RELEASING THE REUSE REVOLUTION IN THE GLOBAL SOUTH

THE TRANSITION OF BUSINESSES FROM SINGLE-USE PLASTIC PACKAGING TO REUSE MODELS AT THE BASE OF THE PYRAMID IN INDONESIA

MASTER'S THESIS BY WIEBE BOR

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Student name: Wiebe Bor
Student code: 5522781
Contact details: wiebe.bor@gmail.com
University supervisor: Dr. Femke van Noorloos
Second reader: Dr. Gery Nijenhuis
University: Utrecht University
Master programme: Sustainable Development
Master track International development track
Internship institution: Enviu
Supervisor host organisation: Sanderine van Odijk

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Summary

With billions of single-use plastics sachets begin sold in Indonesia, were waste management is lacking, reuse is needed to solve the plastic waste problem. This research analyses the transition towards reuse at the Base of the Pyramid (BoP) in Indonesia using a Multi-Level Perspective.

At the global and Indonesian landscape, low oil and plastic prices keep up single-use plastics, while increasing awareness of the plastic waste problem is putting pressure on the single-use plastics regime. The Ellen MacArthur Foundation is channelling this pressure into a specific call for reuse.

The transition towards reuse at the BoP is still a very early phase however. Some start-ups are piloting at a small scale at the local level, but multinationals have not dared to pilot reuse at the BoP yet.

There are several drivers and barriers along the transition dimensions. There are safety barriers, such as contamination, hygiene and related legal concerns that hold the multinationals back. The industry is found to be risk averse and is not innovative. Start-ups however test out new technologies that make reuse more attractive. Low sachet prices are a barrier in the market dimension, but only a small discount or a reward is enough for reuse at the BoP. Reuse can be more convenient due to control over the dosage. Moreover, culturally Indonesian are open to reuse and are already used to refilling. At the policy level there is a ban on sachets in the making that could provide a window of opportunity.

Connections between the different levels proved to be important. Start-ups have problems getting funds in Indonesia. International sustainable investors, awards and competitions are needed to scale up. Challenges, awards and internationals conferences also provide a platform for entrepreneurs to exchange knowledge with each other and learn about developments within the sector.

Start-ups and incumbents complement each other. Reuse start-ups can pioneer reuse models, because they are agile, innovative and willing to take risks. However, they need the market access and financial power of multinationals. Incumbents see the small start-ups as symbiotic and showed great interest in piloting with the start-ups. However, the two actors had trouble finding each other. Entrepreneurs also need to be careful that incumbents do not gain too much power as an investor. Larger start-ups are in a better position to negotiate and provide the logistics and the platform that is needed to realize collaboration with multinationals.

Table of contents

1. Introduction

1.1. Societal background and problem

Every day millions of single-use plastic sachets are sold in the global south. This trend started the beginning of the century, when the case was made for the 'fortune at the Bottom of the Pyramid (BoP)'. Prahalad and Hart (2002) argued that the world's poor could be served and would benefit if multinationals made their products more available and accessible. The multinationals would in turn stand to make an enormous profit. Consequently, multinationals sparked what has been dubbed the 'sachet revolution'. Nowadays sachets containing small amounts of water, food, shampoo, toothpaste and conditioner and many other products are sold to the BoP. However, the consumption of huge amounts of sachets is a plastic waste nightmare. Countries in the global south face many challenges regarding their plastic waste: waste management is often lacking, and sachets are consumed on the spot and dumped in the environment (Nulkar, 2016).

Indonesia is such a country where large sales in sachets are causing increasing problems. Indonesia is an growing and emerging economy, but is also highly unequal: most people are not benefitting from the growth (World Bank, 2015). Most consumers are still buying their goods in small packaging and sachets at traditional retail outlets, such as the mom-and-pop stores called *warungs* (Figure 1). For personal care products 62% or sold in small packs (Euromonitor, 2015b). However, 81% of the waste is inadequately managed (Jambeck *et al*., 2015). The sachets are burned, end up in the environment, in the rivers or the ocean (Poggenpohl, 2018). Consequently, Indonesia is the second largest source of plastics entering the ocean (Jambeck *et al*., 2015). A solution is needed to solve the plastic pollution crisis.

