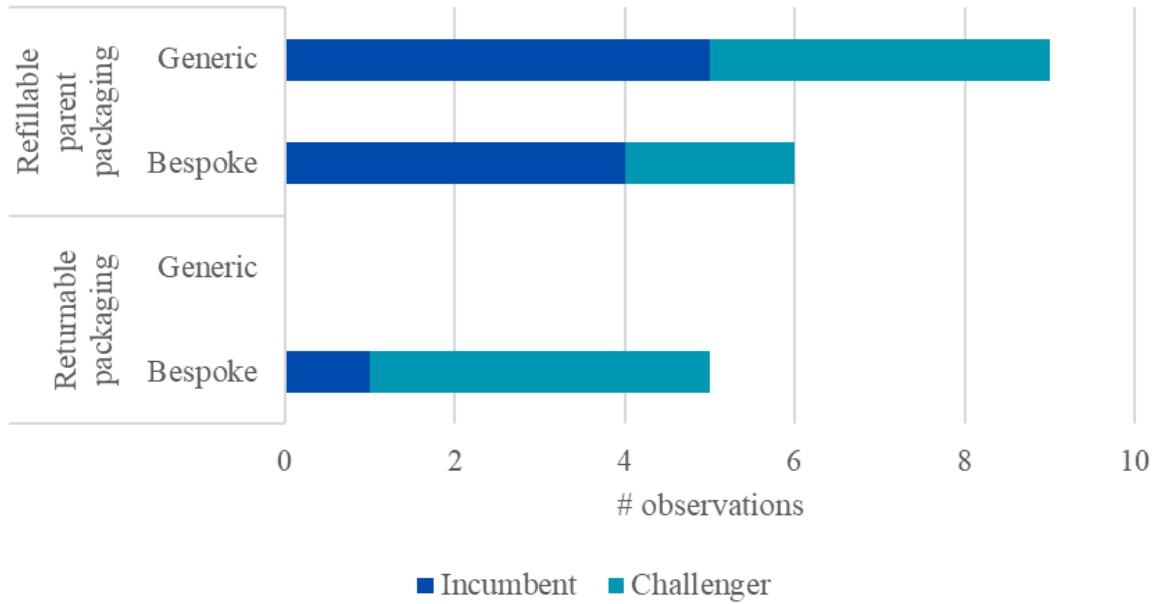


Figure 14. Reusable packaging design by type of company and reusable packaging.

For example, Cif Kitchen Spray Ecorefill (10I) presented bespoke reusable packaging and specified that the refills could only be used in a Cif spray bottle due to the mechanism to pour the refill into the bottle. On the other hand, Ocean Saver Kitchen Cleaner Ecodrop (10C) presented generic reusable packaging design and allows consumers to repurpose any suitable parent packaging as the product could be diluted in any available spray bottle of 750ml. Harmonizing packaging design in reuse models can significantly increase the efficiency of RPS systems (EMF, 2023e).

## Reuse System Elements in the Sample

The RPS system was analyzed based on Muranko et al. (2021) regarding packaging ownership, reuser behavior, cleaning and refilling activities, and infrastructure. These setups influence the customer experience and how companies implement RPS systems. Appendix 4 has a detailed categorization of the reuse system elements.

*Reusable packaging ownership and reuser behavior.* From the sample, 16 products relied on exclusive reuse behavior and the reusable packaging was consumer-owned. Four products relied on sequential reuse behavior and the reusable packaging was company-owned. Additionally, fifteen RPS products had refill packaging, which were further classified by the disposal behavior for refill packaging to describe what is expected of the customer after using the refills. 12 products presented single-use recycling behavior, so consumers need to recycle the empty refill packaging. Two products presented sequential reuse behavior, so multiple users would use a refill packaging and the company owns the refill packaging. One product (Ocean Savier – 10C) presented single-consumption behavior, as consumers would dissolve the refill, and produce no waste. Five products were not classified for disposal behavior of the refill packaging as they did not present the use of refills, only parent packaging (Figure 15).

Return on the go models are typically associated with returnable packaging, which are company-owned, with sequential reuse behavior, and cleaned and refilled by the company (Coelho et al., 2020; EMF, 2019; Muranko et al., 2021). However, the sample had three return on the go products with exclusive reuse behavior (Figure 15). UpCircle Beauty (3C) had returnable packaging with exclusive reuse behavior. Bower

(4C) and Miniml (9C) had returnable refills with sequential reuse behavior. These innovations reflect a change in how companies operate with return on the go models.

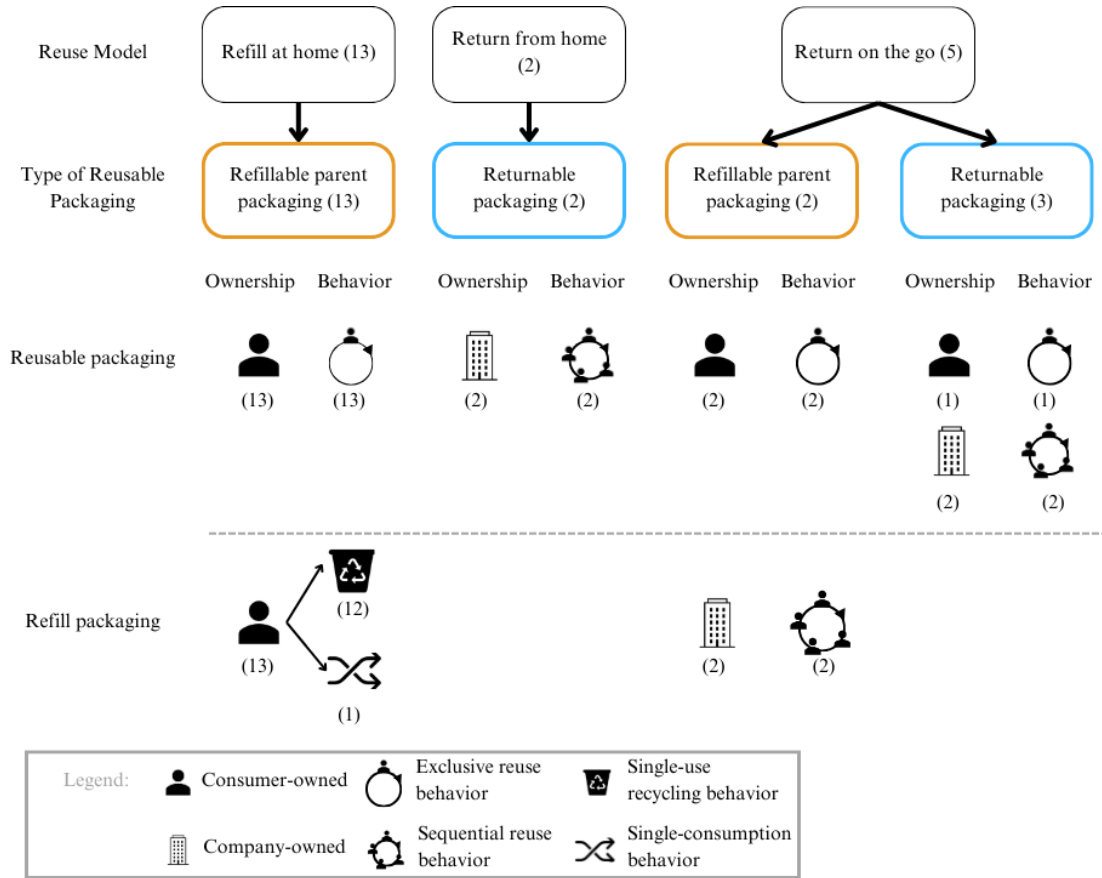


Figure 15. Ownership and behaviors in the RPS system for the sample.

*The numbers in brackets are the number of observations in each category (Coelho et al., 2020; EMF, 2019; Hesseling, 2022; Muranko et al., 2021).*

From the sample, incumbent RPS products mainly relied on exclusive reuse behavior, and their RPS products with refill packaging relied on single-use recycling behavior for the refill packaging. Challenger RPS products were available in both reuse behaviors and offered different types of disposal behavior for consumers (Figure 16).

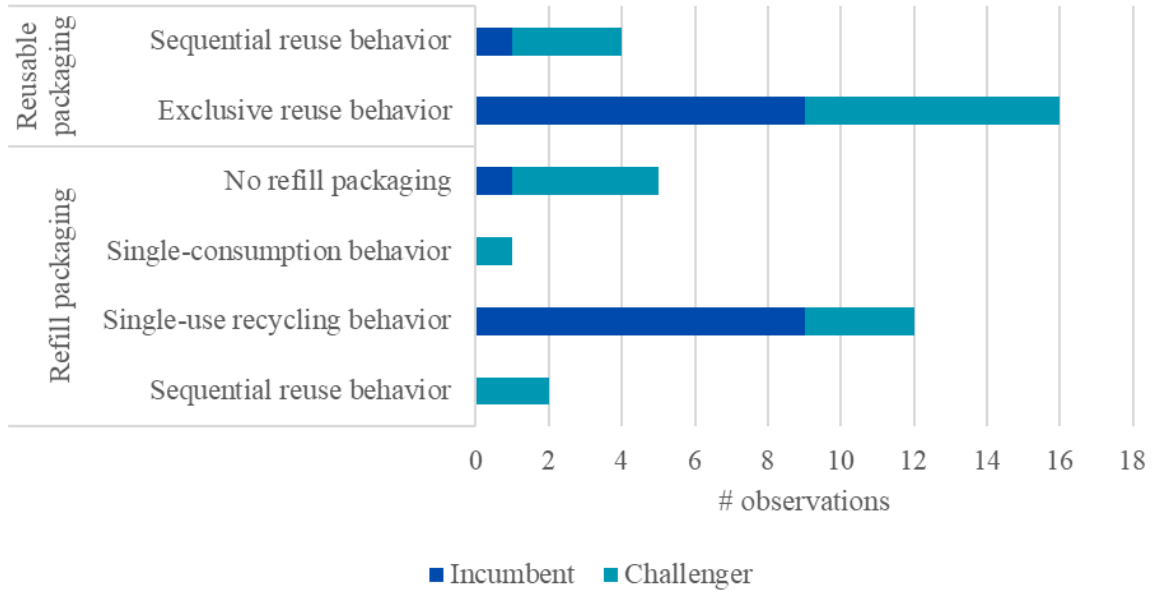


Figure 16. Reuse behaviors per type of company and packaging.

*Cleaning and refilling in RPS systems.* Due to the choice of reuse model, incumbent RPS products mainly give consumers the task of cleaning and refilling, and challenger RPS products share the cleaning and refilling responsibilities. Task responsibility allocation would impact the level of effort from consumers when adopting RPS systems. Refill at home products required the consumer to clean and refill parent packaging as needed. Return from home products required consumers to rinse the containers before the next collection from specialized retailers. Due to the different ways return on the go products are presented to consumers, there are also differences in cleaning and refilling responsibilities, which means consumers need support to learn what to do in each case. Table 10 shows the responsibilities of consumers and companies regarding cleaning and refilling from the sample products.



Table 10. Stakeholder responsibilities for cleaning and refilling by company type.

Reuse Models	Type of Reusable Packaging	Consumer responsibility	Company responsibility	Incumbent # Obs.	Challenger # Obs.
Refill at home	Refillable parent packaging	Cleaning and refilling	N/A	9	4
Return from home	Returnable Packaging	Cleaning	Cleaning and refilling	0	2
	Refillable parent packaging	Cleaning and refilling	Cleaning and refilling	0	2
Return on the go	Returnable Packaging	Cleaning	Cleaning and refilling	0	1
		N/A	Cleaning and refilling	1	1

*Reverse logistics infrastructure for RPS systems.* Companies rely on third-party logistic networks to manage reverse logistics (Table 11). From the sample, return from home models (1C & 2C) are operated via specialist retailers using dedicated home delivery vehicles to collect empty returnable packaging on the next delivery. The return on the go model relies on either the Post Office (4C, 9C, 3C, 6C) or Collect+ drop-off points (1I).

Table 11. Reverse logistics infrastructure.

Reuse Models	Type of Reusable Packaging	Reverse Logistics	# Obs.	Sample Products
Return from home	Returnable Packaging	Dedicated home delivery and collection	2	1C, 2C
	Refillable parent packaging	Drop off in Post Office	2	4C, 9C
Return on the go	Returnable Packaging	Drop off in Collect+ stores	1	1I
		Drop off in Post Office	2	3C, 6C

### Customer Journey Mapping (CJM) for the Sample

After building the 20 CJMs, I consolidated the CJM based on three RPS characteristics: reuse model, reuse behavior, and refill method. This resulted in six consolidated CJMs, which facilitated the identification of technical and information interventions and critical activities across the customer journey.

## CJM Model for Return From Home

From the sample, two observations (1C - Belu and 2C - Worship) were identified as return from home models and operated with returnable packaging and sequential reuse behavior. Their CJM were similar because the RPS products were provided via specialized retailers operating with the milk round model. Without the specialized retailers (Milk & More and The Modern Milkman), these solutions would not operate in return from home. Figure 17 shows the consolidated CJM based on the specialist retailers' websites. Figure 18 shows the interventions identified across the CJM.

A distinct difference with other CJM models is that the loyalty stage is between the disposal stage instead of sequential. This is because in this CJM model, the collection of empty containers depends on the next delivery, so this model encourages recurrent purchasing. Both retailers provided the option for subscriptions with automatic reordering, which could likely enable consumers to build routines around frequent collections and deliveries, making it easier for consumers to switch to RPS. Successful collections could serve as evidence for consumers that the RPS system works and that the company is reusing or recycling the bottles.

Both retailers presented information about the environmental benefits of RPS. Milk & More (1C) mentioned that they would refill and reuse empty bottles as much as possible (Milk & More, n.d.-b), and Modern Milkman (2C) quantified the number of wheelie bins of plastic prevented so far by using their service (The Modern Milkman, n.d.-d). 1C has a dedicated page on how the cleaning process works in partnership with Belu, Milk&More, and Again CleanCell (Milk & More, n.d.-a).

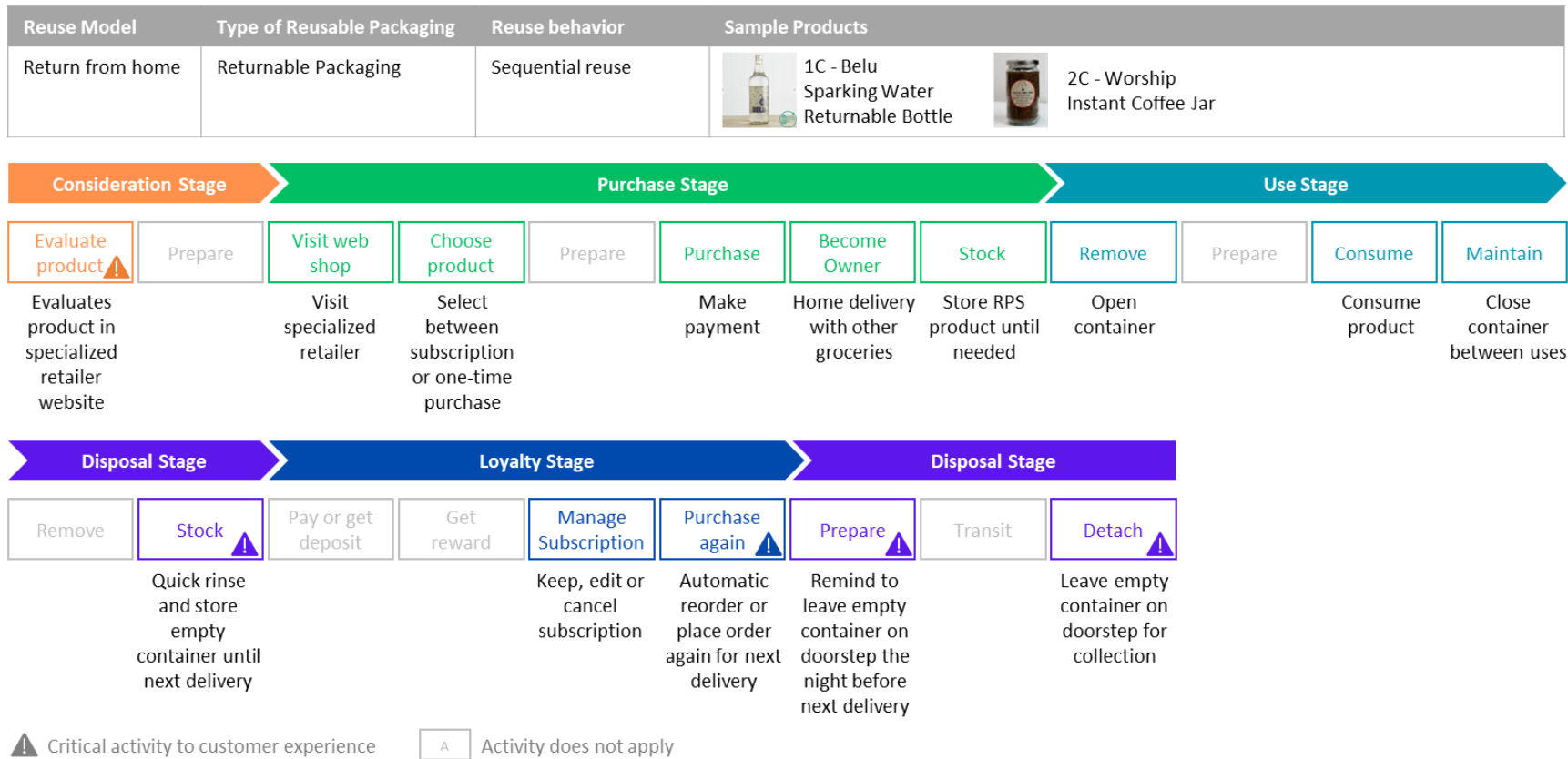


Figure 17. CJM model for return from home.

Mapping based on retailers' websites (Milk & More, n.d.-b, n.d.-c, n.d.-a, n.d.-d; The Modern Milkman, n.d.-c, n.d.-b, n.d.-a, n.d.-d).

	Consider.	Purchase	Use	Disposal	Loyalty
<b>Technical Solutions</b>					
Possible to buy from retailers	X	X			X
Subscription with automatic reordering	X	X		X	X
Customer reviews on RPS product	1C				
Search function on delivery and collection dates per postcode	X	X		X	
Delivery of RPS among other groceries	X	X			
Collection at home on next delivery				X	
<b>Information Solutions</b>					
Information about how RPS works	X	X		X	X
Instructions for return process	X	X		X	X
Instructions for cleaning RPS at home	X				
Information about environmental benefits of RPS solution	X				
Information about benefits of take-back scheme (for reuse or recycling)	X	X		X	X
Information about RPS cleaning process from company	1C				
Information that product is refillable, returnable or reusable	X	X		X	
Certification on positive impact from product or company	2C				
Request consumers to leave empties outside for collection on the next delivery	X	X		X	

Figure 18. CJM interventions in return from home.

*X means all products included in the intervention, and sample code means some products included in the intervention. The interventions were allocated based on how these would support activities in each stage (Milk & More, n.d.-b, n.d.-c, n.d.-a, n.d.-d; The Modern Milkman, n.d.-c, n.d.-b, n.d.-a, n.d.-d)*

## CJM Model for Return on the Go With Sequential Reuse Behavior

Return on the go samples were divided based on sequential and exclusive reuse behavior, as the activities primarily differed based on the reuse behavior. Four observations were considered return on the go with sequential reuse behavior models. These four observations are further differentiated by the type of packaging in the RPS, as two products (1I and 6C) operated with sequential reuse of returnable packaging, and the other two products (4C and 9C) operated with sequential reuse of refill packaging and exclusive reuse of refillable dispensers at home.

This CJM model required the most activities from consumers compared to others. Although there are commonalities in the activities in the sample products, the products had different interventions applied in the CJM so that consumers would have diverse experiences with each RPS. Figure 19 shows the consolidated CJM, and Figure 20 shows the interventions identified across this CJM model.





Before purchasing the RPS, the consumers should confirm if they have the necessary resources available at home, such as a dispenser (4C, 9C), a pump (6C), or the specialized machine (1I), as otherwise, it would not be feasible to operate the RPS. Consumers could add those resources to their purchase if they do not have them at home.

All products provided pay-as-you-go or subscription options but with some differences in their application. 4C, 6C, and 9C offer subscriptions with automatic reordering and financial rewards. If consumers subscribe, they can choose the delivery frequency and receive discounts between 10% and 25% compared to a one-time purchase. Although this is a good financial incentive to subscribe and get new refills, it does not reward or encourage returning the empties. 1I offered a subscription with

financial benefits and was the only RPS applying deposits to get the empty reusable packaging back. If a consumer purchased 1I on pay-as-you-go, then they would pay the deposit during purchase and get the deposit back upon return. However, if a consumer subscribed, they have one month after the latest replacement delivery to return the empty cylinders, or the deposit charge applies.