Figure 1. Sachets hanging in the font of a *warung* store.

Fast-Moving Consumer Goods (FMCG) companies and packaging producers are now mainly using single-use plastic packaging. Sachet packaging is multi-layered low-quality plastic, that is not cost-effective to recycle. Bioplastics alternatives are too expensive, often have negative effects on local food security, and, contrary to popular belief, do not break down in the environment and need processing (Arikan & Ozsoy, 2015).

New innovative reuse and refill business models are needed to change the system towards a zero-waste economy. Several such innovative models have emerged lately. Algramo, for example, provides affordable but high-quality basic foods, such as rice and beans from vending machines in neighbourhood stores in Chile. Reuse models are emerging, however multinational FMCG companies and plastic package producers are still hesitant to jump aboard. It is therefore vital to understand how niche innovations can be mainstreamed, scaled up and adopted by the multinationals.

1.2. Previous research and research gap

The field of sustainability transitions offers several conceptual frameworks that give insight in how the transition of a sustainable innovation into an established regime can take place. Geels (2002) provides an overview of such a transformational process and describes several transformation pathways that new innovations can take in his Multi-Level Perspective (MLP) framework. Hockerts and Wüstenhagen (2010) describe in more detail the interplay that can take place between innovative start-ups and incumbents over time.

While there have been studies on the sustainability transformation towards a circular economy (Jurgilevich *et al*., 2016) and better waste management (e.g. Oyake-Ombis, van Vliet, & Mol, 2015) research on the transition towards sustainable packaging is lacking so far. It is still unknow how the transition towards sustainable packaging is moving along, and what is needed to attain this transition. It is a very recent topic, with both the Centre for Research in Sustainable Packaging (CRISP) and Cleaning Litter by developing and Applying Innovative Methods in EU seas (CLAIM) currently researching it. This research contributes to this science frontier and is unique because it focuses specifically on reuse and the emerging market context.

1.3. Research objective and questions

The research aims to understand the sustainability transition of single-use plastic sachets towards reuse models at BoP in Indonesia from a company perspective. This is done firstly by mapping the transition by analysing the activities of both innovative start-ups and multinational FMCG companies. Secondly, the insights, experiences and attitudes towards reuse of start-ups and multinationals are explored to understand current barriers and drivers, and to make recommendations for the transition. Lastly, by analysing the dynamics between start-ups and multinationals an understanding of how

these actors can contribute to the transition together is created. This aim leads to the following research questions:

How can the sustainability transition from flexible plastic packaging and sachets to reusable packaging be made by start-ups and multinationals at the Base of the Pyramid in Indonesia?

1. What is the background of flexible packaging and sachets in Indonesia?
2. What is the current status of the sustainability transition towards reusable packaging?
3. How do start-ups and multinationals view the case for a sustainability transition towards reusable packaging?
4. What opportunities do start-ups and multinationals see to advance the transition?
5. How are the current dynamics between start-ups and multinationals?
6. How can the dynamics between start-ups and multinationals contribute to the transition?
7. How can start-ups and multinationals make the transition while contributing to environment and the BoP?

1.4. Scientific relevance

This study contributes to the knowledge of how sustainability transitions take place in multiple ways. The study contributes to existing knowledge by combing theory with new topics. Sustainable packaging and reuse models are innovations that have not been researched in sustainability transitions. By mapping this transition for the first time, the sustainability transition literature is broadened. Packaging is a peculiar addition. Sustainability transition usually entail complex technical goods such as cars, or public goods such as energy. Packaging is a product with a short lifespan and unique because it contains different products. The findings therefore provide valuable new insights in what a sustainability transition can entail.

The research also adds to theory because it contributes to several shortcomings and the future research agenda that has been identified for sustainability transitions and the MLP. The MLP is criticized because it was lacking a consideration of the agency and power of individual actors (Geels, 2007). This study contributes to this topic by specifically exploring the roles of two actors within the transition, start-ups and multinationals, and their relationships. By zooming in on these actors it becomes visible how they are individually contributing to the transition, and power issues in the dynamics between the two actors are uncovered. Sustainability transitions are also criticized because they lack a consideration for geography (Markard, Raven, & Truffer, 2012; Smith, Voß, & Grin, 2010). Sustainability transitions have mostly been studied in the western context and can play out differently in the global south (Markard *et al*, 2012). This study explores a sustainability transition in the context of an emerging market. Moreover, it describes how global multinationals with headquarters in western countries look at the sustainability transition in a specific national state in the global south. It also explores how

transnational networks of entrepreneurs connect them to other actors. Another shortcoming of sustainability transitions is that it is often left out in studies wat 'sustainability' means in a sustainability transition (Markard *et al*, 2012). This study is unique because it combines both social issues from the discussion about BoP products with the environmental viewpoints that normally dominates the concept of sustainability transitions. By exploring what both social development and environmental sustainability can mean in the context of reuse in emerging markets, a norm for reaching sustainability in the transition is explored.

1.5. Societal relevance

Poverty and environmental degradation are two enormous global societal concerns. Plastic waste is seen as an increasingly urgent matter worldwide (Williams *et al*., 2019). Plastic pollution is killing aquatic wildlife, destroying ecosystems and harming the poorest people the planet (Chae & An, 2018; McDermott, 2016). Indonesia has the largest open landfill site of South East Asia, one of the most polluted rivers in the world, and is the second largest source of plastic waste leakage into the oceans (Belinawati, Soesilo, Asteria, & Harmain, 2018; Jambeck *et al*., 2015; Oman-Reagan, 2012).

To solve this issue, it is imperative that there is more information about solutions for this problem. However, there mainly attention for recycling in the business and government circles, while this at best is only a part of the solution and is not the preferred solution in the waste management hierarchy (Holt, 2018). More information on reuse systems in needed in order to avert an environmental crisis (Ellen MacArthur Foundation, 2017).

This study contributes to the valorisation of knowledge around reuse in several ways. Firstly, the findings and the connections made by the researcher are used by the host organisation to set up a new pilot in Indonesia with multinationals. Secondly, reuse entrepreneurs and multinationals that that were open to collaborating and were not connected yet were introduced to each other by the researcher. Lastly, by mapping the reuse transition for the first time and by finding the windows of opportunity, recommendations could be made towards the stakeholders to speed up the transition towards an more sustainable society.

2. Theory

This chapter describes the main theories and concepts that are built upon in this study. The 'base of the pyramid' (BoP) literature gives context and background information on the emergence of sachet packaging, and its claimed positive and negative effects on social development.

Next the Multi-Level Perspective framework (MLP) is used to understand what a sustainable transition towards reuse entails. The MLP is one of the frameworks used in

the field of sustainability transitions that is well suited to this study, because it provides a broad systematic overview and the conceptual tools to map this transition for the first time. Being an overarching framework, the MLP is also well suited to incorporate other theories and frameworks that can be seen as complementary (Smith, Voß, & Grin, 2010). This study incorporates the framework of Strategic Niche Management (SNM) that explores how start-ups can grow. It also looks at the concept of transition pathways to understand the different paths start-ups can take in their development in relation to incumbents. The model of 'Greening Goliaths versus emerging Davids' of Hockerts and Wüstenhagen (2010) describe in more detail the dynamics that take place between these two actors. Barriers and drivers for circular economy and reuse are also being looked at to understand the problems and opportunities for the transition.

Last of all, a closer look is taken into the normative meaning of what 'sustainability' means in the transition towards reuse.

2.1. Base of the pyramid

The term the 'bottom of the pyramid' (BoP) refers to the huge untapped market segment that is made up made the poor. The term was first introduced in the context of business strategy by Prahalad and Hart (2002). They saw the world's poor as underserved by multinationals due to market imperfections, and they were consequently paying a 'poverty premium' trough higher prices. So far, the multinationals had not seen much potential in the poor as a market segment. But Prahalad (2006) argued that they could increase their profits by focussing on affordability, access and availability. Market strategies were developed to get goods to smaller towns and local markets where goods are often sold in smaller quantities. The poor would in turn benefit by lower prices and, economic inclusion. For Hammond and Prahalad (2004) being poor is about a lack of choice. Thus, increasing availability of goods and servicing the needs of the poor increases their development. Following this rationale, Prahalad (2006) even claimed that BoP interventions can even eradicate poverty by 2020.