Considering 1I is the only RPS in the sample applying deposits to encourage returns, it seems that more companies are offering complimentary returnable packaging to help adopt reuse behavior, as Miao et al. (2023) suggested. Companies should apply other interventions to encourage customers to return. Return on the go with sequential reuse behavior was the only model that saw the application of QR codes in packaging to track reuse and show consumers how many times a packaging has been reused. This could potentially motivate consumers to return packaging as they see the impact of their actions (Long et al., 2022; WRAP UK, 2021). Another unique intervention in this CJM model is the availability of self-service to request free return labels. Still, two products (1I and 4C) also included a free return label with the delivery. Providing the return labels for free could ease consumers' efforts during the disposal stage.

This CJM model also included additional activities. Consumers are requested to clean, refill, and assemble the RPS, store empty returnables, request pre-paid return labels, pack empties, and take them to the drop-off point. All these activities require extra time, learning how to operate the RPS, and knowing where the nearby drop-off points are. Bower Collective (4C) and Miniml (9C) provided a video about the steps to refill and return, which could help consumers assess effort and see how the activities are done.

Reuse Model	Type of Reusable Packaging	Reuse behavior	Refill packaging disposal	Disposal behavior for refill packaging	Sample Products
Return on the go	Returnable Packaging	Sequential reuse			 1I - SodaStream Cylinder Gas Refill  6C - Beauty Kitchen Body Wash
Return on the go	Refillable parent packaging	Exclusive reuse	Returnable refill	Sequential reuse	 4C - Bower Natural Hand Wash Refill  9C - Miniml Laundry Liquid Bulk Refill

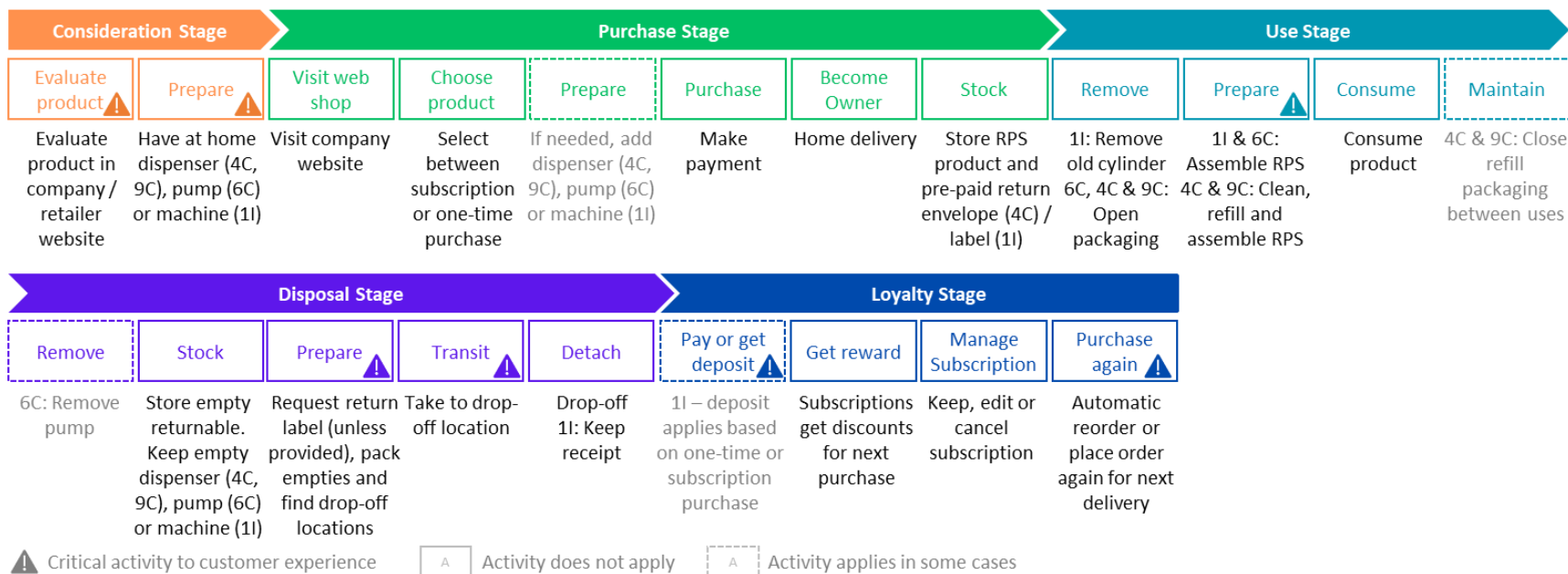


Figure 19. CJM model for return on the go with sequential reuse behavior.

Mapping based on companies' websites (Beauty Kitchen, n.d.-a, n.d.-c, n.d.-b, n.d.-d; Bower Collective, n.d.-d, n.d.-c, n.d.-b, 2023; Miniml, n.d.-a, n.d.-c, n.d.-b; SodaStream, n.d.-d, n.d.-a, n.d.-e, n.d.-a, n.d.-c).

	Consider.	Purchase	Use	Disposal	Loyalty
<b>Technical Solutions</b>					
Possible to buy from retailers	X	X			X
Refill version with discount on PAYG	9C	9C			
Subscription with financial incentives	1I	1I			1I
Subscription with automatic reordering and financial incentives	6C, 4C, 9C	6C, 4C, 9C			6C, 4C, 9C
Customer reviews on RPS product	X	1I, 6C, 4C			
Search function to find retailers selling the product	1I, 9C				
Drop-off locations with good accessibility	X	1I, 4C, 9C		X	
Free return label or envelop provided with delivery	1I, 4C	1I, 4C		1I, 4C	
Self-service to request free return label	6C, 9C			X	
QR code for reuse tracking			6C, 4C	6C	
Possible to repurpose any existing packaging	4C, 9C	4C, 9C	4C, 9C		
<b>Information Solutions</b>					
Information about how RPS works	X	X	X	X	X
Video showing how RPS operates	4C, 9C	4C, 9C	4C, 9C	4C, 9C	4C, 9C
Instructions for return process	X	4C, 9C		X	
Instructions for cleaning RPS at home	9C			9C	
Instructions for how to assemble or refill RPS	1I, 4C, 9C	4C, 9C	1I, 4C, 9C		
Information about the personal positive impact from changing behavior	X	6C, 4C, 9C	6C, 4C		
Information about environmental benefits of RPS solution	X	6C, 4C, 9C			
Information about benefits of take-back scheme (for reuse or recycling)	X	X		X	X
Information about necessary and suitable resources needed to operate RPS	X	1I, 6C, 4C			
Information about RPS cleaning process from company	1I, 6C, 9C	6C, 9C			
Information that product is refillable, returnable or reusable	X	X	6C, 4C	X	
Certification on positive impact from product or company	6C, 4C, 9C				
Regular version references refill version	9C	9C			

Figure 20. CJM interventions in return on the go with sequential reuse behavior.

*X means all products included in the intervention, and sample code means some products included in the intervention. The interventions were allocated based on how these would support activities in each stage (Beauty Kitchen, n.d.-a, n.d.-c, n.d.-b, n.d.-d; Bower Collective, n.d.-d, n.d.-c, n.d.-b, 2023; Miniml, n.d.-a, n.d.-c, n.d.-b; SodaStream, n.d.-d, n.d.-a, n.d.-e, n.d.-a, n.d.-c).*




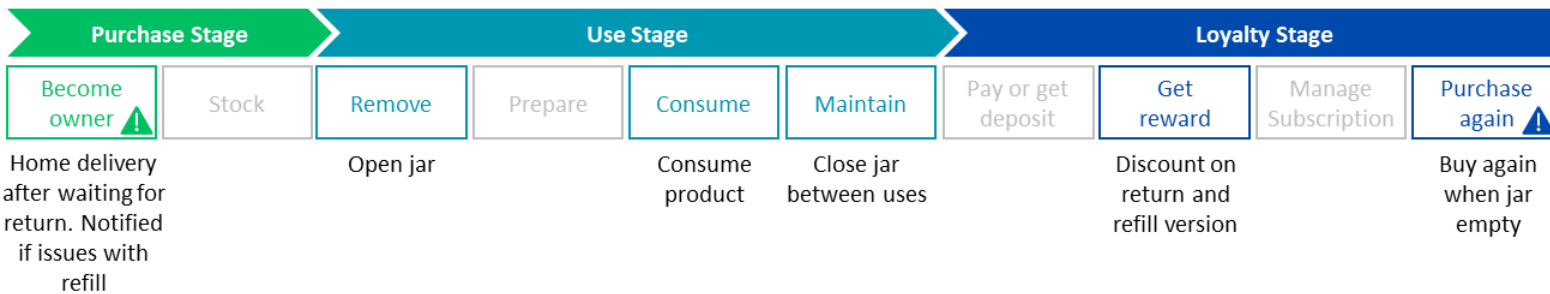
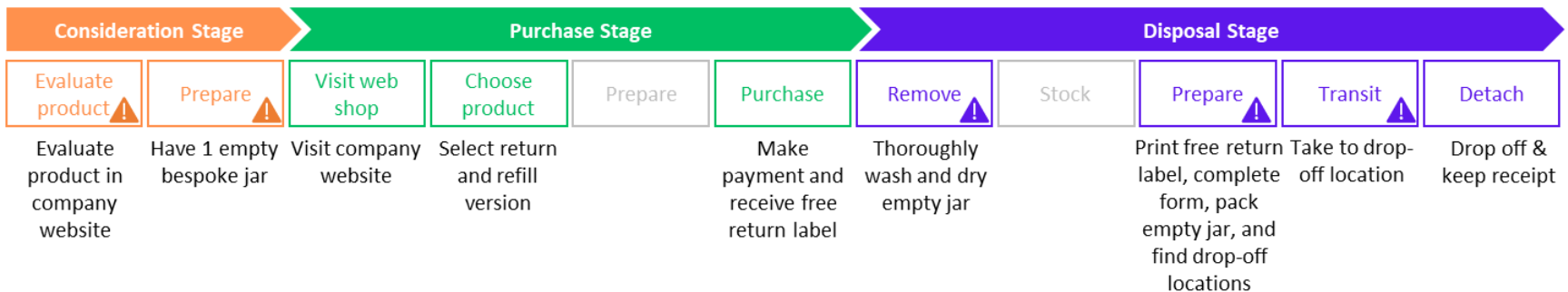
## CJM Model for Return on the Go With Exclusive Reuse Behavior

Observation 3C operates with returnable packaging and exclusive reuse behavior, as consumers are requested to return their used empty cream jars to be refilled by the company. Figure 21 shows the CJM for this product. A key difference with other CJM models is that the disposal stage comes before the use stage because this model requests consumers to purchase the refill online, return an UpCircle empty jar, and then wait for the refilled jar to be delivered at home for use (UpCircle Beauty, n.d.-c, n.d.-d, n.d.-b, n.d.-a). An observation in this CJM model is that the sequence of activities could cause increased inconvenience due to the increased waiting time, new activities, and uncertainty about the hygiene of the refilled jar.

Figure 22 shows the interventions identified across the CJM. This RPS product has a 20% discount compared to the regular version (UpCircle Beauty, n.d.-c). Consumers get a pre-paid return label and a return form via email when purchasing the refill version. Consumers must print the documents and complete the return form to identify the order and what is being refilled. Positive customer reviews on the refill version may influence consumers' choice to try the refill version.

There is a shared responsibility as consumers must thoroughly clean the empty jar before return and the company sterilizes the jar. Consumers should also ensure empty jars are packaged safely to avoid damage in transit. Consumers will be notified if there is an issue with the refill (i.e., incomplete form or smashed jars). Successful delivery of refilled jars could prove to consumers that the RPS works. However, any delays or notifications of issues with refill could hinder the consumer from purchasing again.

Reuse Model	Type of Reusable Packaging	Reuse behavior	Sample Products
Return on the go	Returnable Packaging	Exclusive reuse	 3C - UpCircle Beauty Return + Refill Night Cream



Critical activity to customer experience    Activity does not apply

Figure 21. CJM model for return-on-the-go and exclusive reuse behavior.

Mapping based on the company's website (UpCircle Beauty, n.d.-c, n.d.-d, n.d.-b, n.d.-a).

	Consider.	Purchase	Use	Disposal	Loyalty
<b>Technical Solutions</b>					
Refill version with discount on PAYG	X	X			X
Customer reviews on RPS product	X	X			
Drop-off locations with good accessibility	X	X		X	
Free return label or envelop provided with delivery		X		X	
<b>Information Solutions</b>					
Information about how RPS works	X	X		X	
Video showing how RPS operates	X	X		X	
Instructions for return process	X	X		X	
Instructions for cleaning RPS at home	X			X	
Information about environmental benefits of RPS solution	X	X			
Information about benefits of take-back scheme (for reuse or recycling)	X	X		X	X
Information about necessary and suitable resources needed to operate RPS	X	X		X	
Information about RPS cleaning process from company	X	X			
Information that product is refillable, returnable or reusable	X	X		X	
Notification when issues with refill		X			
Certification on positive impact from product or company	X				
Regular version references refill version	X	X			

Figure 22. CJM interventions in return on the go with exclusive reuse behavior.

*X means all products included in the intervention, and sample code means some products included in the intervention. The interventions were allocated based on how these would support activities in each stage (UpCircle Beauty, n.d.-c, n.d.-d, n.d.-b, n.d.-a).*

## CJM Model for Refill at Home With Placing Refill Method

Refill at home samples were divided based on the refill method, as the activities largely differed based on placing refills, diluting refills, or pouring refills. For this CJM model, sample products 3I, 8I, and 8C operate by providing refill pods that can be placed inside a bespoke case (Boots, n.d.; Eucerin, n.d.; The Body Shop, n.d.-c, n.d.-a, n.d.-b; Zao, n.d.-a, n.d.-b). Figure 23 shows the consolidated CJM, and Figure 24 shows the interventions identified across the CJM.

A key difference is where to purchase the products. 8I can only be bought via the company website, 8C can be purchased via retailers' or the company's website, and 3I can only be bought via retailers, but the company's product page shows more information than the retailer's website. Another difference was the necessary resources to operate the RPS. For 3I, the consumer could refill any previously-owned Eucerin jar; for 8I, the case and refills were sold separately; and for 8C, the consumer could choose between the refill version with a discount or the full version with the bamboo case. These differences could impact how consumers learn to use the RPS.

Regarding the recyclability of the refill packaging, consumers were informed that the refills were recyclable. Still, there were no instructions or incentives to recycle, so consumers need to research and decide if and how to recycle. 3I was mapped when purchased via Boots, which offers a recycling take-back scheme, but consumers are not prompted to this scheme when purchasing the refill. This means that even though consumers can reuse cases and purchase refills, there is no guarantee of closing the loop regarding the materials. This could impact consumers' perception of RPS if they feel the solution is not reducing waste.

Reuse Model	Type of Reusable Packaging	Reuse behavior	Refill method	Sample Products
Refill at home	Refillable parent packaging	Exclusive reuse	Placing	 3I - Eucerin Night Cream Refill  8I - The Body Shop Lipstick Bullet Refill  8C - Zao Refill Matt Lipstick

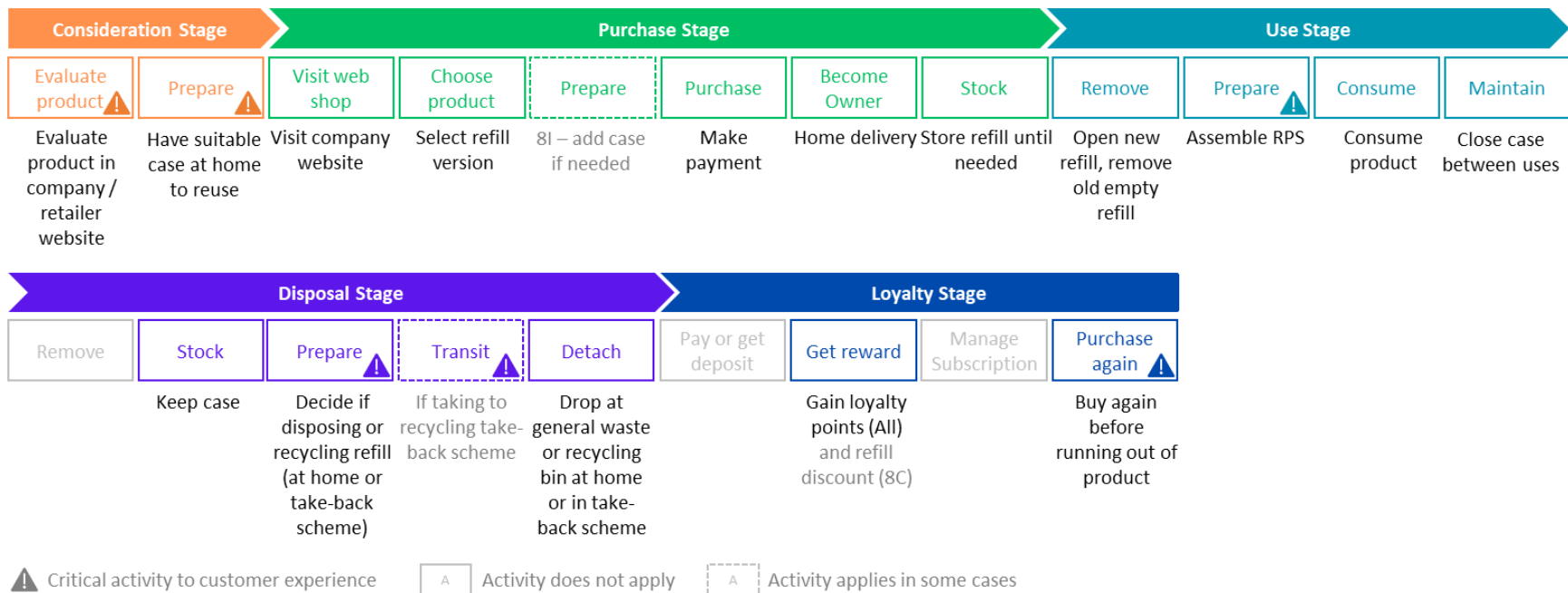


Figure 23. CJM model for refill-at-home and placing refill method.

Mapping is based on companies' or retailers' websites (Boots, n.d.; Eucerin, n.d.; The Body Shop, n.d.-c, n.d.-a, n.d.-b; Zao, n.d.-a, n.d.-b).

	Consider.	Purchase	Use	Disposal	Loyalty
<b>Technical Solutions</b>					
Possible to buy from retailers	3I, 8C	3I, 8C			3I, 8C
Refill version with discount on PAYG	8C	8C			8C
Incentives (other than discounts) on PAYG	X	X			X
Customer reviews on RPS product	X	X			
My favorites or purchased before list	3I				3I
Search function to find retailers selling the product	3I, 8C				
Delivery of RPS among rest of groceries	3I	3I			
Recycling take-back scheme from company / retailer	3I			3I	
<b>Information Solutions</b>					
Information about how RPS works	X	X	X	X	
Video showing how RPS operates	8C	8C	8C		
Instructions for how to assemble or refill RPS	3I, 8I	3I, 8I	3I, 8I		
Information about environmental benefits of RPS solution	X	3I, 8C			
Information about necessary and suitable resources needed to operate RPS	X	X			
Information that product is refillable, returnable or reusable	X	X			
Certification on positive impact from product or company	8I, 8C				
Request consumers to check local recycling rules	3I, 8I				3I, 8I
Regular version references refill version	8C	8C			

Figure 24. CJM interventions in refill at home with placing refill method.

*X means all products included in the intervention, and sample code means some products included in the intervention. The interventions were allocated based on how these would support activities in each stage (Boots, n.d.; Eucerin, n.d.; The Body Shop, n.d.-c, n.d.-a, n.d.-b; Zao, n.d.-a, n.d.-b).*


## CJM Model for Refill at Home With Diluting Refill Method

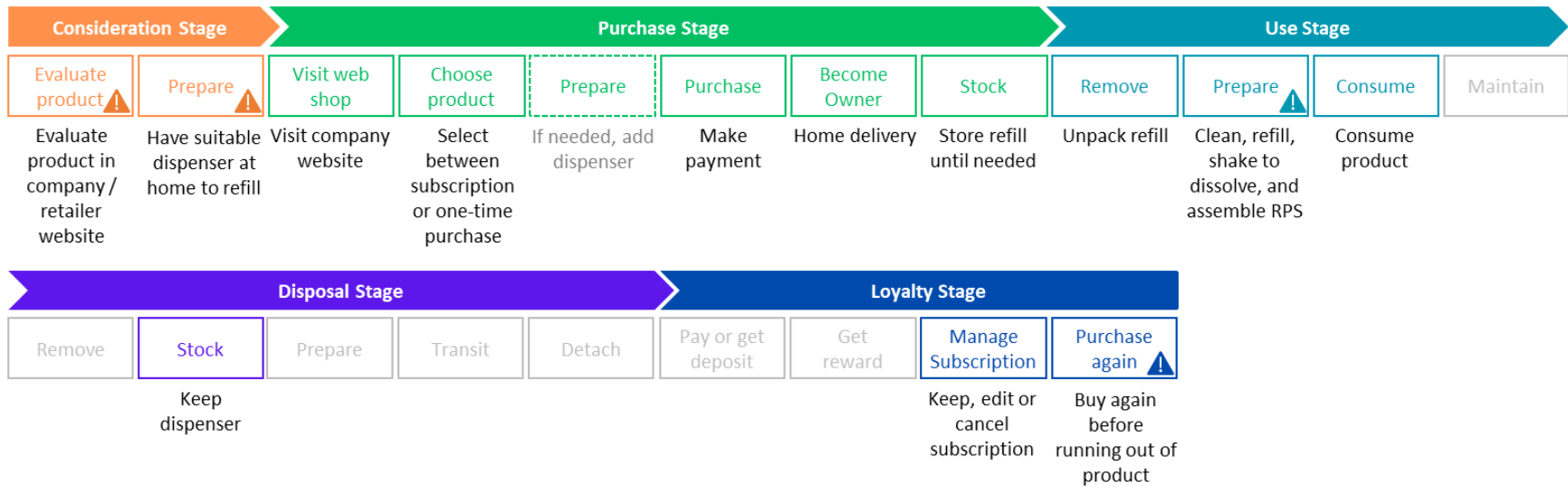
Sample product 10C - OceanSaver Kitchen Cleaner Ecodrop operates with a concentrated cleaning product that can be diluted with water. Figure 25 shows the CJM for 10C (OceanSaver, n.d.-b, n.d.-a, n.d.-c), which has the least activities compared to other CJM models. Figure 26 shows the interventions identified across the CJM.

When purchasing 10C through OceanSaver's website, consumers can subscribe with automatic reordering and a 1£ discount compared to pay-as-you-go. Alternatively, consumers could opt to buy this product via a retailer if that would be more convenient, as it is possible to receive it with other groceries. Consumers need a suitable dispenser to reuse at home or purchase a new one.

For this study, 10C was researched on the company website. The website highlights that the ecodrops are easy to use and provides simple instructions to dissolve the ecodrops in water and then assemble the RPS. OceanSaver also mentions the environmental benefits of RPS such as plastic free and eco-friendly. They also emphasize that six ecodrops equal 6 avoided plastic bottles and that their customers have collectively saved over 2 million bottles to date. As Long et al. (2022) suggested, this could help consumers understand the difference their efforts can make when using RPS.

Unlike other CJM models, consumers do not need to recycle or dispose of empty refill packaging, making it easier for them. The only activity in the disposal stage is to keep the dispenser until the subsequent use. This CJM model includes interventions that could help consumers switch to RPS, such as automatic reordering, the possibility of reusing any suitable dispenser at home, and the dissolvable ecodrops.

Reuse Model	Type of Reusable Packaging	Reuse behavior	Refill method	Sample Products
Refill at home	Refillable parent packaging	Exclusive reuse	Diluting	 10C - Ocean Saver Kitchen Cleaner Ecodrop



 Critical activity to customer experience    
  Activity does not apply    
  Activity applies in some cases

Figure 25. CJM model for refill-at-home with diluting refill method.

Mapping based on the company's website (OceanSaver, n.d.-b, n.d.-a, n.d.-c).



	Consider.	Purchase	Use	Disposal	Loyalty
<b>Technical Solutions</b>					
Possible to buy from retailers	X	X			X
Subscription with automatic reordering and financial incentives	X	X			X
Customer reviews on RPS product	X	X			
Possible to repurpose any existing packaging	X	X	X		
<b>Information Solutions</b>					
Information about how RPS works	X	X	X		
Instructions for cleaning RPS at home	X	X	X		
Instructions for how to assemble or refill RPS	X	X	X		
Information about the personal positive impact from changing behavior	X	X			
Information about environmental benefits of RPS solution	X	X			
Information about necessary and suitable resources needed to operate RPS	X	X			
Information that product is refillable, returnable or reusable	X	X			
Certification on positive impact from product or company	X				

Figure 26. CJM interventions in refill at home with diluting refill method.

*X means all products included in the intervention, and sample code means some products included in the intervention. The interventions were allocated based on how these would support activities in each stage (OceanSaver, n.d.-b, n.d.-a, n.d.-c).*

## CJM Model for Refill at Home With Pouring Refill Method

This CJM model (Figure 27) includes nine sample products, the most products compared to other models. These RPS products operate with refill at home and provide consumers with refill pouches, containers, or bottles for refill (Amazon, n.d.; Cif, n.d.; Ecover, n.d.-c, n.d.-a, n.d.-b; Experimental Perfume Club, n.d.-a, n.d.-b; Johnson's, n.d.-b, n.d.-a; Lancôme UK, n.d.; L'Occitane, n.d.-c, n.d.-a, n.d.-b; Naif, n.d.; Nescafe, n.d.-b, n.d.-a; Notino, n.d.; Palmolive, n.d.-a, n.d.-b; Sainsbury's, n.d.; Tesco, n.d.-a, n.d.-b).

Figure 28 shows the interventions identified across the CJM. All the RPS products had a regular version available; companies need to help consumers identify that there is a refill version for their regular FMCG products. Otherwise, consumers might not become aware of the refill version being available.

Many of the products allowed consumers to repurpose any existing packaging suitable to refill at home, except for the refill perfumes (7I and 7C) and Cif Ecorefill (10I). L'Occitane (6I) was the only RPS in this group with a take-back scheme, which enabled consumers to request a free return envelope when purchasing refills and use the envelope to return empties for recycling. Regarding payment methods, Cif Ecorefill (10I) was the only RPS offering subscription, however this was enabled because of the retailer. If consumers purchased 10I from another retailer, the subscription might not be available.

One of the critical activities for consumers to overcome is the decision of how to dispose of the refill packaging after use. However, only some products were marked as recyclable on the website (2I, 4I, 5I, 6I, 9I, 10I) or included instructions on recycling (2I, 5I, 6I, 9I). The lack of information on recycling can hinder consumer adoption of RPS, as consumers would still need to manage the waste from the refill packaging.

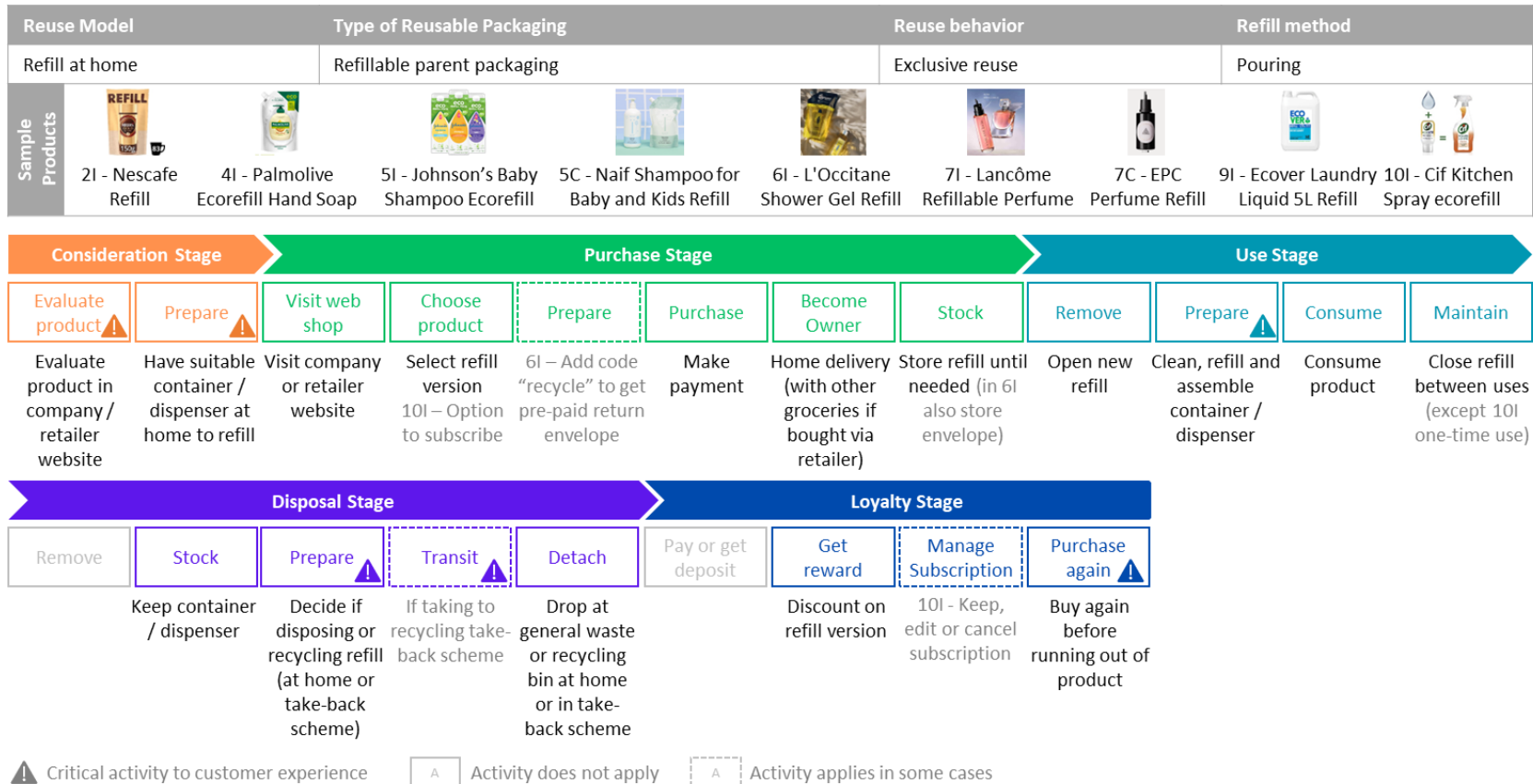


Figure 27. CJM model for refill-at-home with pouring refill method.

Mapping based on companies' and retailers' websites (Amazon, n.d.; Cif, n.d.; Ecover, n.d.-c, n.d.-a, n.d.-b; Experimental Perfume Club, n.d.-a, n.d.-b; Johnson's, n.d.-b, n.d.-a; Lancôme UK, n.d.; L'Occitane, n.d.-c, n.d.-a, n.d.-b; Naif, n.d.; Nescafe, n.d.-b, n.d.-a; Notino, n.d.; Palmolive, n.d.-a, n.d.-b; Sainsbury's, n.d.; Tesco, n.d.-a, n.d.-b).

	Consider.	Purchase	Use	Disposal	Loyalty
<b>Technical Solutions</b>					
Possible to buy from retailers	All but 7C	All but 7C			All but 7C
Refill version with discount on PAYG	X	X			
Subscription with automatic reordering	10I				
Customer reviews on RPS product	X	X			
My favorites or purchased before list					2I, 4I, 5I, 5C, 10I
Search function to find retailers selling the product	2I, 4I, 5I, 9I				
Delivery of RPS among rest of groceries	All but 7C				
Free return label or envelop provided with delivery	6I				
Recycling take-back scheme from company / retailer	6I				
Possible to repurpose any existing packaging	2I, 4I, 5I, 5C, 6I, 9I	2I, 4I, 5I, 5C, 6I	2I, 4I, 5I, 5C, 6I, 9I		
<b>Information Solutions</b>					
Information about how RPS works	All but 9I	All but 9I			
Video showing how RPS operates	5I		5I		
Instructions for return process	6I			6I	
Instructions for how to assemble or refill RPS	5I, 7I, 10I	5I, 7I, 10I	5I, 7I, 10I		
Instruction for how to recycle (at home or out of home)	2I, 5I, 6I, 9I			2I, 5I, 6I, 9I	
Information about the personal positive impact from changing behavior	5I				
Information about environmental benefits of RPS solution	All but 7I	All but 7I, 7C			
Information about benefits of take-back scheme (for reuse or recycling)	2I, 6I	6I			
Information about necessary and suitable resources needed to operate RPS	2I, 4I, 5I, 5C, 7C, 10I	2I, 4I, 7C, 10I			
Information that product is refillable, returnable or reusable	X	X			
Certification on positive impact from product or company	5C, 6I, 7C, 9I	X			
Request consumers to check local recycling rules	5I	X		5I	
Regular version references refill version	All but 2I, 4I	6I, 7I, 7C, 9I, 10I			

Figure 28. CJM interventions in refill at home with pouring refill method.

*X means all products included in the intervention, and sample code means some products included in the intervention. The interventions were allocated based on how these would support activities in each stage (Amazon, n.d.; Cif, n.d.; Ecover, n.d.-c, n.d.-a, n.d.-b; Experimental Perfume Club, n.d.-a, n.d.-b; Johnson's, n.d.-b, n.d.-a; Lancôme UK, n.d.; L'Occitane, n.d.-c, n.d.-a, n.d.-b; Naif, n.d.; Nescafe, n.d.-b, n.d.-a; Notino, n.d.; Palmolive, n.d.-a, n.d.-b; Sainsbury's, n.d.; Tesco, n.d.-a, n.d.-b).*

## Understanding the Target Behavior

Considering the literature review around the UK consumer and the information from the sample of RPS products selected, this section focuses on understanding the behavior context and what barriers or enablers could affect change.

### Defining the Problem in Behavioral Terms

The success and scalability of RPS solutions to reduce plastic packaging waste depend on consumer adoption (Long et al., 2022; Miao et al., 2023; WEF, 2021). Currently, consumers prefer to recycle or dispose packaging, instead of reuse (Greenwood et al., 2021). Consumers are interested in RPS solutions (WRAP UK, 2022a), but companies should address barriers to adoption (WEF, 2021). The barriers identified from the literature review are understanding of RPS benefits, convenience, affordability, hygiene, and infrastructure accessibility. Consumers should be provided with equal or superior consumer experience over disposable alternatives, and the rise of e-commerce can be favorable for adoption (WEF, 2021). This research focused on how companies help UK consumers adopt RPS solutions by addressing the barriers identified in the online customer experience. The reuse models in scope are refill at home, return from home, and return on the go, as those can be purchased online.

### Selecting the Target Behavior

Behaviors exist as part of a system in the context of other behaviors (Michie et al., 2014). Regarding adopting RPS, the consumer decides to purchase the RPS solution, not just the first time but regularly. The target behavior selected is for UK consumers to switch their FMCG products to reusable packaging alternatives. By using the word

“switch,” I considered that the consumers become regular users of RPS solutions. In the e-commerce setting, this is influenced by the information present when consumers evaluate the product, the activities they need to perform to purchase, use, and dispose of the RPS, and the infrastructure to support them in maintaining their behavior.

### Specifying the Target Behavior

The selected target behavior is further detailed to understand the context and changes needed for the behavior to occur (Table 12).

Table 12. Specifying the target behavior.

Target behavior	UK consumers switch their FMCG products to reusable packaging alternatives.
Who needs to perform the behavior?	UK consumers identified as early adopters of reuse, who do at least half their shopping online and are motivated by environmental concerns. Their shopping habits are affected by convenience, pricing, and social influences (WRAP UK, 2021)
What do they need to do differently to achieve the desired change?	<ul style="list-style-type: none"> <li>• They need to decide to reuse instead of discarding or recycling single-use FMCG products.</li> <li>• They need to know where and how to buy the RPS.</li> <li>• They need to know how the RPS operates.</li> <li>• They need to maintain the RPS in good condition.</li> <li>• They need the opportunity to access reuse infrastructure.</li> <li>• They need to be willing to change their buying and payment habits.</li> </ul>
When do they need to do it?	When they need to buy a new FMCG product.
Where do they need to do it?	<ul style="list-style-type: none"> <li>• They buy the RPS FMCG product on any device with access to the internet (mobile phones, tablets, computers).</li> <li>• They use the RPS product at home.</li> </ul>
How often do they need to do it?	Regularly, every time they run out of FMCG products at home.
With whom do they need to do it?	On their own

*Prepared by author based on the literature review.*

## Understanding the Target Behavior and What Needs to Change

Michie et al. (2014) highlighted the importance of analyzing the behavior as a system to promote the target behavior and discourage competing behaviors. I considered recycling as a competing behavior since it is a normalized behavior among UK consumers and can impact reuse adoption (WRAP UK, 2021).

After completing the behavioral diagnosis based on the COM-B components, I identified nineteen behavior requirements (Table 13), which describe what needs to happen for the target behavior to occur. There is no need to change for two of them, so seventeen behavior requirements are further analyzed in this research.

Based on this, psychological capability, physical opportunity, social opportunity, automatic motivation, and reflective motivation need to change for UK consumers to switch their FMCG products to reusable packaging alternatives. The COM-B model highlights how the components of behavior affect each other and the target behavior (Michie et al., 2014). In this case, the behavioral analysis shows that capability, opportunity, and motivation all need to be addressed to achieve change (Figure 29). Regarding the RPS engagement factors, all five factors are addressed in the behavioral analysis, with convenience having the most behavior requirements (Figure 30).

After identifying what needs to happen for the target behavior to occur, the next step is to analyze the temporal sequence in which these barriers or enablers are presented across the CJM and determine which interventions are in place that address the behavior requirements.

Table 13. Behavioral diagnosis of the target behavior.

COM-B Component	What needs to happen for the target behavior to occur? (Behavior requirements)	Is there a need for change?	Factor	Applicable Intervention Function
Physical Capability	Have the physical skills, strength, or stamina to switch to the RPS	No, the literature review does not suggest gaining physical capability as a barrier or enabler of adoption.		
Psychological Capability	Know about environmental issues related to plastic packaging	No, the target audience is early adopters, already motivated by environmental concerns (WRAP UK, 2021).	Understanding of RPS benefits	
Psychological Capability	Know about the benefits of switching to RPS.	Yes, Companies need to improve communication with consumers about the benefits of buying RPS (EMF, 2019) and the difference their efforts can make (Long et al., 2022). Third-party certifications can enhance reliability and help compare against other products (Di Iorio et al., 2023)	Understanding of RPS benefits	Education, training, enablement
Psychological Capability	Know that there are RPS alternatives to cover their needs	Yes, the perceived lack of availability and choices on RPS alternatives is a barrier to adoption (WRAP UK, 2021).	Convenience	Education, training, enablement
Psychological Capability	Know how to use the RPS.	Yes, consumers need to learn how to operate the RPS and carry out additional activities compared to regular products (Long et al., 2022; Muranko et al., 2021; WEF, 2021; Zeeuw van der Laan & Aurisicchio, 2019)	Convenience	Education, training, enablement



COM-B Component	What needs to happen for the target behavior to occur? (Behavior requirements)	Is there a need for change?	Factor	Applicable Intervention Function
Psychological Capability	Know how and when to reuse, refill, return, or recycle the RPS.	Yes, depending on the reuse model, the parent or refill packaging can be recycled, reused, or returned. Additionally, this is a way to dissuade discarding in general waste or recycling as competing behaviors (Greenwood et al., 2021; WRAP UK, 2023a).	Convenience	Education, training, enablement
Psychological Capability	Know about the costs associated and incentives to switch to RPS	Yes, customers need to understand the affordability of RPS, including cost savings, price comparison, or incentives (Long et al., 2022; Miao et al., 2023; Muranko et al., 2021; WRAP UK, 2021; Zeeuw van der Laan & Aurisicchio, 2019)	Affordability	Education, training, enablement
Psychological Capability	Know about the hygiene standards of RPS and which actions need to be carried out to keep it in good condition.	Yes, perception of hygiene standards could influence adoption (Long et al., 2022; Miao et al., 2023).	Hygiene	Education, training, enablement
Psychological Capability	Know where the drop-off or collection points are located	Yes, lack of awareness of locations is a barrier to adoption (WRAP UK, 2021)	Infrastructure accessibility	Education, training, enablement
Physical Opportunity	Have easier access to RPS, with solutions that help save time, reduce effort, and provide necessary resources.	Yes, RPS requires more effort, resources, and time to operate RPS (Miao et al., 2023). For example, time to clean RPS or space to stock RPS products (Muranko et al., 2021; Zeeuw van der Laan & Aurisicchio, 2019)	Convenience	Training, restriction, environmental restructuring, enablement

COM-B Component	What needs to happen for the target behavior to occur? (Behavior requirements)	Is there a need for change?	Factor	Applicable Intervention Function
Physical Opportunity	Have access to mechanisms that incentive to switch to RPS	Yes, mechanisms like incentives, deposits, penalties, and payment methods can encourage the adoption of reuse (Muranko et al., 2021)	Affordability	Training, restriction, env. restructuring, enablement
Physical Opportunity	Be prompted to clean and maintain RPS in good conditions	Yes, consumers and/or companies are responsible for preparing and recovering for reuse (Muranko et al., 2021).	Hygiene	Training, restriction, env. restructuring, enablement
Physical Opportunity	Have access to convenient locations for drop-off or collection for reuse or recycling.	Yes, lack of access to necessary infrastructure limits adoption of RPS (Miao et al., 2023)	Infrastructure accessibility	Training, restriction, env. restructuring, enablement
Social Opportunity	Influenced by positive experiences with the RPS from other consumers	Yes, consumer acceptance can improve if they learn about convenient RPS alternatives (WEF, 2021) and that more people around them use RPS (WRAP UK, 2021). This can also help against recycling behavior as a normalized behavior (WRAP UK, 2021)	Understanding of RPS benefits	Restriction, environmental restructuring, modeling, enablement
Automatic Motivation	Build established routines and habits for RPS.	Yes, consumers need to establish routines around RPS to carry out the activities required for reuse (Long et al., 2022; Muranko et al., 2021; WEF, 2021; Zeeuw van der Laan & Aurisicchio, 2019)	Convenience	Persuasion, incentivization, coercion, training, env. restructuring, modeling, enablement