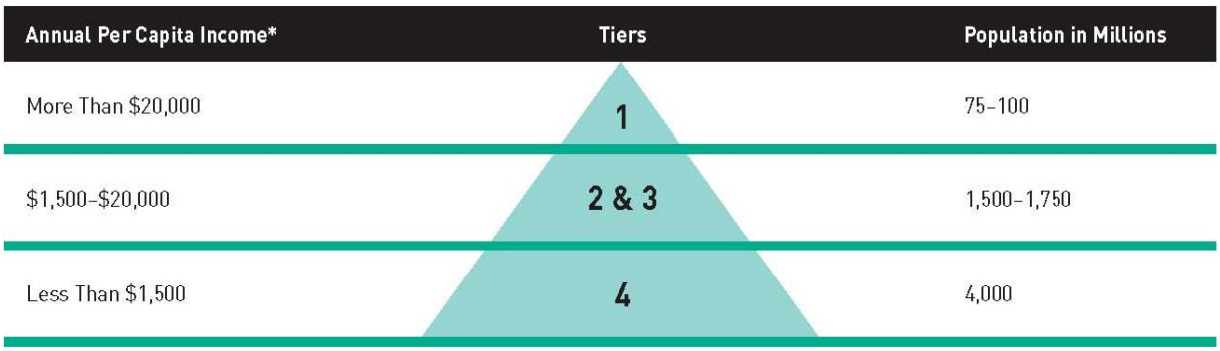

Figure 2. The World Economic Pyramid. Reprinted from "The Fortune at the Bottom of the Pyramid," by Prahalad, C. K., & Hart, S. L., 2002, *Strategy+ Business, 26*(1st), 2-14.

The idea that businesses can reduce poverty by profit maximalization in a market-based system has been met with much criticism from the scientific community (f.e. Banerjee & Duflo, 2007; Davidson, 2009; Karnani, 2007; de Soto, 2000; Sachs, 2005; Seelos & Mair, 2007; Warnholz, 2007). Many feel that targeting the poor as consumers is unethical, because it will lead to business practices which will further their exploitation. In reality the branded products are often more expensive than traditionally supplied by local producers. Moreover, pushing these products through aggressive marketing strategies could be seen as exploitative. Problems of power relations, where the resourceful multinationals push the poor to buy non-essentials instead of much needed goods are especially problematic. A famous example of unethical practices is the sale of skin-whitening cream marketed and pushed by Hindustan Unilever. Some women bought this cream over food that they needed for their family (Karnani, 2007). Another point is that the emergence of BoP products can disrupt self-reliance and social harmony when people become dependent retailers instead of each other. In short, scholars doubt that companies have the best in mind for the poor. Arora and Romijn (2012) also argue not to use the term 'bottom', because is a derogatory way to view the poor, and introduced the term Base of the Pyramid (BoP) instead. They argue that, rather than finding fortune at the BoP, there should be a discourse about creating fortune for the BoP.

In light of these criticisms, a "BoP 2.0" strategy has evolved that sees the BoP as partners and cocreators instead of consumers (Rahman, Amran, Ahmad, & Taghizadeh, 2015). This can be done by involving the poor and by building their skills. Ansari, Munir, and Gregg (2012) argue to look at BoP initiatives from the lens of Sen's Development as freedom, where the economic wellbeing of the poor is viewed through capabilities and functionings, rather than economic concepts such as income (Sen, 1999). Functionings refers to what an individual wants to achieve, while capabilities refer to the ability to achieve this. Capacity development is critical in order for people to lead the lives that they desire. Ansari *et al.* (2012) argue that capability development should be measured by the effect of BoP initiatives on social capital, that is often the primary form of capital in BoP communities. Based on this Ansari *et al.* (2012) argue that BoP communities need the ability to pursue new opportunities and a socially enabling context for knowledge transfers both within the community and with multinationals. For this to happen, BoP initiatives need to be more community centric and focus on building capacities in communities. This new version of BoP also emphasizes an involvement of local agencies, NGOs and 'fringe stakeholders' with important knowledge, skills, and experience (Ansari *et al*., 2012).