COM-B Component	What needs to happen for the target behavior to occur? (Behavior requirements)	Is there a need for change?	Factor	Applicable Intervention Function
Automatic Motivation	Financially incentivized to switch to RPS products	Yes, financial benefits and cost savings are important for consumer motivation (Long et al., 2022)	Affordability	Persuasion, incentivization, coercion, training, env. restructuring, modeling, enablement
Reflective Motivation	Believes that using RPS helps reduce plastic waste	Yes, motivation is key to changing consumption patterns, and highlighting the environmental benefits of RPS can improve RPS adoption (Long et al., 2022).	Understanding of RPS benefits	Education, persuasion, incentivization, coercion
Reflective Motivation	Believes that proper maintenance, cleaning, and preparation of RPS can keep the packaging in good condition for reuse and avoid messy situations	Yes, consumers and/or companies are responsible for preparing and recovering for reuse (Muranko et al., 2021). Consumers should trust the process keeps the RPS clean for sequential users. Hygiene concerns could trigger earlier packaging replacement (Long et al., 2022; Miao et al., 2023).	Hygiene	Education, persuasion, incentivization, coercion
Reflective Motivation	Believes that making an effort to take back empty packaging for reuse or recycling is better for the environment.	Yes, consumers are motivated if they believe take-back schemes help reduce waste and ensure the packaging is on a reliable recovery route (Long et al., 2022; WRAP UK, 2021). Difficulties in recycling at home or accessing drop-off locations can result in incorrect disposal (Muranko et al., 2021).	Infrastructure accessibility	Education, persuasion, incentivization, coercion

*Prepared by author based on background review and results on prior sections. Used Michie et al. (2014) methods.*

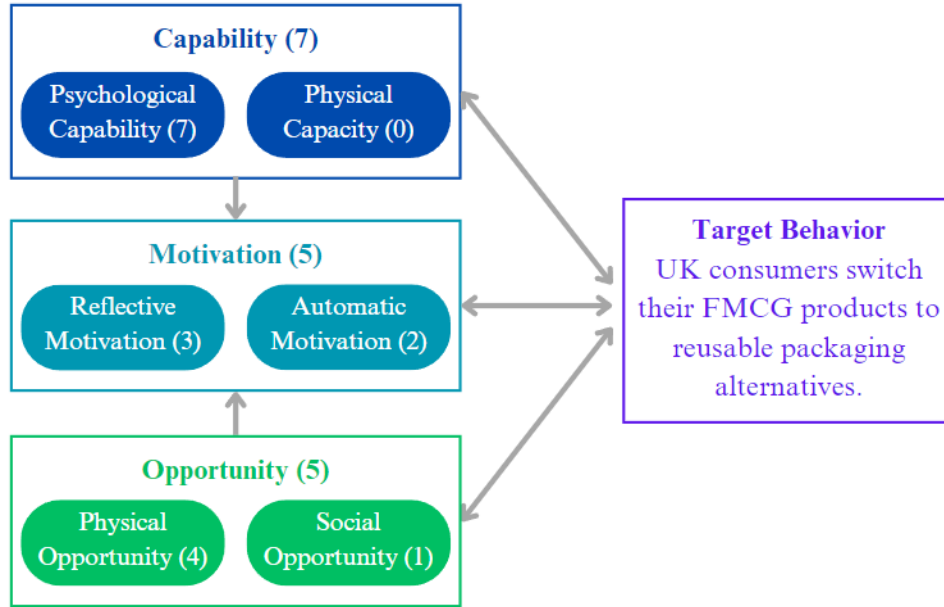


Figure 29. Summary of behavioral diagnosis based on COM-B components.

*The COM-B model (Michie et al., 2014) was applied to this analysis. The numbers in brackets are the number of behavior requirements.*

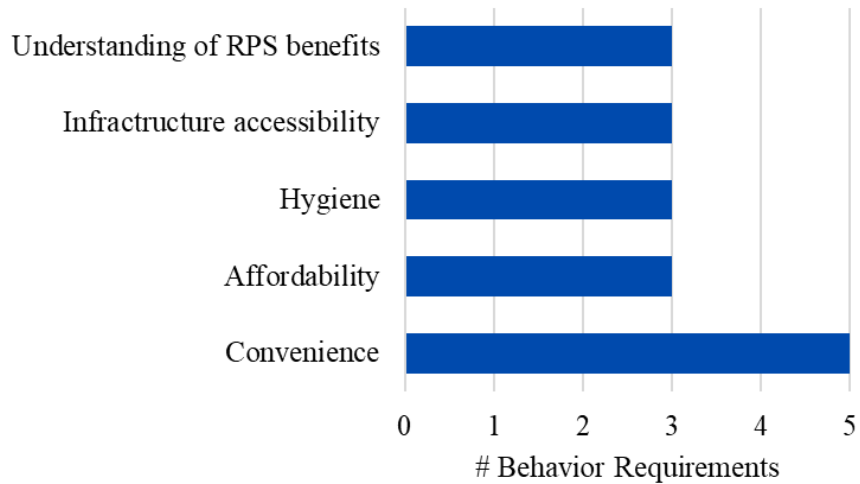


Figure 30. Summary of behavioral diagnosis based on RPS engagement factors.

## Combining the CJM and BCW Analysis

The five hypotheses from this research were analyzed based on the results from the scorecard combining the CJM and the BCW.

### Comparison Between Incumbent and Challenger RPS products

The literature review revealed a lack of research on how the different approaches from incumbent and challenger companies impact the customer journey design to enable consumers to switch to RPS products. My first hypothesis predicted that RPS products from challenger FMCG companies are better (higher scorecard rating) than RPS products from incumbent companies at enabling consumers to adopt reuse behaviors. Distributions of the scorecard ratings for RPS products from incumbent and challenger companies were not similar, as assessed by visual inspection. Therefore, a Mann-Whitney U test was run to determine if there were differences in scorecard ratings between RPS products from incumbent and challenger companies. Scorecard ratings for RPS challenger products (mean rank = 13.3) were significantly higher than for RPS incumbent products (mean rank = 7.8) ( $U = 77.5$ ,  $z = -2.04$ ,  $p = 0.0207$ ) (Table 14, Figure 31).

This result means that RPS challenger products have interventions across the customer journey that are more likely to be effective at enabling consumers to switch to RPS products. In the following sections, I analyzed in more detail what differences are driving this result. The top five products by scorecard rating are RPS products from challenger companies: 9C - Minimal Laundry Liquid Bulk Refill, 10C - Ocean Saver Kitchen Cleaner Ecodrop, 4C - Bower Natural Hand Wash Refill, 3C - UpCircle Beauty Return + Refill Night Cream, and 6C - Beauty Kitchen Body Wash. Incumbent companies have a low adoption of reuse models, and most RPS offerings are either pilots

or exploratory products (WRAP UK, 2022b). By comparing to the challenger companies, who incorporate circularity as a business differentiator (Zucchella et al., 2022), it is possible to draw conclusions and learnings to scale up RPS products.

Table 14. Scorecard comparison between incumbent and challenger RPS products.

Pair	Incumbents	Challengers
1	0.67	0.57
2	0.41	0.52
3	0.40	0.75
4	0.32	0.76
5	0.48	0.38
6	0.56	0.72
7	0.25	0.28
8	0.25	0.36
9	0.37	0.81
10	0.36	0.80
Mean	0.41	0.59
Standard Deviation	0.13	0.20

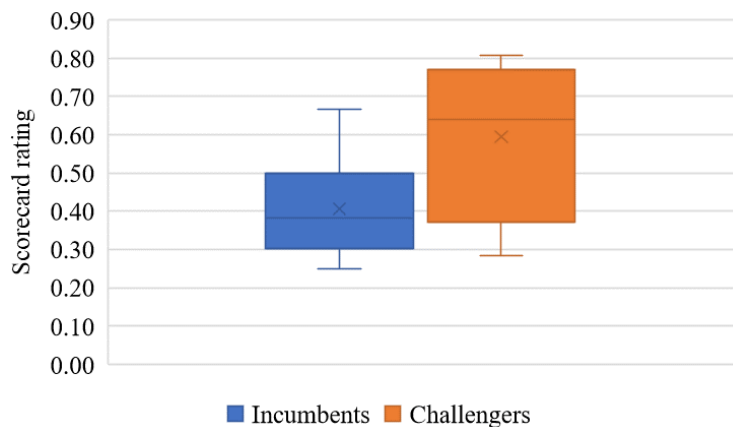


Figure 31. Box-plots of the rating of incumbent and challenger RPS products.

*The box-plots show the distribution of both samples, including the minimum, first quartile, median, third quartile, and maximum scorecard values.*

## Analyzing the Factors Associated with Consumer Engagement

Five factors were associated with RPS consumer engagement: understanding of RPS benefits, convenience, affordability, hygiene, and infrastructure accessibility. The second hypothesis predicted that RPS products with lower scorecard ratings were more likely to miss addressing one or more factors. This is important to understand as it helps identify which factors are least addressed in the CJM, which would be barriers that companies should improve addressing through interventions.

The results did not support the hypothesis, as two of the top five high scorecard rating products missed one factor, but the products with lower scorecard ratings had more factors missing (Figure 32). Since the highest scorecard rating is 0.81 out of 1, there are gaps to address even in products with higher ratings. From the 20 products in the sample, the least addressed factors were hygiene (missed by 15 products), followed by infrastructure accessibility (missed by nine products) and affordability (missed by four products). All sample products included interventions addressing understanding of RPS benefits and convenience. The difference in factor scores is because not all the products included the same interventions to address each RPS consumer engagement factor.

Table 15 shows the statistical differences in factor scores comparing incumbent and challenger RPS products. Mann-Whitney U tests reveal that the factor scores for understanding of RPS benefits, convenience, and hygiene in challenger RPS products were significantly higher than for incumbent RPS products. This suggests that RPS challenger products have interventions in those three RPS engagement factors that are more likely to be effective at enabling consumers to switch to RPS products.

Company type	Product ID	Sample RPS Product	CJM Model	Score	Understand. RPS benefits	Convenience	Affordability	Hygiene	Infrastr. accessibility	# Missed factors
		<b>Max rating (# behavior requirements)</b>		<b>1.00</b>	<b>3.00</b>	<b>5.00</b>	<b>3.00</b>	<b>3.00</b>	<b>3.00</b>	
Challenger	9C	Miniml Laundry Liquid Bulk Refill	Return on the go + Sequential reuse	0.81	2.75	4.07	2.75	1.67	2.50	0
Challenger	10C	Ocean Saver Kitchen Cleaner Ecodrop	Refill at home + Diluting	0.80	3.00	3.55	2.67	2.00	N/A	0
Challenger	4C	Bower Natural Hand Wash Refill	Return on the go + Sequential reuse	0.76	3.00	3.90	2.67	0.33	3.00	1
Challenger	3C	UpCircle Beauty Return + Refill Night Cream	Return on the go + Exclusive reuse	0.75	2.33	3.17	1.33	3.00	3.00	0
Challenger	6C	Beauty Kitchen Body Wash	Return on the go + Sequential reuse	0.72	3.00	3.33	2.50	0.33	3.00	1
Incumbent	1I	SodaStream Cylinder Gas Refill	Return on the go + Sequential reuse	0.67	2.17	3.33	3.00	0.33	2.50	1
Challenger	1C	Belu Sparking Water Returnable Bottle	Return from home	0.57	1.58	3.87	0.00	1.67	2.50	1
Incumbent	6I	L'Occitane Shower Gel Refill	Refill at home + Pouring	0.56	2.33	2.72	1.50	0.00	3.00	1
Challenger	2C	Worship Instant Coffee Jar	Return from home	0.52	1.17	3.87	0.00	1.33	2.50	1
Incumbent	5I	Johnson's Baby Shampoo Ecorefill	Refill at home + Pouring	0.48	2.33	3.65	1.50	0.00	0.67	2
Incumbent	2I	Nescafe Refill	Refill at home + Pouring	0.41	1.67	2.50	1.50	0.00	1.33	1
Incumbent	3I	Eucerin Night Cream Refill	Refill at home + Placing	0.40	1.67	3.10	0.33	0.00	1.67	2
Challenger	5C	Naif Shampoo for Baby and Kids Refill	Refill at home + Pouring	0.38	2.33	2.55	1.50	0.00	0.00	2
Incumbent	9I	Ecover Laundry Liquid 5L Refill	Refill at home + Pouring	0.37	2.33	2.10	1.50	0.00	0.33	2
Challenger	8C	Zao Refill Matt Lipstick	Refill at home + Placing	0.36	2.33	2.10	1.67	0.00	0.00	2
Incumbent	10I	Cif Kitchen Spray ecorefill	Refill at home + Pouring	0.36	1.67	3.10	1.33	0.00	0.00	2
Incumbent	4I	Palmolive Ecorefill Hand Soap	Refill at home + Pouring	0.32	1.67	2.25	1.50	0.00	0.00	2
Challenger	7C	EPC Perfume Refill	Refill at home + Pouring	0.28	2.33	1.15	1.33	0.00	0.00	2
Incumbent	8I	The Body Shop Lipstick Bullet Refill	Refill at home + Placing	0.25	2.33	1.10	0.50	0.00	0.33	3
Incumbent	7I	Lancome Refillable Perfume	Refill at home + Pouring	0.25	1.00	1.90	1.33	0.00	0.00	2
		<b># Missed factors</b>			<b>0</b>	<b>0</b>	<b>4</b>	<b>15</b>	<b>9</b>	<b>28</b>

Figure 32. Scores per consumer engagement factors for RPS.

The table is sorted from higher to lower scorecard ratings per RPS product, calculated as the sum of the factor scores divided by the total behavior requirements. The factor scores are calculated based on the sum of the result per behavior requirement in each factor (Table 9). If the result per factor is less than 1, it counts as a missed factor.



Table 15. Factor score differences between incumbent and challenger RPS products.

RPS Engagement Factor	Mean rank Incumbent	Mean rank Challenger	U	z	p
Understand. RPS benefits	8.1	12.9	74.0	-1.78	0.0375
Convenience	8.1	12.9	74.0	-1.78	0.0375
Affordability	9.8	11.3	57.5	-0.53	0.2981
Hygiene	7.3	13.8	82.5	-2.42	0.0078
Infrastr. accessibility	8.7	11.5	58.5	-1.06	0.1446

*A Mann-Whitney U test was run to determine if there were differences in each factor scores between incumbent and challenger RPS products. Distributions of the factors scores for incumbent and challenger RPS products were not similar in any of the factors, as assessed by visual inspection. A p-value  $\leq 0.05$  is considered statistically significant (Gotelli & Ellison, 2004).*

### Impact of Interventions Across the CJM

This research divided the customer journey into five stages: Consideration, Purchase, Use, Disposal, and Loyalty. The third hypothesis predicted that RPS products with higher scorecard ratings would have implemented more interventions across all customer journey stages (before, during, and after purchase), particularly in post-purchase when consumers decide if packaging becomes waste or gets reused.

A linear regression was run to understand the relationship between the scorecard rating and the sum of interventions in the CJM of an RPS product. The linear regression established that the sum of interventions in the CJM was statistically and positively correlated to the scorecard rating ( $F(1,18) = 52.21, p < .001$ ). Since the variable coefficients are positive, an increase in the number of interventions across the customer journey is correlated to an increase in the total score. Results further show that 74.3% of the variation in the RPS scorecard rating was explained by the number of interventions found across the CJM (Figure 33).

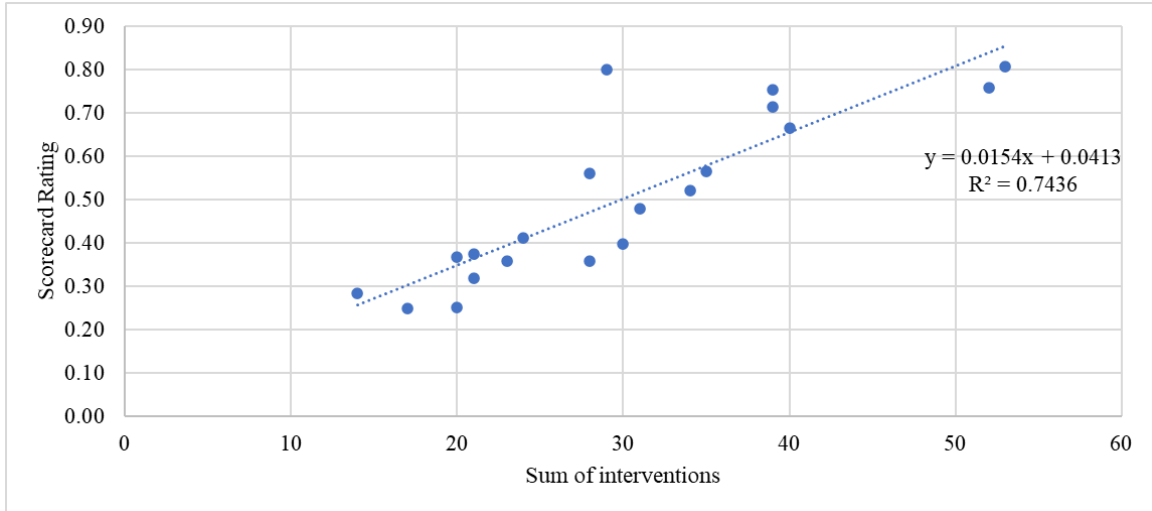


Figure 33. Linear regression between sum of interventions and scorecard rating.

Figure 34 shows a heatmap of the interventions identified per customer journey stage. One intervention can be applied to multiple purchase stages, depending on its suitability to address the activities identified in the CJM. All products included interventions in the considerations and purchase stage. However, some products with lower scores did not implement interventions in some stages, which supports the hypothesis. For some products, some stages are marked as not applicable, mainly because of the characteristics of the reuse model and the critical activities identified in the CJM. The number of interventions could also be related to the complexity of the model; for example, the return on the go model tends to have more interventions applied because it requires higher consumer effort to travel to the drop-off points (EMF, 2019; WEF, 2021).

Product ID	Sample RPS Product	CJM Model	Score	Pre-purchase	Purchase	Post-purchase			Missing Stages	Sum of Interv.	Total Unique
				Consider. Stage	Purchase Stage	Use Stage	Disposal Stage	Loyalty Stage			
9C	Miniml Laundry Liquid Bulk Refill	Return on the go + Sequential reuse	0.81	21	15	5	7	5	0	53	21
10C	Ocean Saver Kitchen Cleaner Ecodrop	Refill at home + Diluting	0.80	12	11	4	N/A	2	0	29	12
4C	Bower Natural Hand Wash Refill	Return on the go + Sequential reuse	0.76	17	15	7	8	5	0	52	19
3C	UpCircle Beauty Return + Refill Night Cream	Return on the go + Exclusive reuse	0.75	14	14	N/A	9	2	0	39	16
6C	Beauty Kitchen Body Wash	Return on the go + Sequential reuse	0.72	14	10	4	7	4	0	39	15
1I	SodaStream Cylinder Gas Refill	Return on the go + Sequential reuse	0.67	16	10	2	7	5	0	40	17
1C	Belu Sparking Water Returnable Bottle	Return from home	0.57	13	9	N/A	8	5	0	35	14
6I	L'Occitane Shower Gel Refill	Refill at home + Pouring	0.56	15	9	1	2	1	0	28	15
2C	Worship Instant Coffee Jar	Return from home	0.52	12	9	N/A	8	5	0	34	13
5I	Johnson's Baby Shampoo Ecorefill	Refill at home + Pouring	0.48	16	8	3	2	2	0	31	17
2I	Nescafe Refill	Refill at home + Pouring	0.41	12	8	1	1	2	0	24	13
3I	Eucerin Night Cream Refill	Refill at home + Placing	0.40	13	9	2	3	3	0	30	13
5C	Naif Shampoo for Baby and Kids Refill	Refill at home + Pouring	0.38	11	7	1	0	2	1	21	12
9I	Ecover Laundry Liquid 5L Refill	Refill at home + Pouring	0.37	11	6	1	1	1	0	20	11
8C	Zao Refill Matt Lipstick	Refill at home + Placing	0.36	12	10	2	1	3	0	28	12
10I	Cif Kitchen Spray ecorefill	Refill at home + Pouring	0.36	11	9	1	0	2	1	23	12
4I	Palmolive Ecorefill Hand Soap	Refill at home + Pouring	0.32	10	8	1	0	2	1	21	11
7C	EPC Perfume Refill	Refill at home + Pouring	0.28	8	6	0	0	0	3	14	8
8I	The Body Shop Lipstick Bullet Refill	Refill at home + Placing	0.25	9	6	2	2	1	0	20	9
7I	Lancome Refillable Perfume	Refill at home + Pouring	0.25	8	7	1	0	1	1	17	8

Figure 34. Heatmap of interventions across the customer journey stages.