The BoP 2.0 concept initially was focused on corporate initiatives. However, it later evolved into the broader concept that includes start-ups (Hart, Sharma, & Halme, 2016). The BoP idea was adopted in the United Nations Development Programme (UNDP) inclusive market report (2008), that presented examples of inclusive businesses models for enterprises of all sizes (Hart, *et al*., 2016). This version spread to other developmental institutions such as the World Bank (Hart, *et al*., 2016). The BoP idea became to be understood as any inclusive business model that increased the wellbeing of the BoP

(Halme, Lindeman, & Linna, 2012). However, despite this attention, most BoP start-ups and corporate initiatives have failed, only achieved moderate successes at great costs, or have been converted to philanthropic programs (Simanis, 2012). Only a few have become successful and achieved substantial scale (Simanis, 2012).

In the case of flexible packaging and sachets, the goods are sold in local mom and pop stores. Changing towards reuse requires working with local business owners, to ensure the safe van correct use of dispensing systems or the return of empty containers (Ellen MacArthur Foundation[EMF], 2019b). Moreover, multinationals will have to build more expensive distribution networks to take care of the logistics of returned packaging (EMF, 2019b). Consequently, there is a potential opportunity to involve the BoP as partners and co-creators in the this collaboration with traditional retail outlets and in the expansion of the logistical network.

2.2. Multi-Level Perspective

Sustainability transitions is a growing field of research that analyses the transformational processes of new sustainable niche innovations that aim to replace established socio-technical regimes (Markard, Raven, & Truffer, 2012). New sustainability innovations strive to achieve sustainable modes of production and consumption, where resources are recirculated in loops of reuse, recycling and renewal (Clark *et al.*, 2016). There are several conceptual frameworks in the field of sustainability transitions.

The Multi-Level Perspective (MLP) of Geels (2002) is a framework that provides a relatively straightforward way of ordering a large and complex transition (Figure 3). It distinguishes three different analytical levels that are relevant for explaining change in socio-technical systems: niches, sociotechnical regimes and landscapes. The MLP posits that transitions come about through the interactions between these analytical levels (Geels, 2002).

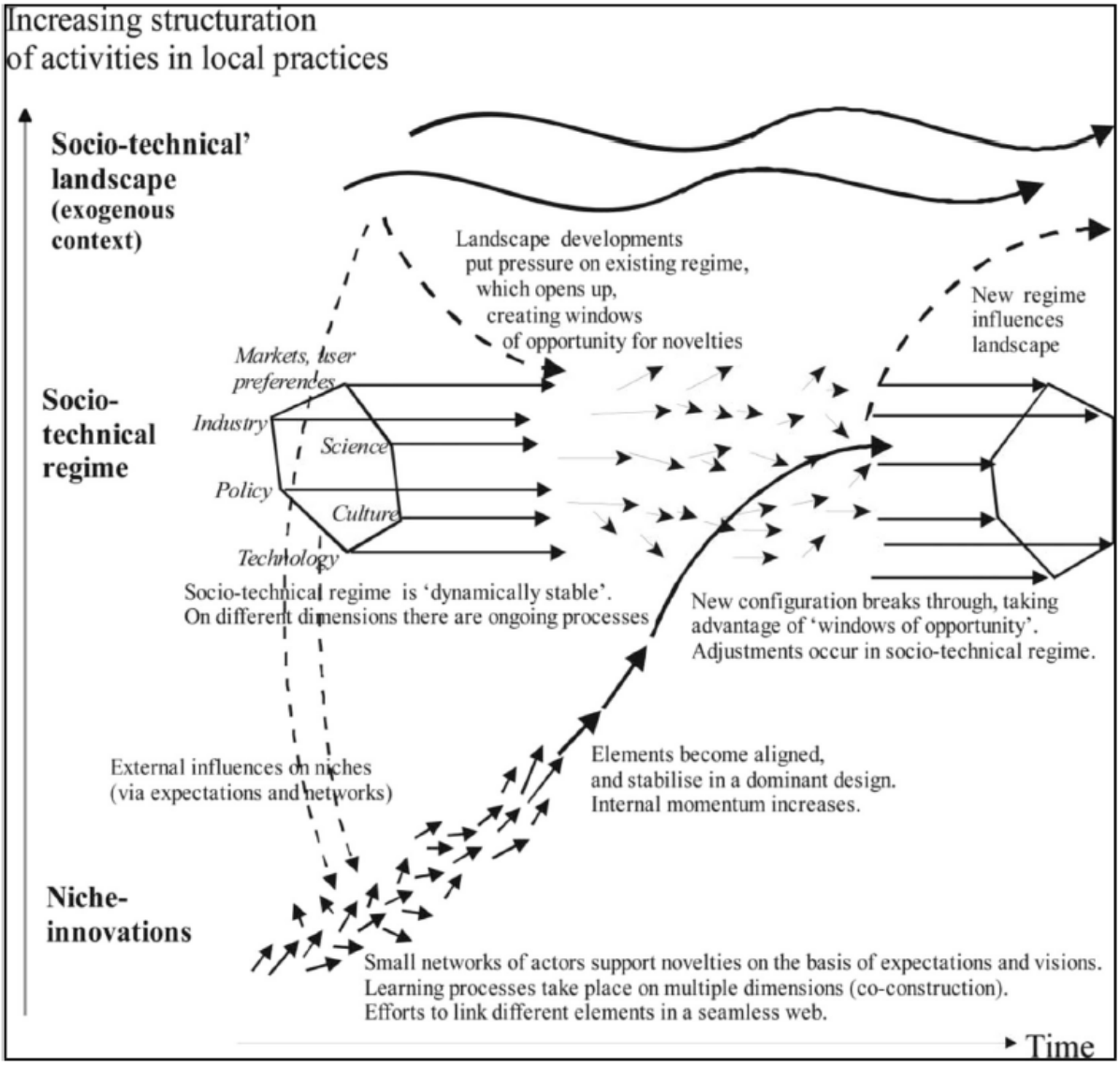

Figure 3. Multi-Level Perspective on Transitions. Adapted from "Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study," By F.W. Geels, 2002, *Research policy*, 31(8-9), 1257-1274.

The landscape level of the MLP represents the exogenous environment that cannot be influenced by the actors (Geels, 2002). Factors such as oil prices, economic growth, wars, immigration, broad political coalitions, cultural norms, environmental problems and paradigms can provide a barrier or a window of opportunity for the transition. Plastic pollution gained significant attention lately, and there is increasing pressure to find environmentally friendly solutions. The case of sachet packaging is especially problematic: smaller packaging means more waste that is produced in places where there is no waste management (Nulkar, 2016).

Regimes represent the current established way of realizing a particular societal function, such as packaging (Smith *et al*., 2010). Regimes do not function on their own, but consist

of a multi-actor network of users, policy makers, societal groups, suppliers, scientists, and investors that interact with each other (Figure 4). Geels (2002) also categorises several socio-technical dimensions: technology, science, industry, markets and user preferences, cultural meaning and policy. Sustainability transitions are thus also shaped by rules, regulations, and the expectations and skills of its users (Kemp, Schot, & Hoogma, 1998). Regimes are therefore conceptualized as socio-technical systems, which recognizes that technologies are embedded in society (Markard *et al.*, 2012). For packaging for example, government regulation on the standardisation of beer bottles has led to the rise of reuse of glass bottles, while the growing demand for convenience has caused a later shift towards the aluminium beer can (Morawski, 2019). Changes in the dimensions can provide a window of opportunity for niche innovations to change the system.