List of products sorted from higher to lower score. The table shows the number of interventions applicable per customer journey stage and product. 1C, 2C, and 3C are marked N/A in the Use Stage as these products came ready to use and did not require additional activities in this stage. 10C is marked N/A as it has a diluting refill method, so there is no refill packaging to dispose of. In Product ID, I refers to incumbent companies and C to challenger companies.

## Analyzing the COM-B Components

This section explores how the interventions found in the CJM help address what needs to happen for the target behavior to occur per each COM-B component. There were 17 behavior requirements to review across all products. The BCW theory has the COM-B model at the center of the target behavior analysis, where changing one or more of the capability, opportunity, and motivation components could drive change (Michie et al., 2014). The fourth hypothesis predicted that RPS products with higher scorecard ratings are linked to companies addressing all COM-B components (capability, opportunity, and motivation) instead of only focusing on motivation. This is important to understand as it helps identify which COM-B components are least addressed in the CJM, which would be areas companies could focus on to enable consumers to switch to RPS.

The results do not fully support the hypothesis. One of the top five high scorecard rating products missed addressing one COM-B component. The RPS products with the lower scorecard rating had more factors missing (Figure 35). Surprisingly, motivation was the least addressed of the COM-B components. From the 20 products in the sample, the least addressed COM-B components were reflective motivation (missed by 11 products, automatic motivation (missed by 10 products), physical opportunity (missed by six products), and social opportunity (missed by 1 product). All sample products included interventions addressing psychological capability. This means companies focus more on providing knowledge on RPS to consumers than increasing opportunities to engage with the RPS or supporting consumers to be motivated to switch to RPS. The absence of at least one source of behavior could cause an intention-action gap (Michie et al., 2011).

The results suggest that since companies are not fully addressing motivation or opportunity, this could impact how consumers engage with RPS products.

Table 16 shows the differences in COM-B component scores comparing incumbent and challenger RPS products. Based on the Mann-Whitney U test, the COM-B component scores for psychological capability and reflective motivation in challenger RPS products were statistically significantly higher than for incumbent RPS products. This means that challenger RPS products have interventions in those COM-B components that are more likely to be effective at enabling consumers to switch to RPS products than incumbent RPS products.

Table 16. COM-B component score between incumbent and challenger RPS products.

COM-B Components	Mean rank Incumbent	Mean rank Challenger	U	z	p
Psychological Capability	7.7	13.4	78.5	-2.12	0.017
Physical Opportunity	8.4	12.6	71.0	-1.55	0.061
Social Opportunity	11	10	45.0	0.34	0.367
Automatic Motivation	9.1	11.9	64.0	-1.02	0.154
Reflective Motivation	7.9	13.2	76.5	-1.97	0.024

*A Mann-Whitney U test was run to determine if there were differences in each COM-B component score between incumbent and challenger RPS products. Distributions of the COM-B component scores for incumbent and challenger RPS products were not similar in any of the COM-B components, as assessed by visual inspection. A p-value  $\leq 0.05$  is considered statistically significant (Gotelli & Ellison, 2004).*

Product ID	Sample RPS Product	CJM Model	Score	Psychological Capability	Physical Opportunity	Social Opportunity	Automatic Motivation	Reflective Motivation	# missed COM-B components
	<b>Max rating (# behavior requirements)</b>		<b>1.00</b>	<b>7.00</b>	<b>4.00</b>	<b>1.00</b>	<b>2.00</b>	<b>3.00</b>	
9C	Miniml Laundry Liquid Bulk Refill	Return on the go + Sequential reuse	0.81	6.42	3.57	1.00	1.50	1.25	0
10C	Ocean Saver Kitchen Cleaner Ecodrop	Refill at home + Diluting	0.80	5.47	2.25	1.00	1.50	1.00	0
4C	Bower Natural Hand Wash Refill	Return on the go + Sequential reuse	0.76	5.83	2.57	1.00	1.50	2.00	0
3C	UpCircle Beauty Return + Refill Night Cream	Return on the go + Exclusive reuse	0.75	5.50	3.17	1.00	0.50	2.67	1
6C	Beauty Kitchen Body Wash	Return on the go + Sequential reuse	0.72	5.33	2.33	1.00	1.50	2.00	0
1I	SodaStream Cylinder Gas Refill	Return on the go + Sequential reuse	0.67	5.67	2.67	1.00	1.00	1.00	0
1C	Belu Sparking Water Returnable Bottle	Return from home	0.57	4.60	2.60	1.00	0.67	0.75	2
6I	L'Occitane Shower Gel Refill	Refill at home + Pouring	0.56	4.32	2.07	1.00	0.50	1.67	1
2C	Worship Instant Coffee Jar	Return from home	0.52	4.60	2.60	0.00	0.67	1.00	2
5I	Johnson's Baby Shampoo Ecorefill	Refill at home + Pouring	0.48	4.38	1.10	1.00	1.00	0.67	1
2I	Nescafe Refill	Refill at home + Pouring	0.41	2.57	1.10	1.00	1.00	1.33	0
3I	Eucerin Night Cream Refill	Refill at home + Placing	0.40	3.18	1.75	1.00	0.50	0.33	2
5C	Naif Shampoo for Baby and Kids Refill	Refill at home + Pouring	0.38	2.82	0.90	1.00	1.00	0.67	2
9I	Ecover Laundry Liquid 5L Refill	Refill at home + Pouring	0.37	3.00	1.10	1.00	0.50	0.67	2
8C	Zao Refill Matt Lipstick	Refill at home + Placing	0.36	3.18	0.75	1.00	0.50	0.67	3
10I	Cif Kitchen Spray ecorefill	Refill at home + Pouring	0.36	2.52	0.75	1.00	1.50	0.33	2
4I	Palmolive Ecorefill Hand Soap	Refill at home + Pouring	0.32	1.98	1.10	1.00	1.00	0.33	1
7C	EPC Perfume Refill	Refill at home + Pouring	0.28	2.15	0.50	1.00	0.50	0.67	3
8I	The Body Shop Lipstick Bullet Refill	Refill at home + Placing	0.25	2.60	0.00	1.00	0.00	0.67	3
7I	Lancome Refillable Perfume	Refill at home + Pouring	0.25	1.98	0.75	1.00	0.50	0.00	3
		<b># missed COM-B components</b>		<b>0</b>	<b>6</b>	<b>1</b>	<b>10</b>	<b>11</b>	<b>28</b>

Figure 35. Scores per COM-B component for RPS.

The table is sorted from higher to lower scorecard ratings. There were 17 behavior requirements identified in the BCW. 10C has 14 behavior requirements instead of 17 because infrastructure accessibility is not applicable. The COM-B component scores are calculated based on the sum of the result per behavior requirement in each COM-B Component (Table 9). If the COM-B component score is less than 1, it counts as a missed factor. In Product ID, I refers to incumbent and C to challenger companies.

## Analyzing the Presence of Intervention Functions

The intervention functions are the generic categories of means by which an intervention can change behavior, and the behavior change techniques (BCTs) are a taxonomy for describing interventions (Michie et al., 2014). The fifth hypothesis predicted that education, persuasion, incentives, and enablement are FMCG companies' most common intervention functions in the customer journey of RPS products. To examine this, all the 35 interventions identified in the CJM were assigned their BCTs and the intervention function. One intervention can have multiple BCTs and intervention functions. Figure 36 shows the distribution of the intervention functions in the sample. Table 17 shows the intervention functions found per product for all the samples.

Figure 36 shows that all intervention functions, except restriction, were found in the CJM of the sample products: education (30%), enablement (22%), persuasion (15%), training (13%), environmental restructuring (13%), incentivization (5%), modeling (1%), and coercion (<1%). Table 17 shows how many products had at least one intervention in the intervention function. In this case, education, persuasion, training, environmental restructuring, and enablement are present in all the RPS sample products. Incentivization is present in 18 observations, followed by modeling in 5 observations, and coercion in 1 observation. Table 18 shows the 23 BCTs identified in this research and their applicable intervention functions. 82% of the BCTs involve 11 BCTs, mainly focused on education and enablement.

These results support the hypothesis, as education, enablement, persuasion, and incentivization are common intervention functions. However, results also show that training and environmental restructuring are interventions found in the RPS. Training

supports psychological capability, physical opportunity, and automatic motivation. Training interventions help gain new skills (Michie et al., 2014), so in this case, they help consumers learn how to operate the RPS system. Environmental Restructuring supports physical opportunity, social opportunity, and automatic motivation. It refers to changes in the physical or social context (Michie et al., 2014) that companies can implement to enable consumers to switch to RPS and prevent competing behavior like recycling or disposing. These results show that companies use various intervention functions to support consumers adopting RPS products.

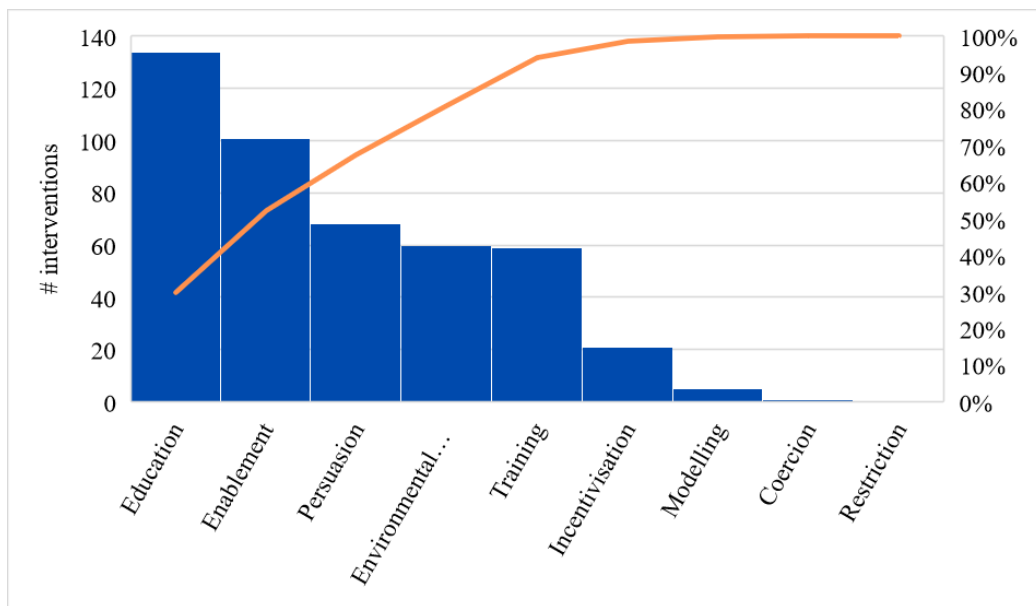


Figure 36. Distribution of intervention functions in the sample.

*The distribution is based on the total number of interventions in each intervention function identified.*



Table 17. Intervention functions in the sample.

Product ID	Sample RPS Product	Education	Persuasion	Incentivisation	Coercion	Training	Restriction	Environmental Restructuring	Modelling	Enablement
1I	SodaStream Cylinder Gas Refill	8	4	2	1	3	0	3	0	7
1C	Belu Sparking Water Returnable Bottle	4	3	0	0	5	0	3	0	7
2I	Nescafe Refill	6	3	1	0	2	0	3	0	6
2C	Worship Instant Coffee Jar	4	3	0	0	5	0	3	0	6
3I	Eucerin Night Cream Refill	5	2	1	0	2	0	4	0	6
3C	UpCircle Beauty Return + Refill Night Crea	9	5	1	0	4	0	4	1	4
4I	Palmolive Ecorefill Hand Soap	5	2	1	0	1	0	3	0	6
4C	Bower Natural Hand Wash Refill	9	6	1	0	5	0	3	1	7
5I	Johnson's Baby Shampoo Ecorefill	7	3	1	0	4	0	4	1	7
5C	Naif Shampoo for Baby and Kids Refill	7	3	1	0	1	0	4	0	5
6I	L'Occitane Shower Gel Refill	7	4	1	0	3	0	5	0	6
6C	Beauty Kitchen Body Wash	9	6	1	0	3	0	2	0	5
7I	Lancome Refillable Perfume	4	1	1	0	2	0	3	0	3
7C	EPC Perfume Refill	7	3	1	0	1	0	2	0	1
8I	The Body Shop Lipstick Bullet Refill	6	3	1	0	2	0	1	0	1
8C	Zao Refill Matt Lipstick	8	3	2	0	2	0	2	1	3
9I	Ecover Laundry Liquid 5L Refill	6	3	1	0	1	0	3	0	5
9C	Miniml Laundry Liquid Bulk Refill	10	5	2	0	6	0	3	1	8
10I	Cif Kitchen Spray ecorefill	6	2	1	0	3	0	4	0	5
10C	Ocean Saver Kitchen Cleaner Ecodrop	7	4	1	0	4	0	1	0	3
# Total Interventions		134	68	21	1	59	0	60	5	101
# Products		20	20	18	1	20	0	20	5	20

*The table shows the count of interventions in each intervention function identified per product and how many products had at least one intervention in each intervention function. In Product ID, I refers to incumbent companies and C to challenger companies.*

Table 18. Behavior change techniques (BCTs) in the sample.

BCT Number	BCT Label	Count	%	Education	Persuasion	Incentivisation	Coercion	Training	Restriction	Environmental Restructuring	Modelling	Enablement
BCT 4.1	Instruction on how to perform a behavior	50	13%					✓				
BCT 7.1	Prompts/cues	49	13%	✓						✓		
BCT 5.3	Information about social and environmental consequences	40	11%	✓	✓							
BCT 1.2	Problem solving	31	8%									✓
BCT 8.2	Behaviour substitution	21	6%									✓
BCT 10.1	Material incentive (behavior)	21	6%	✓								
BCT 10.2	Material reward (behavior)	21	6%			✓						
BCT 12.1	Restructuring the physical environment	20	5%							✓		✓
BCT 1.4	Action planning	19	5%									✓
BCT 6.3	Information about others' approval	19	5%	✓	✓							
BCT 4.2	Information about antecedents	15	4%	✓								
BCT 9.1	Credible source	12	3%		✓							
BCT 12.5	Adding objects to the environment	10	3%							✓		✓
BCT 8.3	Habit formation	9	2%					✓				
BCT 1.1	Goal setting (behavior)	8	2%									✓
BCT 5.6	Information about emotional consequences	6	2%	✓	✓							
BCT 11.2	Reduce negative emotions	6	2%									✓
BCT 6.1	Demonstration of the behavior	5	1%					✓			✓	
BCT 14.6	Situation-specific reward	4	1%			✓						
BCT 2.2	Feedback on behavior	2	1%	✓	✓	✓	✓					
BCT 2.7	Feedback on outcome(s) of behavior	1	0%	✓	✓	✓	✓	✓				
BCT 10.11	Future punishment	1	0%				✓					
BCT 14.2	Punishment	1	0%			✓	✓					✓
Total # BCTs per intervention function				8	6	5	4	4	0	3	1	8

## Chapter IV

### Discussion

This research aimed to understand how FMCG companies enable sustainable consumption behavior with RPS products through the customer journey. I combined the behavior change wheel (BCW) and customer journey mapping (CJM) into a scorecard to rate and analyze 20 RPS products in incumbent and challenger companies. The findings suggest that challenger RPS products better enable consumers to switch to RPS products. However, some companies do not include interventions in all RPS consumer engagement factors, particularly hygiene, infrastructure accessibility, or affordability. Also, companies are not addressing all components of behavior, especially motivation, so this could contribute to the intention-action gap in consumers to switch to RPS.

In this chapter I highlight four implications for how companies present RPS products to consumers and review the results relative to the existing literature. The implications discussed are the diversity of RPS options in the FMCG market, the complexities in the CJM and its impact on consumers, the need for companies to address RPS engagement barriers, and how companies can influence capability, motivation, and opportunity throughout the CJM. Then, I propose recommendations for businesses to improve the customer journey design and support consumer adoption of RPS in FMCG. The chapter ends with suggestions for future research questions and a conclusion.

## Diversity of RPS Options in the Market

Reusing packaging in FMCG products is a relevant solution to reduce plastic waste (EMF, 2022; Long et al., 2022). The choice of RPS characteristics, such as the reuse model (EMF, 2019), type of packaging (Coelho et al., 2020), and reuse system elements (Muranko et al., 2021), plays a significant role in how companies engage consumers to make them active participants in RPS. Companies should carefully decide the RPS characteristics, as it would impact the efforts needed by consumers, retailers, and companies, as well as the design of the customer journey. Some incumbent and challenger companies offer flexibility to consumers by providing different RPS options so the consumers can choose which is more convenient for them.

RPS products in FMCG continue to evolve, as evidenced in this research sample. Based on commonalities in characteristics and CJM, the RPS products were consolidated into six groups: return from home, return on the go with sequential reuse behavior, return on the go with exclusive reuse behavior, and refill at home with three variants for placing, diluting, and pouring refill methods. Two of these can be considered emerging trends, presenting new RPS characteristics combinations.

First, the return on the go model is commonly associated with returnable packaging and sequential reuse behavior (Hesseling, 2022), where multiple users can access the product (Muranko et al., 2021). So, introducing return on the go with exclusive reuse behavior model allows consumers to return their own packaging for refill by the company, which then returns the same packaging to the consumers. This model seems to be an answer to taking refill on the go to online shopping, as it enables companies to

manage the refills in a centralized manner instead of multiple refill stores, while allowing consumers to reuse their own packaging.

Second, the return on the go model with sequential reuse for refill packaging had refillable parent packaging and reusable refill packaging. This was a slight variation in the typical return on the go model, which generally uses returnable packaging and does not rely on refills (Hesseling, 2022). Introducing this variation on the return on the go model seems to respond to the challenge of refill at home models to ensure the refill packaging is reusable, recyclable, or compostable (EMF, 2019). When a refill at home model presents reusable refill packaging, the RPS changes to return on the go for the refill packaging. This shows progress from companies to close the loop with refill packaging, which has remained a challenge as refills often come in disposable packaging (EMF, 2019; WEF, 2021).

### Complexities in the CJM

Companies need to engage with consumers to enable reuse behaviors (Long et al., 2022; Zeeuw van der Laan & Aurisicchio, 2019). The CJM is a representation of the different steps consumers experience with the RPS product and can help identify gaps to improve customer experience (Elizarova & Kahn, 2018; Zeeuw van der Laan & Aurisicchio, 2019). This research used the CJM models corresponding to the six consolidated groups (Figures 17, 19, 21, 23, 25, and 27) and included five stages: consideration, purchase, use, disposal, and loyalty. Companies should consider the sequence of the stages and the number of activities in the CJM to find ways to improve customer experience and prioritize interventions to support critical activities.

The order of the activities and stages could lead to more effort from consumers to learn to operate all these different RPS models. Two of the CJM models operated with a different sequence of stages compared to the others. Return from home requires consumers to purchase the next delivery, as the collection and delivery happen simultaneously. Return on the go with exclusive reuse behavior requests consumers to first purchase the refill and then return the packaging, meaning the consumers must wait for their RPS product to arrive in their own packaging.

The CJM models also had differences in the number of activities in the CJM, which could lead to higher consumer effort to perform the activities. Refill at home with diluting refill method presented the least number of activities in the CJM, suggesting lower effort. Other CJM models, such as return on the go with sequential reuse behavior or refill at home with pouring refill method, required more activities from consumers, thus presenting higher complexity for consumers.

From all six consolidated CJMs, I identified 11 critical activities required from consumers to enable the RPS system to work (Figure 37). This does not mean the other activities required from consumers are not important, but the critical activities signal higher effort and a higher risk of RPS failure, which could prevent consumers from switching to RPS and adopting reuse behaviors. All customer journey stages have critical activities. However, consideration and purchase had the most interventions, so companies should focus on improving interventions to support consumers during post-purchase.

	Critical Activity to Customer Experience	Reasons why the activity carries a risk of RPS system failure from the consumer side	Return from home	Return on the go – sequential reuse	Return on the go – exclusive reuse	Refill at home - placing	Refill at home - diluting	Refill at home - pouring
Consider.	Evaluate product	Consumer needs to understand how RPS works, benefits from switching and costs.	●	●	●	●	●	●
	Prepare	Consumer should ensure to have suitable resources at home to refill and reuse (i.e., dispensers, pumps, containers, etc.)		●	●	●	●	●
Purchase	Become owner	Consumer needs to wait for return of their packaging, which means consumer is left without product for a few days.			●			
Use	Prepare	Consumer should know when and how to clean, refill, and assemble RPS as needed.		●		●	●	●
Disposal	Remove	Consumer must thoroughly clean container, as company does not clean, only sterilizes and refills.			●			
	Stock	Only when consumers need to clean empties and store them until collection / return	●	●				
	Prepare	Consumer needs to remember, plan and perform different tasks for collection / return / recycle (i.e., leave empties in doorstep, request return label, decide where to recycle or return)	●	●	●	●		●
	Transit	Consumer needs to make effort to go to drop-off locations		●	●	●		●
	Detach	If consumer forgets to leave empties for collection or has issues with collection, then RPS does not work	●					
Loyalty	Pay or get deposit	Consumer incurs in higher costs as deposit charges apply if return is unsuccessful		●				
	Purchase again	Consumer should be able to reorder the RPS, and be encouraged or supported to build routines around the activities required for the RPS	●	●	●	●	●	●

Figure 37. Critical activities to customer experience.

Prepared by author. This table shows all the critical activities identified in the CJM models.

## During the Use Stage

Overall, fewer interventions were found in the use stage. The critical activity in the use stage was “prepare”, which was relevant to return on the go with sequential reuse and all refill models (Figure 37). Consumers need to prepare for use by cleaning, refilling, and assembling the RPS, as needed per the instructions provided. For example, 7I - Lancôme Refillable Perfume provided instructions on how to refill on the company website, as it has a special mechanism to transfer the perfume between bottles (Lancôme UK, n.d.). Also, some companies would communicate about cleaning containers between uses, as low maintenance and residue build-up could impact customers’ perception of the hygiene standards of RPS and hinder adoption (Long et al., 2022; Miao et al., 2023). For example, 9C - Miniml Laundry Liquid Bulk Refill provided a video covering all the steps to use the RPS, which include cleaning the dispenser between uses and before refilling (Miniml, n.d.-a). However, 4I - Palmolive Ecorefill Hand Soap does not inform consumers of cleaning dispensers between uses.

Although the customer interacts less with a company or retailer website in the use stage, interventions were available online if the consumer required preparation support, such as searching for assembly instructions or how to operate the RPS. Packaging design would likely have a more significant impact in the use stage, as it could include instructions on how to use the RPS product and reduce the effort from consumers to research online for instructions.

## During the Disposal Stage

All models rely on disposal for either collections, returns or recycling to ensure the success of the RPS, except for refill at home with diluting refill method (Figure 37).



This stage also had fewer interventions than the pre-purchase and purchase stages (Figure 34). Critical activities during the disposal stage relate to cleaning for reuse, returning empties to drop-off locations, preparing for home collection, and recycling via take-back schemes or at home. In RPS, consumers own the empty packaging and decide if it becomes waste or is reused (Zeeuw van der Laan & Aurisicchio, 2019). So, at this stage, consumers need support to determine how to dispose of the empty packaging and ensure it is allocated in a trustworthy route to recovery (Long et al., 2022; WRAP UK, 2021). The disposal stage is closely connected to the infrastructure accessibility (Figure 32), which many companies missed addressing.

Preparing for disposal is a high effort activity for consumers, which varies depending on the CJM model. In return from home, consumers need to remember to leave empties on the doorstep before the next delivery. If consumers choose to set regular deliveries with automatic reordering (Milk & More, n.d.-b; The Modern Milkman, n.d.-c), this could enable them to set up a routine to perform this task. In return on the go with sequential reuse, consumers must request and print return labels, pack empty containers for return, and take them to nearby drop-off locations. Some RPS products included pre-paid return labels and envelopes in their deliveries, which could help reduce effort on this activity (Bower Collective, n.d.-d; SodaStream, n.d.-d). In the refill at home model with placing or pouring refill method, consumers prepare for disposal by deciding how to dispose of the refill packaging, which could be either by discarding in the general waste, recycling at home, or recycling in a take-back scheme.

Although recycling is an established behavior in the UK, most people do not recycle correctly (WRAP UK, 2023a). Companies should provide information to help

dispose of the refill packaging correctly. Companies usually communicate that the packaging is recyclable, but consumers must check local recycling rules. In return from home and on the go, companies provide more support to close the loop of the packaging materials. However, in refill at home, companies place more responsibility on the consumer to decide how and if to recycle, which may result in consumers not seeing the benefits of their efforts to switch to RPS. It is likely that packaging design would impact the disposal stage. For example, for recyclable refill pouches, the packaging could have information to indicate if the item is recyclable or not.

Another critical activity is transit for disposal when consumers must take returnables to drop-off locations or drop empties in recycling take-back schemes. Although there is good coverage of post offices, post boxes, and Collect+ locations (Booth, 2023; Collect+, n.d.; Royal Mail, n.d.), and there is an uptake on take-back recycling schemes (WRAP UK, 2023a), having access to those facilities might not be enough to overcome other barriers such as extra effort to transport items and difficulty to maintain this habit (WRAP UK, 2021).

#### During the Loyalty Stage

The loyalty stage had fewer interventions than the consideration and purchase stage. In this stage, different interventions are applied to incentivize repurchase; among them, automatic reordering of refills or returnables could help with habit formation. The return from home model is the only CJM model that requires consumers to place a new order through a specialist retailer, so a collection of empty packaging takes place. The sequence of activities helps consumers purchase the RPS again, which in time could enable consumers to switch to RPS. However, this is not the case in other CJM models,

which either rely on subscriptions with automatic reordering to help consumers purchase again or do not have any interventions to help consumers buy the RPS again. Companies should seek to address how to encourage and facilitate consumers to purchase RPS again in a way that supports how the consumers purchase FMCG products.

### Companies Still Need to Improve How to Address Engagement Barriers

From the literature review, five factors were associated with RPS consumer engagement: understanding of RPS benefits, convenience, affordability, hygiene, and infrastructure accessibility. Despite the well-researched barriers to RPS engagement, companies still did not address all RPS engagement factors. Hygiene, infrastructure accessibility, and affordability were the least addressed factors in the sample (Figure 32). Notably, challenger RPS products were better than incumbent RPS products at implementing interventions to address hygiene (Table 15).

### Hygiene

Hygiene is the least addressed engagement factor (Figure 32). This finding is not surprising, as Long et al. (2022) warned that hygiene concerns are the least discussed barriers to RPS adoption. However, customer perception of the hygiene standards of RPS could influence adoption (Long et al., 2022; Miao et al., 2023). If consumers are concerned with the packaging or the hygiene standards of the RPS, this could lead to discarding the packaging earlier than expected or not engaging with the RPS solutions (Greenwood et al., 2021; Miao et al., 2023).

Seven challenger RPS products related to return models and refill at home with diluting refill method addressed this factor with variable scoring, but almost none of the

incumbent RPS products addressed hygiene. Any of the refill at home with pouring or placing refill methods addressed hygiene in the CJM. This is an area for improvement, as maintenance of the refillable parent packaging can ensure it is used for longer.

### Infrastructure Accessibility

This is the second least addressed factor. Each reuse model has a challenge regarding infrastructure, whether it is drop-off locations for return on the go, collections at home for return from home, or recycling empty refills for refill at home model. Companies need to focus on this factor. If consumers do not reuse or recycle the packaging, then RPS risks not closing the loop of materials and further affects the motivation of consumers to prepare for disposal (EMF, 2019; Muranko et al., 2021).

One key issue with refill at home models is that the refills need to be reusable, recyclable, or compostable, and not disposable (EMF, 2019; WEF, 2021). Although all the refill at home with pouring and placing refill methods are recyclable based on company information or a search on the Recycle Now website, only four products included instructions for recycling (either at home or out of home). This could lead to refill packaging being disposed of in general waste and consumers not identifying the correct way to recycle an item (WRAP UK, 2023a). So, companies offering refill at home with placing or pouring refill methods should focus on improving how to provide better access to recycling facilities, whether those are take-back schemes or at home recycling. An example is 6I - L'Occitane Shower Gel Refill, which has a recycling program that enables consumers to request a free return label to recycle empty refill pouches after use.

## Affordability

The interventions associated with affordability relate to subscriptions with financial incentives, such as when the refill version is discounted compared to the regular version or loyalty points. An exception is the return from home model, as it does not have interventions that relate to affordability. Both products are sold via specialized retailers operating on the milk round distribution model and offer subscriptions for automatic reorders, but they do not include any affordability mechanisms. Thus, it is relevant for return from home models to find ways to address affordability, as incentives can encourage consumers to adopt reuse behaviors (Muranko et al., 2021).

## Influencing Consumer Behavior From the CJM

From the research, all products included interventions addressing capability, but most missed interventions to influence opportunity and motivation. The absence of at least one source of behavior could cause an intention-action gap (Michie et al., 2011).

## Influencing Capability

Seven behavior requirements were identified in influencing psychological capability, particularly how to increase knowledge and educate consumers about how to enact the desired behavior and enable them to maintain it (Michie et al., 2014) (Table 13). Out of the seven behavior requirements, five were addressed by most of the products: knowing about the benefits of switching to RPS (19 observations), knowing that there are RPS alternatives to cover their needs (19 observations), knowing how to use the RPS (19), knowing how and when to reuse, refill, return, or recycle the RPS (20 observations) and learning about the costs associated and incentives to switch to RPS (18 observations).

The least addressed areas for change were knowing about the hygiene standards of RPS and which actions need to be carried out to keep RPS in good condition (8 observations) and knowing where the drop-off or collection points are located (either for return or recycling) (13 observations).

Most of the interventions (25 out of the 35) identified in the CJM addressed psychological capabilities. The most used interventions were information that the product is refillable, returnable, or reusable (20 observations), information about how RPS works (19 observations), information about the environmental benefits of RPS solution (19 observations), possible to buy from retailers (17 observations), and information about necessary and suitable resources needed to operate RPS (15 observations).

### Influencing Motivation

There were five behavior requirements related to motivation: two for automatic motivation, which is about building routines, desires, and reflex responses, and three for reflective motivation, which is about planning, making conscious efforts, and evaluating if something is good or bad (Michie et al., 2014). Motivation was the least addressed COM-B component, which is a gap in the CJM design.

Out of the five behavior requirements (Table 13), two were addressed by most of the products: believes that using RPS helps reduce plastic waste (19 observations) and financially incentivized to switch to RPS products (16 observations). The least addressed areas for change were building established routines and habits for RPS (12 observations), believing that making an effort to return (at home or drop off) empty packaging for reuse or recycling is better for the environment (nine observations), and believing that proper maintenance, cleaning, and preparation of RPS can keep the packaging in good

conditions for reuse and avoid messy situations (one observation). There is room for improvement among companies to address these areas.

Motivation was addressed by 12 interventions, which is the lowest compared to capability and opportunity. The most used interventions were information about the benefits of the take-back scheme for reuse or recycling (nine observations), information about the personal positive impact of changing behavior (six observations), my favorites or purchased before list (six observations), subscription with automatic reordering and financial incentives (four observations), and subscription with automatic reordering (three observations). Automatic reordering is linked to goal setting, action planning, and habit formation, which are strong interventions to help people adopt reuse behaviors.

### Influencing Opportunity

Five behavior requirements referred to opportunity: Four for the physical opportunity, which relates to time, resources, locations, and prompts to aid the target behavior, and one for the social opportunity, which is about interpersonal influences, social cues, and cultural norms (Michie et al., 2014).

Out of the five behavior requirements, three were addressed by most of the products: influenced by positive experiences with the RPS from other consumers (19 observations), having easier access to RPS, with solutions that help save time, reduce effort, and provide necessary resources (18 observations), and having access to financial mechanisms that incentive to switch to RPS (16 observations). The least addressed areas for change were access to convenient locations for drop-off or collection for reuse or recycling (nine observations) and being prompted to clean and maintain RPS in good condition (five observations). Since this research was done online, the only social

opportunity identified was related to customer reviews. However, there are other ways to tackle social opportunities in social media or word of mouth.

Fifteen interventions addressed opportunity, only one for social opportunity. The most used were customer reviews on RPS products (19 observations), certification on positive impact from product or company (12 observations), refill version with a discount on pay as you go (12 observations), and delivery of RPS among the rest of the groceries. Opportunity is often linked to infrastructure accessibility so that people can access home collections, drop-off locations with good accessibility, or recycling take-back schemes.

### Guidelines for Companies to Improve Reuse Adoption

When performing the research, I noticed similarities and differences in the activities required from consumers based on the RPS characteristics, which could also impact the interventions and behavior requirements. Based on this, and following the analysis in the customer journey maps and behavior change wheel, I created guidelines to help companies assess and improve their RPS offering, starting from characterizing the RPS model, analyzing the customer journey, and finally assessing which areas of behavior change need attention.

#### Guideline for Return From Home

The RPS products using the return from the home model in the sample used a third-party specialized retailer to do a milk round delivery, where the retailer delivers new products and collects empty reusable packaging. Figure 38 shows the main characteristics of this model and the critical activities in the customer journey that could influence customer experience. This should be used along with Figure 17, which shows



the detailed customer journey map for the return from a home model based on the sample products. The CJM model has been done in a way that can serve as a starting point for customer journey design and adjusted as required. Figure 39 shows the behavior change intervention strategies companies could use to improve their offering and enable consumers to switch to RPS using the return from home model. Each factor addresses the three components of change so companies can review which interventions they have to address capability, opportunity, and motivation. The interventions identified in this model from the sample products have been summarized, including where in the customer journey those would fit best to address change.

Return from home		
<b>Characteristics:</b>		
<input type="checkbox"/>	<b>Type of Reusable Packaging:</b>	Returnable packaging owned by company
<input type="checkbox"/>	<b>Consumer behavior:</b>	Sequential reuse behavior
<input type="checkbox"/>	<b>Operation:</b>	Delivery & Collection at home, most suited for a milkround delivery system with set frequent deliveries.
Critical Activities in the Customer Journey		
CJM Stage	Critical Activity	Key considerations on CJM design
Consideration	Evaluate product	Consumer needs to understand how RPS works, benefits from switching to RPS and costs.
Disposal	Stock	Consumers need to clean empties and store them until collection.
	Prepare	Consumer needs to remember, plan, and prepare for collection on empties on the next delivery.
	Detach	If consumer forgets to leave empties for collection or has issues with collection, then RPS does not work.
Loyalty	Purchase again	Collection depends on the next delivery; lack of repeat purchase means the RPS does not work, and company loses packaging.

Figure 38. Main characteristics of return from home model

*Prepared by author.*

## Return from home

### Behavior Change Intervention Strategies

- This model tends to be stronger in convenience and infrastructure accessibility because it operates with delivery and collections at home.
- Key areas to improve are: Understanding of benefits of RPS, Hygiene, Affordability.



Understanding of benefits of RPS

#### What needs to change?

- Capability:** Know about the benefits of switching to RPS
- Opportunity:** Influenced by positive experiences with the RPS from other consumers
- Motivation:** Believes that using RPS helps reduce plastic waste



Hygiene

#### What needs to change?

- Capability:** Know about the hygiene standards of RPS and actions to keep RPS in good conditions
- Opportunity:** Be prompted to clean and maintain RPS in good conditions
- Motivation:** Believes that proper cleaning, maintenance, and preparation of RPS can keep the packaging in good conditions for reuse and avoid messy situations.



Affordability

#### What needs to change?

- Capability:** Know about the costs associated and incentives to switch to RPS
- Opportunity:** Have access to financial mechanisms that incentive to switch to RPS
- Motivation:** Financially incentivized to switch to RPS products

Intervention Strategies	C	O	M	CJ Stage
Information about environmental benefits of RPS solution	✓		✓	Consideration, Purchase
Information about the personal positive impact from changing behavior	✓		✓	Consideration, Purchase
Certification on positive impact from product or company	✓			Consideration, Purchase
Customer reviews on RPS product		✓		Consideration, Purchase
QR code for reuse tracking			✓	Use, Disposal, Loyalty

Intervention Strategies	C	O	M	CJ Stage
Information about RPS cleaning process from company	✓			Consideration, Purchase
Instructions for cleaning RPS at home	✓	✓		Consideration, Purchase, Use, Disposal
Notification when issues with return	✓		✓	Purchase, Disposal

Intervention Strategies	C	O	M	CJ Stage
Subscription with automatic reordering and financial incentives	✓	✓	✓	Consideration, Purchase, Loyalty
Subscription with financial incentives	✓	✓	✓	Consideration, Purchase, Loyalty
Incentives (other than discounts) on PAYG	✓		✓	Consideration, Purchase, Loyalty

Figure 39. Behavior change intervention strategies for return from home model.

*Prepared by author.*

## Guideline for Return on the Go With Sequential Reuse Behavior

The RPS products using return on the go with sequential reuse behavior in the sample presented two variations: first when the RPS comes in returnable packaging ready to use, and second when the RPS comes in returnable refills, and the consumer should have a refillable parent packaging to use the product. Among these two variations, there were not many differences. Therefore, these variations were grouped in this model, given the consumers need to return the reusable packaging or reusable refill, which is owned by the company and used by multiple consumers. It is important to note that the literature regarding reuse models normally allocates return on the go model with returnable packaging, so this thesis introduces the variations in this model, as it is a key consideration in the design of RPS products from companies. Additionally, RPS products in the sample had the highest scores for enabling consumers to switch to RPS based on the interventions identified in the CJM. However, this model is also the most complex and has the most critical activities to consider in the CJM.

Figure 40 shows the main characteristics of this model and the critical activities in the customer journey that could influence customer experience. This should be used along with Figure 19, which shows this model's detailed customer journey map based on the sample products. Figure 41 shows the behavior change intervention strategies companies could use to improve their offering and enable consumers to switch to RPS using the return on the go with sequential reuse behavior.

## Return on the go with sequential reuse behavior

### Version 1: RPS in returnable packaging

- Type of Reusable Packaging:** Returnable packaging owned by company
- Consumer behavior:** Sequential reuse behavior
- Operation:** RPS sold directly via the company or retailers online. Drop-off points with either Post Office or Collect+ to ensure accessible drop-off locations.

### Version 2: RPS using refillable parent packaging & returnable refills

- Type of Reusable Packaging:** Refillable parent packaging owned by consumers, and returnable refills owned by company
- Consumer behavior:** Both, exclusive reuse for refillable parent packaging and sequential reuse for returnable refills
- Operation:** RPS sold directly via the company or retailers online. Drop-off points with either Post Office or Collect+ to ensure accessible drop-off locations.

### Critical Activities in the Customer Journey

CJM Stage	Critical Activity	Key considerations on CJM design
Consideration	Evaluate product	Consumer needs to understand how RPS works, benefits from switching and costs.
	Prepare	Consumer should ensure to have suitable refillable parent packaging
Use	Prepare	Consumer should know when and how to clean, refill, and assemble RPS as needed.
Disposal	Stock	Consumers need to clean empties and store them until return
	Prepare	Consumer needs to remember, plan and perform different tasks for return (i.e., request return label, decide where to return)
	Transit	Consumer needs to make effort to go to drop-off locations
Loyalty	Pay or get deposit	Consumer incurs in higher costs as deposit charges applies or are not refunded if return is unsuccessful

Figure 40. Main characteristics of return on the go with sequential reuse behavior.

*Prepared by author.*

## Return on the go with Sequential Reuse Behavior

### Behavior Change Intervention Strategies

- This model tends to be stronger infrastructure accessibility due to the use of Post Office and Collect+ locations, affordability due to the use of subscriptions, and understanding of benefits of RPS, mainly from the challenger companies.
- Key areas to improve are Convenience and Hygiene.



Convenience

#### What needs to change?

- Capability 1:** Know that there are RPS alternatives to cover their needs
- Capability 2:** Know how to use the RPS
- Capability 3:** Know how and when to reuse, refill, return, or recycle the RPS.
- Opportunity:** Have easier access to RPS, with solutions that help save time, reduce effort, and provide necessary resources.
- Motivation:** Build established routines and habits for RPS

Intervention Strategies	C	O	M	CJ Stage
Possible to buy from retailers	✓	✓		Consid., Purchase, Loyalty
Regular version references refill version	✓			Consid., Purchase
Information about how RPS works	✓			All
Information about necessary and suitable resources needed to operate RPS	✓			Consid., Purchase, Disposal
Instructions for how to assemble or refill RPS	✓			Consid., Purchase, Use
Instructions for return process	✓			All but Use
Video showing how RPS operates	✓			All
Instructions for cleaning RPS at home	✓			All but loyalty
Drop-off locations with good accessibility	✓	✓		Consid., Purchase, Disposal
Information that product is refillable, returnable or reusable	✓			All but loyalty
Delivery of RPS among rest of groceries			✓	Consid., Purchase
Possible to repurpose any existing packaging			✓	Consid., Purchase, Use
Search function to find retailers selling the product			✓	Consid.
Free return label or envelop provided with delivery			✓	Consid., Purchase, Disposal
Self-service to request free return label			✓	Consid., Disposal
Subscription with automatic reordering and financial rewards			✓	All but Use
Subscription with automatic reordering			✓	All but Use
My favorites or purchased before list			✓	Consid., Loyalty



Hygiene

#### What needs to change?

- Capability:** Know about the hygiene standards of RPS and actions to keep RPS in good conditions
- Opportunity:** Be prompted to clean and maintain RPS in good conditions
- Motivation:** Believes that proper cleaning, maintenance, and preparation of RPS can keep the packaging in good conditions for reuse and avoid messy situations.