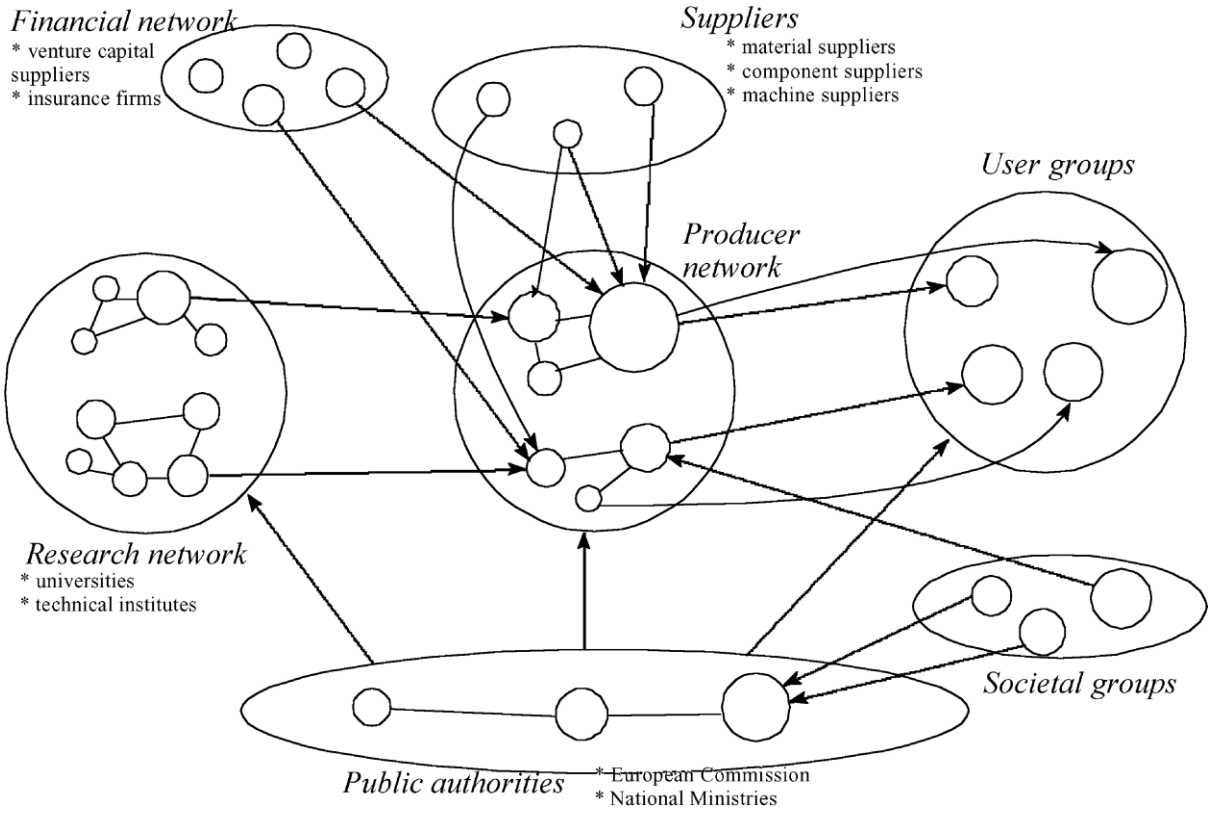

Figure 4. The multi-actor network involved in sociotechnical regimes. Reprinted from "Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study," By F. W. Geels, 2002, *Research policy*, 31(8-9), 1257-1274.

Radical innovations are envisioned to emerge at the niche level (Geels, 2002). Niches are conceptualized as spaces where innovations are protected and can develop without the selection pressures that exist in prevailing regimes (Markard *et al.*, 2012). Examples of niche protection are lead markets, subsidized projects or a specific cultural milieu for early adoption and experimentation (Smith *et al.*, 2010). Strategic Niche Management (SNM) is a framework within the field of sustainability transitions that focusses on the

deliberate creation and support of such niches (Markard *et al.*, 2012). Three processes were distinguished for start-ups to be successful. By experimenting start-ups undergo processes of social learning and become more competitive (Elzen, Hoogma, & Schot, 1996). Moreover, by articulating promising expectations and by networking with different actors, niche innovations can gain momentum and grow (Elzen *et al*., 1996). While start-ups can be important instigators, actors within the regime must become involved for widescale adoption and to mobilise social legitimacy (Smith *et al*., 2010). Some innovations will fail in this process or remain stuck at the niche level, but when innovations do succeed, they will embed themselves into society and enter the level of socio-technical regimes where they will compete with or even replace current regimes (Smith *et al*., 2010).