Intervention Strategies	C	O	M	CJ Stage
Information about RPS cleaning process from company	✓			Consideration, Purchase
Instructions for cleaning RPS at home	✓	✓		Consideration, Purchase, Use, Disposal
Notification when issues with return	✓		✓	Purchase, Disposal

Figure 41. Behavior change intervention strategies for return on the go with sequential reuse behavior.

*Prepared by author.*

## Guideline for Return on the Go With Exclusive Reuse Behavior

Applying return on the go with exclusive reuse behavior in the sample is considered innovative, as the literature connects return on the go with sequential reuse behavior. Although only one product in the sample was analyzed with this model (3C - UpCircle Beauty Return + Refill Night Cream), another product in the sample (7C - EPC Perfume Refill) also offered the same product in a return on the go with exclusive reuse behavior, that model was not selected for this research.

This product is among the top performers of RPS products, given how they enable consumers to switch to RPS based on the interventions identified in the CJM. However, this is the only model with a critical activity in the purchase stage, as the consumer must first purchase the refill, then return the empty jar via mail, and wait for the RPS product to return. This model operates very differently from the others, so it might take longer for consumers to get used to the customer journey. For example, 3C - UpCircle Beauty Return + Refill Night Cream offered the regular version with a subscription model with automatic reordering and a 15% discount, compared to the return and refill version without any subscription and a 20% discount. Although this product scored high in the model due to the interventions in place, consumers could be influenced by the convenience of subscriptions to the regular version of this product.

Figure 42 shows the main characteristics of this model and the critical activities in the customer journey that could influence customer experience. This should be used along with Figure 21, which shows this model's detailed customer journey map based on the sample products. Figure 43 shows the behavior change intervention strategies

companies could use to improve their offering and enable consumers to switch to RPS using the return on the go with exclusive reuse behavior.

Return on the go with exclusive reuse behavior		
<b>Characteristics</b>		
<input type="checkbox"/>	<b>Type of Reusable Packaging:</b>	Returnable packaging owned by consumer
<input type="checkbox"/>	<b>Consumer behavior:</b>	Exclusive reuse behavior
<input type="checkbox"/>	<b>Operation:</b>	RPS sold only if consumer has bespoke empty packaging ready for return. Consumer returns empty packaging via a drop-off location and waits for delivery of refilled packaging.
<b>Critical Activities in the Customer Journey</b>		
CJM Stage	Critical Activity	Key considerations on CJM design
Consideration	Evaluate product	Consumer needs to understand how RPS works, benefits from switching and costs.
	Prepare	Consumer should ensure to have suitable resources at home to refill and reuse (i.e., dispensers, pumps, containers, etc.)
Purchase	Become owner	Consumer needs to wait for return of their packaging, which means consumer is left without product for a few days.
Disposal	Remove	Consumer must thoroughly clean container, as company does not clean, only sterilizes and refills.
	Prepare	Consumer needs to remember, plan and perform different tasks for collection / return / recycle (i.e., leave empties in doorstep, request return label, decide where to recycle or return)
	Transit	Consumer needs to make effort to go to drop-off locations

Figure 42. Main characteristics of return on the go with exclusive reuse behavior.

*Prepared by author.*

## Return on the go with Exclusive Reuse Behavior

### Behavior Change Intervention Strategies

- This model tends to be stronger infrastructure accessibility due to the use of Post Office or Collect+ locations, hygiene as consumers need to ensure empty packaging is returned in good conditions and understanding of benefits of RPS.
- Key areas to improve are Convenience and Affordability.



Convenience

#### What needs to change?

- Capability 1:** Know that there are RPS alternatives to cover their needs
- Capability 2:** Know how to use the RPS
- Capability 3:** Know how and when to reuse, refill, return, or recycle the RPS.
- Opportunity:** Have easier access to RPS, with solutions that help save time, reduce effort, and provide necessary resources.
- Motivation:** Build established routines and habits for RPS



Affordability

#### What needs to change?

- Capability:** Know about the costs associated and incentives to switch to RPS
- Opportunity:** Have access to financial mechanisms that incentive to switch to RPS
- Motivation:** Financially incentivized to switch to RPS products

Intervention Strategies	C	O	M	CJ Stage
Possible to buy from retailers	✓	✓		Consid., Purchase, Loyalty
Regular version references refill version	✓			Consid., Purchase
Information about how RPS works	✓			All
Information about necessary and suitable resources needed to operate RPS	✓			Consid., Purchase, Disposal
Instructions for return process	✓			All but Use
Video showing how RPS operates	✓			All
Instructions for cleaning RPS at home	✓			All but loyalty
Drop-off locations with good accessibility	✓	✓		Consid., Purchase, Disposal
Information that product is refillable, returnable or reusable	✓			All but loyalty
Delivery of RPS among rest of groceries		✓		Consid., Purchase
Search function to find retailers selling the product		✓		Consid.
Free return label or envelop provided with delivery		✓		Consid., Purchase, Disposal
Self-service to request free return label		✓		Consid., Disposal
Subscription with automatic reordering and financial rewards			✓	All but Use
Subscription with automatic reordering			✓	All but Use
My favorites or purchased before list			✓	Consid., Loyalty

Intervention Strategies	C	O	M	CJ Stage
Subscription with automatic reordering and financial incentives	✓	✓	✓	Consideration, Purchase, Loyalty
Subscription with financial incentives	✓	✓	✓	Consideration, Purchase, Loyalty
Incentives (other than discounts) on PAYG	✓		✓	Consideration, Purchase, Loyalty
Refill version with discount on PAYG	✓	✓	✓	Consideration, Purchase, Loyalty

Figure 43. Behavior change intervention strategies for return on the go with sequential reuse behavior.

*Prepared by author.*



## Guideline for Refill at Home With Placing Refill Method

Refill at home models are considered more accessible and with less behavior change needed from consumers, compared to return models (EMF, 2019; WEF, 2021). It was a surprise when the refill at home with placing and pouring methods was the lower performer regarding how they enable consumers to switch to RPS based on the interventions identified in the CJM. One possible explanation is that companies focus on selling the refill, but without ownership of the return process, hygiene and access to infrastructure are less addressed or considered irrelevant. However, the findings in this thesis suggest that consumers still need support to maintain and clean refillable packaging at home to ensure it is used multiple times and know how to recycle the empty refill packaging after use.

Figure 44 shows the main characteristics of this model and the critical activities in the customer journey that could influence customer experience. This should be used along with Figure 23, which shows this model's detailed customer journey map based on the sample products. Figure 45 shows the behavior change intervention strategies companies could use to improve their offering and enable consumers to switch to RPS using the refill at home with the placing refill method.

## Refill at home with placing refill method

### Characteristics

- ❑ **Type of Reusable Packaging:** Refillable parent packaging owned by consumer
- ❑ **Consumer behavior:** Exclusive reuse behavior
- ❑ **Operation:** Consumer owns a refillable parent packaging and purchases for the refills. Once refillable is consumed, the packaging should be recyclable or compostable (if refill packaging is returnable, then apply return on the go with exclusive or sequential reuse behavior).

### Critical Activities in the Customer Journey

CJM Stage	Critical Activity	Key considerations on CJM design
Consideration	Evaluate product	Consumer needs to understand how RPS works, benefits from switching and costs.
	Prepare	Consumer should ensure to have suitable resources at home to refill and reuse (i.e., dispensers, pumps, containers, etc.)
Use	Prepare	Consumer should know when and how to clean, refill, and assemble RPS as needed.
Disposal	Prepare	Consumer needs to remember, plan and perform different tasks to recycle empty refill packaging (i.e., decide if recycling at home or out of home, where to recycle)
	Transit	Consumer needs to make effort to go to take-back scheme if recycling out of home

Figure 44. Main characteristics of refill at home with the placing refill method.

*Prepared by author.*

## Refill at home with placing refill method

### Behavior Change Intervention Strategies

- This model does not address any of the factors strongly. It addresses understanding of benefits and convenience partially.
- Main areas for improvement are affordability, hygiene, and infrastructure accessibility to ensure consumers recycle the empty refill packaging instead of disposing.
- Note: In the UK, the refill packaging is mainly recycled via take-back schemes in supermarkets or retail stores, as not all councils accept them yet on curbside recycling.



Infrastructure accessibility

#### What needs to change?

- Capability:** Know where the drop-off are located for recycling
- Opportunity:** Have access to convenient locations for drop-off for recycling
- Motivation:** Believes that making effort to return empty packaging for recycling is better for the environment.



Hygiene

#### What needs to change?

- Capability:** Know about the hygiene standards of RPS and actions to keep RPS in good conditions
- Opportunity:** Be prompted to clean and maintain RPS in good conditions
- Motivation:** Believes that proper cleaning, maintenance, and preparation of RPS can keep the packaging in good conditions for reuse and avoid messy situations.



Affordability

#### What needs to change?

- Capability:** Know about the costs associated and incentives to switch to RPS
- Opportunity:** Have access to financial mechanisms that incentive to switch to RPS
- Motivation:** Financially incentivized to switch to RPS products

Intervention Strategies	C	O	M	CJ Stage
Recycling take-back scheme from company / retailer	✓	✓		Consideration, disposal
Instructions for return process	✓			All but use
Request consumers to check local recycling rules	✓			Consideration, disposal
Instruction for how to recycle (at home or out of home)	✓			Consideration, disposal
QR code for reuse tracking			✓	Use, disposal
Information about benefits of take-back scheme (for reuse or recycling)			✓	All but use

Intervention Strategies	C	O	M	CJ Stage
Instructions for cleaning RPS at home	✓	✓		Consideration, Purchase, Use, Disposal
Information about the benefits of cleaning and maintaining RPS at home *	✓		✓	Consideration, Purchase, Use, Disposal

\* No interventions addressed motivation for hygiene among the sample in this model. This is a proposal using the intervention functions of education and persuasion. Other applicable intervention functions (incentivization, coercion) did not seem as practical to implement.

Intervention Strategies	C	O	M	CJ Stage
Subscription with automatic reordering and financial incentives	✓	✓	✓	Consideration, Purchase, Loyalty
Subscription with financial incentives	✓	✓	✓	Consideration, Purchase, Loyalty
Refill version with discount on PAYG	✓	✓	✓	Consideration, Purchase, Loyalty
Incentives (other than discounts) on PAYG	✓		✓	Consideration, Purchase, Loyalty

Figure 45. Behavior change intervention strategies for refill at home with placing refill method.

*Prepared by author.*

## Guideline for Refill at Home With Diluting Refill Method

Although there was only one product in the sample in this model, it came as the second highest performer regarding how they enable consumers to switch to RPS based on the interventions identified in the CJM.

Figure 46 shows the main characteristics of this model and the critical activities in the customer journey that could influence customer experience. This should be used along with Figure 25, which shows this model's detailed customer journey map based on the sample products. Figure 47 shows the behavior change intervention strategies companies could use to improve their offering and enable consumers to switch to RPS using the refill at home with the diluting refill method.

Refill at home with diluting refill method		
<b>Characteristics</b>		
<input type="checkbox"/>	<b>Type of Reusable Packaging:</b>	Refillable parent packaging owned by consumer
<input type="checkbox"/>	<b>Consumer behavior:</b>	Exclusive reuse behavior
<input type="checkbox"/>	<b>Operation:</b>	Consumer owns a refillable parent packaging and purchases for the refills. The refill is dissolved in water, so there is no waste. (If refill is a concentrate product in a small container, then apply refill at home with pouthing refill method, as the empty refill packaging would remain).
Critical Activities in the Customer Journey		
CJM Stage	Critical Activity	Key considerations on CJM design
Consideration	Evaluate product	Consumer needs to understand how RPS works, benefits from switching and costs.
	Prepare	Consumer should ensure to have suitable resources at home to refill and reuse (i.e., dispensers, pumps, containers, etc.)
Use	Prepare	Consumer should know when and how to clean, refill, and assemble RPS as needed.

Figure 46. Main characteristics of refill at home with diluting refill method.

*Prepared by author.*

## Refill at home with diluting refill method

### Behavior Change Intervention Strategies

- This model addresses all areas, only hygiene and convenience have a slightly lower performance.
- Infrastructure accessibility does not apply to this model, as the refill packaging dissolves in water.



Convenience

#### What needs to change?

- Capability 1:** Know that there are RPS alternatives to cover their needs
- Capability 2:** Know how to use the RPS
- Capability 3:** Know how and when to reuse, refill, return, or recycle the RPS.
- Opportunity:** Have easier access to RPS, with solutions that help save time, reduce effort, and provide necessary resources.
- Motivation:** Build established routines and habits for RPS

Intervention Strategies	C	O	M	CJ Stage
Possible to buy from retailers	✓	✓		Consid., Purchase, Loyalty
Information about how RPS works	✓			All
Information about necessary and suitable resources needed to operate RPS	✓			Consid., Purchase, Disposal
Instructions for how to assemble or refill RPS	✓			Consid., Purchase, Use
Video showing how RPS operates	✓			All
Instructions for cleaning RPS at home	✓			All but loyalty
Information that product is refillable, returnable or reusable	✓			All but loyalty
Delivery of RPS among rest of groceries		✓		Consid., Purchase
Possible to repurpose any existing packaging		✓		Consid., Purchase, Use
Search function to find retailers selling the product		✓		Consid.
Subscription with automatic reordering and financial rewards			✓	All but Use
Subscription with automatic reordering			✓	All but Use
My favorites or purchased before list			✓	Consid., Loyalty



Hygiene

#### What needs to change?

- Capability:** Know about the hygiene standards of RPS and actions to keep RPS in good conditions
- Opportunity:** Be prompted to clean and maintain RPS in good conditions
- Motivation:** Believes that proper cleaning, maintenance, and preparation of RPS can keep the packaging in good conditions for reuse and avoid messy situations.

Intervention Strategies	C	O	M	CJ Stage
Instructions for cleaning RPS at home	✓	✓		Consideration, Purchase, Use, Disposal
Information about the benefits of cleaning and maintaining RPS at home *	✓		✓	Consideration, Purchase, Use, Disposal

\* No interventions addressed motivation for hygiene among the sample in this model. This is a proposal using the intervention functions of education and persuasion. Other applicable intervention functions (incentivization, coercion) did not seem as practical to implement.

Figure 47. Behavior change intervention strategies for refill at home with diluting refill method.

*Prepared by author.*

## Guideline for Refill at Home With Pouring Refill Method

The refill at home with pouring method was the most used among the sample RPS products, and most incumbents in this research applied this model.

Figure 48 shows the main characteristics of this model and the critical activities in the customer journey. This should be used along with Figure 27, which shows this model's detailed customer journey map. Figure 49 shows the behavior change intervention strategies companies could use to enable consumers to switch to RPS using this model.

Refill at home with pouring refill method		
<b>Characteristics</b>		
<input type="checkbox"/>	<b>Type of Reusable Packaging:</b>	Refillable parent packaging owned by consumer
<input type="checkbox"/>	<b>Consumer behavior:</b>	Exclusive reuse behavior
<input type="checkbox"/>	<b>Operation:</b>	Consumer owns a refillable parent packaging and purchases for the refills. Once refillable is consumed, the packaging should be recyclable or compostable (if refill packaging is returnable, then apply return on the go with exclusive or sequential reuse behavior).
<b>Critical Activities in the Customer Journey</b>		
CJM Stage	Critical Activity	Key considerations on CJM design
Consideration	Evaluate product	Consumer needs to understand how RPS works, benefits from switching and costs.
	Prepare	Consumer should ensure to have suitable resources at home to refill and reuse (i.e., dispensers, pumps, containers, etc.)
Use	Prepare	Consumer should know when and how to clean, refill, and assemble RPS as needed.
Disposal	Prepare	Consumer needs to remember, plan and perform different tasks to recycle empty refill packaging (i.e., decide if recycling at home or out of home, where to recycle)
	Transit	Consumer needs to make effort to go to take-back scheme if recycling out of home

Figure 48. Main characteristics of refill at home with diluting refill method.

*Prepared by author.*

## Refill at home with pouring refill method

### Behavior Change Intervention Strategies

- This model does not address any of the factors strongly. It addresses understanding of benefits and convenience partially.
- Main areas for improvement are affordability, hygiene, and infrastructure accessibility to ensure consumers recycle the empty refill packaging instead of disposing.
- Note: In the UK, the refill packaging is mainly recycled via take-back schemes in supermarkets or retail stores, as not all councils accept them yet on curbside recycling.



Infrastructure accessibility

#### What needs to change?

- Capability:** Know where the drop-off are located for recycling
- Opportunity:** Have access to convenient locations for drop-off for recycling
- Motivation:** Believes that making effort to return empty packaging for recycling is better for the environment.



Hygiene

#### What needs to change?

- Capability:** Know about the hygiene standards of RPS and actions to keep RPS in good conditions
- Opportunity:** Be prompted to clean and maintain RPS in good conditions
- Motivation:** Believes that proper cleaning, maintenance, and preparation of RPS can keep the packaging in good conditions for reuse and avoid messy situations.



Affordability

#### What needs to change?

- Capability:** Know about the costs associated and incentives to switch to RPS
- Opportunity:** Have access to financial mechanisms that incentive to switch to RPS
- Motivation:** Financially incentivized to switch to RPS products

Intervention Strategies	C	O	M	CJ Stage
Recycling take-back scheme from company / retailer	✓	✓		Consideration, disposal
Instructions for return process	✓			All but use
Request consumers to check local recycling rules	✓			Consideration, disposal
Instruction for how to recycle (at home or out of home)	✓			Consideration, disposal
QR code for reuse tracking			✓	Use, disposal
Information about benefits of take-back scheme (for reuse or recycling)			✓	All but use

Intervention Strategies	C	O	M	CJ Stage
Instructions for cleaning RPS at home	✓	✓		Consideration, Purchase, Use, Disposal
Information about the benefits of cleaning and maintaining RPS at home *	✓		✓	Consideration, Purchase, Use, Disposal

\* No interventions addressed motivation for hygiene among the sample in this model. This is a proposal using the intervention functions of education and persuasion. Other applicable intervention functions (incentivization, coercion) did not seem as practical to implement.

Intervention Strategies	C	O	M	CJ Stage
Subscription with automatic reordering and financial incentives	✓	✓	✓	Consideration, Purchase, Loyalty
Subscription with financial incentives	✓	✓	✓	Consideration, Purchase, Loyalty
Refill version with discount on PAYG	✓	✓	✓	Consideration, Purchase, Loyalty
Incentives (other than discounts) on PAYG	✓		✓	Consideration, Purchase, Loyalty
Possible to repurpose any existing packaging	✓			

Figure 49. Behavior change intervention strategies for refill at home with diluting refill method.

Prepared by author.

## Questions for Future Research

The reuse models and samples analyzed in this research were based on existing cases of reuse offerings. The work built on reuse frameworks referenced in the literature, such as the reuse model from EMF (2019), the types of reusable packaging from Coelho et al. (2020), the reuse system elements from Muranko et al. (2021), and the customer journey map from Zeeuw van der Laan & Aurisicchio (2019). Although these frameworks are relatively recent, this research has shown that reuse models continue to advance and evolve. This research has applied a novel method combining the behavior change wheel and the customer journey maps proposed by Elizarova and Kahn (2018) in the field of sustainability.

This research characterized what needs to change for consumers to switch to RPS products and what interventions are present across the CJM. Since this research was based on online research observations, as a future consideration, this framework could be used in an experimental setting that manipulates the use of the different interventions and validates how consumers respond to the changes. In addition, research could be conducted in which this framework is applied to interventions in packaging design. Findings could help complement the present research by assessing how much packaging design choices enable or hinder consumers from switching to RPS systems; I identified in this research that the use stage and disposal stage could be impacted by the packaging design and interventions applied there.

## Conclusions

Introducing reusable packaging is a significant change for producers, retailers, and consumers (Coelho et al., 2020). Businesses are facing increasing pressure to address



the issue of plastic waste generated by their products (Zucchella et al., 2022); therefore, they need to reconsider their dependence on disposable packaging (EMF, 2019).

Reusable packaging systems (RPS) can help address the plastic packaging waste issue, but their implementation depends on consumer adoption (WEF, 2021). Research into FMCG reuse systems is growing, focusing mainly on the packaging, analyzing RPS models, and consumer adoption challenges (Coelho et al., 2020; EMF, 2019, 2023e; Muranko et al., 2021; Zeeuw van der Laan & Aurisicchio, 2019). This thesis examined how interventions from companies in the customer journey can enable the adoption of reusable packaging behaviors.

I explored and evaluated how FMCG companies enable sustainable consumption behavior with RPS products through the customer journey. The research is based on a novel application of the Behavior Change Wheel to understand barriers and enablers for consumers to switch to RPS products and the Customer Journey Mapping to analyze the interventions present across the journey in a temporal way. The findings from both methods were combined into a scorecard to help understand which products were better at enabling consumers to switch to RPS products.

I selected 20 samples from RPS products in the market, divided by incumbent versus challenger companies. The purpose of choosing and comparing both groups was because incumbents have struggled to move beyond pilots to scalable solutions. At the same time, challenger companies can build their business model around circularity and sustainability offerings. Based on the scorecard results, RPS products from challenger companies were better at enabling consumers to switch to RPS products than incumbent companies. Additionally, the top five performing RPS products were all from challenger

companies. Another key finding, although not part of the initial hypothesis, is how the characteristics of the reuse model affected the customer journey map and interventions, thus impacting behavior change. Due to this, the RPS products were classified into six groups: return from home, return on the go with sequential reuse behavior, return on the go with exclusive reuse behavior, and refill at home with diluting, placing, and pouring refill methods.

Five factors were identified in the literature as critical to address when implementing RPS products: understanding RPS benefits, convenience, affordability, hygiene, and accessible infrastructure. RPS products with higher scores addressed all five factors. Refill from home with pouring or placing refill methods had the lowest scores among the RPS products and missed addressing hygiene and/or accessible infrastructure. Return from home products missed addressing affordability.

Most interventions in the customer journey were found in the consideration and purchase stage, leaving post-purchase with fewer interventions. This finding suggests there are opportunities for companies to support consumers further in the post-purchase stage and increase loyalty. RPS products with higher scores also had psychological capability, physical opportunity, social opportunity, automatic motivation, and reflective motivation addressed with high individual scores per factor. The results show that most interventions addressed capability. Regarding the intervention functions, the most frequently used are education (30%), enablement (22%), persuasion (15%), training (13%), and environmental restructuring (13%). Incentivization (5%) was initially expected to be among the most used intervention functions, as it would mean companies provide some incentives or rewards to increase motivation.

Overall, findings in this research demonstrate the complexities of how consumers engage with RPS products and whether companies have applied interventions to help consumers overcome adoption barriers. The results contribute to the ongoing research on the transition to CE for plastics and how to make RPS viable and scalable in the near future.

## Appendix 1

### Intervention Coding Guidelines

Table 19. List of technical interventions identified in the customer journey maps.

Intervention	Explanation and coding aid
1. Collection at home on the next delivery	Customers can access collections at home. Note: Only applicable to return from home model.
2. Customer reviews on RPS product	Customer review functionality available, with rating and/or comments
3. Delivery of RPS among the rest of the groceries	When it is possible to purchase RPS via retailers, the customers benefit from receiving RPS among other groceries.
4. Drop-off locations with good accessibility	The customer has access to multiple drop-off locations, which can be easily accessible, like post offices, post-boxes, or collect+ locations. Not applicable when only selected stores allow for drop-off. Note: Only applicable to return on the go model.
5. Free return label or envelop provided with delivery	Information that delivery will also include a free return label or envelope. Note: Only applicable to return on the go model. I also added 6I (L'Occitane), as they provide an envelope to return for recycling.
6. My favorites or purchased before list	Functionality online to either create a favorites list or have the item saved as purchased before.
7. Possible to buy from retailers	In the consideration stage, consumers could search where to buy the product and find the product is sold directly by the company and via retailers, so consumers can choose where to buy.

Intervention	Explanation and coding aid
8. Possible to repurpose any existing packaging	Information that it is possible to reuse any suitable container at home. Note: This applies only to RPS products with generic refillable parent packaging.
9. QR code for reuse tracking	The company includes a QR code in the packaging to inform consumers how often the packaging has been used. Note: only applies for return from home and return on the go with sequential reuse behavior.
10. Recycling take-back scheme from company/retailer	Either the company or retailer has a take-back scheme for recycling. Prompts consumers to search for convenient locations and plan to go there. Note: only applicable to refill at home with placing or pouring method. It is not applicable to refill at home with the diluting method as the refill is dissolved in water, leaving no waste.
11. Refill version with a discount on PAYG	When a company or retailer sells both refill and regular versions, and the refill version is discounted compared to the full pay-as-you-go (PAYG) version. Note: only applicable to RPS products that have a regular version.
12. Incentives (other than discounts) on PAYG	Consumers can access loyalty points or returnable deposits on pay-as-you-go (PAYG)
13. Search function on delivery and collection dates per postcode	Consumers can search for delivery dates and collection dates based on their postcode. It does not apply when only for delivery, as this would not be a functionality exclusive to RPS. Note: Applicable only for return from home model.
14. Search function to find retailers selling the product	Stockists or retailers finder based on postcode directly from the product website.
15. Self-service to request a free return label	Link available to create a free return label.

Intervention	Explanation and coding aid
	Note: Only applicable to return on the go model.
16. Subscription with automatic reordering	Subscription available with automatic reordering only
17. Subscription with automatic reordering and financial incentives	Subscription available with both automatic reordering and financial rewards
18. Subscription with financial incentives	Subscriptions are available with financial incentives, such as discounts and delay deposit charges.

*Prepared by author based on observations from sample products websites.*

Table 20. List of information interventions identified in the customer journey maps.

Intervention	Explanation and coding aid
1. Certification on positive impact from product or company	Certifications related to RPS or sustainability. Example: B-Corp, EcoCert, Cradle-to-cradle
2. Information about benefits of take-back scheme (for reuse or recycling)	Information to motivate consumers to return empties for reuse or recycling and ensure packaging is on a trustworthy route to recovery.
3. Information about environmental benefits of RPS solution	Example: plastic-free, eco-friendly, circular economy, charity work, reducing carbon emissions
4. Information about how RPS works	Description of how RPS operates includes infographics of the process.
5. Information about necessary and suitable resources needed to operate RPS	Communication about what items are needed to operate RPS, like bespoke cases or generic dispensers available at home.

Intervention	Explanation and coding aid
6. Information about RPS cleaning process and standards from company	<p>Communication that the company cleans reusable and returnable packaging. Ex. quality controls, explanation of the process, packaging safety measures.</p> <p>Note: Only applicable to return from home and return on the go models.</p>
7. Information about the personal positive impact of changing behavior	<p>Example: amount of plastic saved, number of times packaging is reused when returned, donations per purchase</p>
8. Information that the product is refillable, returnable, or reusable	<p>The packaging is refillable, returnable, and/or reusable when the company mentions it. It also includes labels or images sharing this information.</p>
9. Instruction for how to recycle (at home or out of home)	<p>When a company goes beyond just saying an item is recyclable and provides details of how to recycle (ex., Link to recycle now)</p> <p>Note: only applicable to refill at home with placing or pouring method. It is not applicable to refill at home with the diluting method as the refill is dissolved in water, leaving no waste.</p>
10. Instructions for cleaning RPS at home	<p>Instructions for cleaning and maintaining RPS in good condition and/or information on consequences of not cleaning RPS.</p>
11. Instructions for how to assemble or refill RPS	<p>Description of how RPS is assembled or refilled includes infographics.</p> <p>Note: Only applicable on return on the go with sequential reuse and refill at home with placing, diluting, or pouring refill methods. This is because the “Prepare” activity in the Use Stage is required.</p>
12. Instructions for the return process	<p>Description of how customers can return packaging includes infographics.</p> <p>Note: Only applicable to return from home and return on the go models.</p>
13. Notification when issues with return	<p>Information that customers would be notified if any issues happen during return.</p> <p>Note: Applicable to return from home or return on the go.</p>

Intervention	Explanation and coding aid
14. Regular version references refill version	<p>When there is a regular and refill version, the regular version references the refill version.</p> <p>Note: only applicable to RPS products that have a regular version.</p>
15. Request consumers to check local recycling rules	<p>Prompts consumers to research how to recycle packaging.</p> <p>Note: only applicable to refill at home with placing or pouring method. It is not applicable to refill at home with the diluting method as the refill is dissolved in water, leaving no waste.</p>
16. Request consumers to leave empties outside for collection on the next delivery	<p>Prompts consumers to remember to leave empties outside for collection before the next delivery.</p> <p>Note: Only applicable to return from home model.</p>
17. Video showing how RPS operates	<p>Video showing how other people use RPS could include the customer journey or focus on activities.</p>

*Prepared by author based on observations from sample products websites.*



## Appendix 2

### Behavior Change Technique Taxonomy

Table 21. Behavior change technique (BCTs) taxonomy and intervention functions.

BCT No.	BCT Label	Definition	Intervention Function
1.1	Goal setting (behavior)	<p>Set or agree on a goal for the behavior to be achieved.</p> <p>Note: Only code goal setting if there is sufficient evidence that the goal was set as part of the intervention.</p> <p>If the goal defines a specific context, frequency, duration, or intensity, also code 1.4, Action planning.</p>	Enablement
1.2	Problem solving	<p>Analyze or prompt the person to analyze factors influencing the behavior and generate or select strategies that include overcoming barriers and/or increasing facilitators.</p> <p>Note: barrier identification without solutions is not sufficient.</p>	Enablement
1.4	Action planning	<p>Prompt detailed planning of behavior performance (must include at least one of context, frequency, duration, and intensity). Context may be environmental (physical or social) or internal (physical, emotional, or cognitive).</p> <p>Note: evidence of action planning does not necessarily imply goal setting, only code latter if sufficient evidence.</p>	Enablement
2.2	Feedback on behavior	<p>Monitor and provide informative or evaluative feedback on the performance of the behavior (e.g., form, frequency, duration, intensity)</p>	Education, persuasion, incentivization, coercion

BCT No.	BCT Label	Definition	Intervention Function
2.7	Feedback on outcome(s) of behavior	Monitor and provide feedback on the outcome of the performance of the behavior.	Education, persuasion, incentivization, coercion, training
4.1	Instruction on how to perform a behavior	Advise or agree on how to perform the behavior (includes ‘Skills training’)	Training
4.2	Information about antecedents	Provide information about antecedents (e.g., social and environmental situations and events, emotions, cognitions) that reliably predict the performance of the behavior.	Education
5.3	Information about social and environmental consequences	Provide information (e.g., written, verbal, visual) about the social and environmental consequences of performing the behavior.	Education, persuasion
5.6	Information about emotional consequences	Provide information (e.g., written, verbal, visual) about the emotional consequences of performing the behavior.	Education, persuasion
6.1	Demonstration of the behavior	Provide an observable sample of the performance of the behavior, directly in person or indirectly, e.g., via film or pictures, for the person to aspire to or imitate (includes ‘Modelling’).  Note: if provided with instructions on how to perform, also code 4.1, Instruction on how to perform the behavior.	Training, modeling
6.3	Information about others’ approval	Provide information about what other people think about the behavior. The information clarifies whether others will like, approve, or disapprove of what the person is doing or will do.	Education, persuasion
7.1	Prompts/cues	Introduce or define environmental or social stimulus to prompt or cue the behavior. The prompt or cue would normally occur at the time or place of performance.	Education, environmental restructuring

BCT No.	BCT Label	Definition	Intervention Function
		Note: when a stimulus is linked to a specific action in an if-then plan to include one or more of frequency, duration, or intensity, also code 1.4, Action planning.	
8.2	Behavior substitution	Prompt substitution of the unwanted behavior with a wanted or neutral behavior.	Enablement
8.3	Habit formation	Prompt rehearsal and repetition of the behavior in the same context repeatedly so that the context elicits the behavior.	Training
9.1	Credible source	Present verbal or visual communication from a credible source in favor of or against the behavior.  Note: if about social, environmental, or unspecified consequences, also code 5.3, Information about social and environmental consequences	Persuasion
10.1	Material incentive (behavior)	Inform that money, vouchers, or other valued objects will be delivered if there has been effort and/or progress in performing the behavior.  Note: If the reward is delivered, also code 10.2, Material reward (behavior).	Education
10.2	Material reward (behavior)	Arrange for the delivery of money, vouchers, or other valued objects if there has been effort and/or progress in performing the behavior.  Note: If informed of reward in advance of rewarded behavior, also code one of 10.1, Material incentive (behavior).	Incentivization
10.11	Future punishment	Inform that future punishment or removal of reward will be a consequence of the performance of an unwanted behavior.	Coercion

BCT No.	BCT Label	Definition	Intervention Function
11.2	Reduce negative emotions	Advise on ways of reducing negative emotions to facilitate the performance of the behavior.	Enablement
12.1	Restructuring the physical environment	Change or advise to change the physical environment to facilitate the desired behavior's performance or create barriers to the unwanted behavior (other than prompts/cues, rewards, and punishments).	Environmental restructuring, enablement
12.5	Adding objects to the environment	Add objects to the environment to facilitate the performance of the behavior.  Note: Information (e.g., written, verbal, visual) in a booklet or leaflet is insufficient.  If the environment is changed beyond the addition of objects, also code 12.1, Restructuring the physical environment.	Environmental restructuring, enablement
14.2	Punishment	Arrange for aversive consequences contingent on the performance of the unwanted behavior.	Incentivization, coercion, enablement
14.6	Situation-specific reward	Arrange for reward following the behavior in one situation but not in another.	Incentivization

*Prepared by author based on Michie et al. (2014) for the 23 BCTs in this research and their corresponding intervention functions.*

### Appendix 3

#### Type of Reusable Packaging in the Sample

Table 22. Types of reusable packaging in the selected sample.

ID	Sample RPS Product	Reuse Models	Type of Reusable Packaging	Reusable packaging description	Refill packaging description	Refill method	Refill packaging disposal (from Recycle Now)	Reusable Packaging Design
1I	SodaStream Cylinder Gas Refill	Return on the go	Returnable Packaging	Returnable gas container				Bespoke
1C	Belu Sparking Water Returnable Bottle	Return from home	Returnable packaging	Returnable bottle				Bespoke
2I	Nescafe Refill	Refill at home	Refillable parent packaging	Reusable container	Refill pouch	Pouring	Recycle out of home	Generic
2C	Worship Instant Coffee Jar	Return from home	Returnable packaging	Returnable container				Bespoke
3I	Eucerin Night Cream Refill	Refill at home	Refillable parent packaging	Reusable container	Refill pod	Placing	Recycle out of home	Bespoke
3C	UpCircle Beauty Return + Refill Night Cream	Return on the go	Returnable packaging	Returnable container				Bespoke

ID	Sample RPS Product	Reuse Models	Type of Reusable Packaging	Reusable packaging description	Refill packaging description	Refill method	Refill packaging disposal (from Recycle Now)	Reusable Packaging Design
4I	Palmolive Ecorefill Hand Soap	Refill at home	Refillable parent packaging	Reusable dispenser bottle	Refill pouch	Pouring	Recycle out of home	Generic
4C	Bower Natural Hand Wash Refill	Return on the go	Refillable parent packaging	Reusable dispenser bottle	Returnable refill pouch	Pouring		Generic
5I	Johnson's Baby Shampoo Ecorefill	Refill at home	Refillable parent packaging	Reusable dispenser bottle	Refill container	Pouring	Recycle at home or recycle out of home	Generic
5C	Naif Shampoo for Baby and Kids Refill	Refill at home	Refillable parent packaging	Reusable dispenser bottle	Refill pouch	Pouring	Recycle out of home	Generic
6I	L'Occitane Shower Gel Refill	Refill at home	Refillable parent packaging	Reusable dispenser bottle	Refill pouch	Pouring	Recycle out of home	Generic
6C	Beauty Kitchen Body Wash	Return on the go	Returnable packaging	Returnable bottle				Bespoke
7I	Lancôme Refillable Perfume	Refill at home	Refillable parent packaging	Reusable spray bottle	Refill bottle	Pouring	Recycle at home or recycle out of home	Bespoke
7C	EPC Perfume Refill	Refill at home	Refillable parent packaging	Returnable spray bottle	Refill bottle	Pouring	Recycle at home or recycle out of home	Bespoke
8I	The Body Shop Lipstick Bullet Refill	Refill at home	Refillable parent packaging	Reusable container	Refill pod	Placing	Recycle out of home	Bespoke

ID	Sample RPS Product	Reuse Models	Type of Reusable Packaging	Reusable packaging description	Refill packaging description	Refill method	Refill packaging disposal (from Recycle Now)	Reusable Packaging Design
8C	Zao Refill Matt Lipstick	Refill at home	Refillable parent packaging	Reusable container	Refill pod	Placing	Recycle out of home	Bespoke
9I	Ecover Laundry Liquid 5L Refill	Refill at home	Refillable parent packaging	Reusable bottle	Refill container	Pouring	Recycle at home or recycle out of home	Generic
9C	Miniml Laundry Liquid Bulk Refill	Return on the go	Refillable parent packaging	Reusable bottle	Returnable refill container	Pouring		Generic
10I	Cif Kitchen Spray Ecorefill	Refill at home	Refillable parent packaging	Reusable spray bottle	Refill pod	Pouring	Recycle at home or recycle out of home	Bespoke
10C	Ocean Saver Kitchen Cleaner Ecodrop	Refill at home	Refillable parent packaging	Reusable spray bottle	Refill drop	Diluting		Generic

*Compiled by author. In the ID, I refers to incumbent companies, and C refers to challenger companies.*

## Appendix 4

### Reuse System Elements in the Sample

Table 23. Reusable packaging ownership and behavior in the selected sample.

ID	Sample RPS Product	Ownership of reusable packaging	Ownership of refill packaging	Reuse behavior for RPS	Disposal behavior for refill	Consumer responsibility	Company responsibility	Reverse Logistics
1I	SodaStream Cylinder Gas Refill	Company owned		Sequential reuse		N/A	Cleaning and refilling	Drop off in Collect+ stores
1C	Belu Sparking Water Returnable Bottle	Company owned		Sequential reuse		Cleaning	Cleaning and refilling	Dedicated home collection on next delivery
2I	Nescafe Refill	Consumer owned	Consumer owned	Exclusive reuse	Single-use recycling	Cleaning and refilling	N/A	N/A
2C	Worship Instant Coffee Jar	Company owned		Sequential reuse		Cleaning	Cleaning and refilling	Dedicated home collection on next delivery
3I	Eucerin Night Cream Refill	Consumer owned	Consumer owned	Exclusive reuse	Single-use recycling	Cleaning and refilling	N/A	N/A
3C	UpCircle Beauty Return + Refill Night Cream	Consumer owned		Exclusive reuse		Cleaning	Cleaning and refilling	Drop off at Post Office



ID	Sample RPS Product	Ownership of reusable packaging	Ownership of refill packaging	Reuse behavior for RPS	Disposal behavior for refill	Consumer responsibility	Company responsibility	Reverse Logistics
4I	Palmolive Ecorefill Hand Soap	Consumer owned	Consumer owned	Exclusive reuse	Single-use recycling	Cleaning and refilling	N/A	N/A
4C	Bower Natural Hand Wash Refill	Consumer owned	Company owned	Exclusive reuse	Sequential reuse	Cleaning and refilling	Cleaning and refilling	Drop off at Post Office
5I	Johnson's Baby Shampoo Ecorefill	Consumer owned	Consumer owned	Exclusive reuse	Single-use recycling	Cleaning and refilling	N/A	N/A
5C	Naif Shampoo for Baby and Kids Refill	Consumer owned	Consumer owned	Exclusive reuse	Single-use recycling	Cleaning and refilling	N/A	N/A
6I	L'Occitane Shower Gel Refill	Consumer owned	Consumer owned	Exclusive reuse	Single-use recycling	Cleaning and refilling	N/A	N/A
6C	Beauty Kitchen Body Wash	Company owned		Sequential reuse		N/A	Cleaning and refilling	Drop off at Post Office
7I	Lancôme Refillable Perfume	Consumer owned	Consumer owned	Exclusive reuse	Single-use recycling	Cleaning and refilling	N/A	N/A
7C	EPC Perfume Refill	Consumer owned	Consumer owned	Exclusive reuse	Single-use recycling	Cleaning and refilling	N/A	N/A
8I	The Body Shop Lipstick Bullet Refill	Consumer owned	Consumer owned	Exclusive reuse	Single-use recycling	Cleaning and refilling	N/A	N/A

ID	Sample RPS Product	Ownership of reusable packaging	Ownership of refill packaging	Reuse behavior for RPS	Disposal behavior for refill	Consumer responsibility	Company responsibility	Reverse Logistics
8C	Zao Refill Matt Lipstick	Consumer owned	Consumer owned	Exclusive reuse	Single-use recycling	Cleaning and refilling	N/A	N/A
9I	Ecover Laundry Liquid 5L Refill	Consumer owned	Consumer owned	Exclusive reuse	Single-use recycling	Cleaning and refilling	N/A	N/A
9C	Miniml Laundry Liquid Bulk Refill	Consumer owned	Company owned	Exclusive reuse	Sequential reuse	Cleaning and refilling	Cleaning and refilling	Drop off at Post Office
10I	Cif Kitchen Spray Ecorefill	Consumer owned	Consumer owned	Exclusive reuse	Single-use recycling	Cleaning and refilling	N/A	N/A
10C	Ocean Saver Kitchen Cleaner Ecodrop	Consumer owned	Consumer owned	Exclusive reuse	Single-consumption	Cleaning and refilling	N/A	N/A

*Compiled by author. In the ID, I refers to incumbent companies, and C refers to challenger companies.*

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