2.3. Critiques and debates

Geels originally envisioned the MLP to have one niche innovation and one regime. However, later research showed that there are often multiple niche innovations and regimes are in play (Smith *et al*., 2010). Different regimes can interact and influence a transition. For packaging, the waste management regime can, for example, be relevant. There is also often a contest between multiple niches, who might not all be sustainable, and are each positioned differently towards regimes (Scoones *et al*., 2007). In the case of packaging, there are currently three circular business model innovations that aim the make packaging more sustainable: recycling, bioplastics and reuse models.

There has also been more interest in the geographical dimensions of sustainability transitions lately (Markard *et al.*, 2012). The MLP introduces three scales but does not account for spatial differences at these levels. Coenen, Benneworth and Truffer (2012) argue that spatial transition contexts be addressed much more explicitly in future studies, such as the differences between the global presence of multinationals and their reuse activities in Indonesia. Moreover, Markard *et al.* (2012) argue that sustainability transitions have so far mainly been studied in the context of 'western' countries, and that there should be more attention to how they play out in emerging economies.

The main point of critique on the MLP however have been the lack of representation of agency and the bias towards bottom-up change models. Smith, Stirling, and Berkhout (2005) for example criticise the MLP for being too descriptive and structural. Strategies of firms and other actors have so for not received enough attention. There is therefore a call of sustainability transition authors to include the agency of different actor groups and the role of power and politics in future research (Markard *et al.*, 2012). A lack of consideration of agency has also caused too much emphasis on a niche-driven transition in the past. Smith *at al*. (2005), for example, argue that incremental reforms in regimes can also lead to radical transformations over longer periods of time.

2.4. Niche development and pathways

In the beginning SNM focussed mainly on the internal niche mechanisms for the development of niches. In later research it became clear that external factors also play a crucial role; Niche development occurs with the help of broader forces and processes (Schot & Geels, 2008). It was found that changes take place through processes of co-evolution and mutual adaptation within and between different scales. Raven (2006) for example found that niche innovations can be adopted by the regime early on to solve certain problems, and can even be incorporated to transform the regime from within. At the same time MLP researchers also emphasised that innovations come about by learning process on multiple scales.

In response to the criticisms of a lack of consideration agency, power and a bias towards niche-driven transformations, Geels and Schot (2007) supplemented the MLP with a typology of transition pathways. The pathways zoom in on the transformation of a niche to regime, gives more insight in the role that actors play in the transformation and show how path dependencies can be overcome.

There are different paths for a niche innovation toward becoming a socio-technical regime. Geels and Schot (2007) discern four types of pathways. Each path differs in the timing and nature of the interactions amongst actors (Appendix 1). The transformation path takes place when there is a moderate landscape pressure, and when niche innovations have not yet been sufficiently developed. Niche innovations will not break through, but the experiences from niches can be translated and used by regime actors during gradual adjustments in response to the landscape pressures. The de-alignment and re-alignment path happens when landscape change is divergent, large and sudden. This will cause increasing problems for the regime, that will erode and de-align. After this several niche innovations, that have not yet developed, will compete to become the established regime. In the technological substitution pathway, there is also a big landscape change followed by the erosion of the regime, but in this case one new well-developed niche innovation will take over. Lastly, the in the reconfiguration pathway niche innovations are also well developed when landscape developments put a big pressure on the regime. However, in this pathway regimes have a symbiotic relation with niche innovations and will adopt them to solve local problems. The pathways show that the dynamics of niches and regimes also impact regime shifts and that learning processes take place on multiple dimensions.

2.5. Start-ups and incumbents dynamics

Hockerts and Wüstenhagen (2010) describe the dynamics between start-ups and market incumbents in more detail from their perspective on sustainable entrepreneurship. They argue that sustainability transitions are realized by the interplay between sustainability start-ups and market incumbents (Figure 5). On their own, these two actors do not have the ability to transform the existing systems.

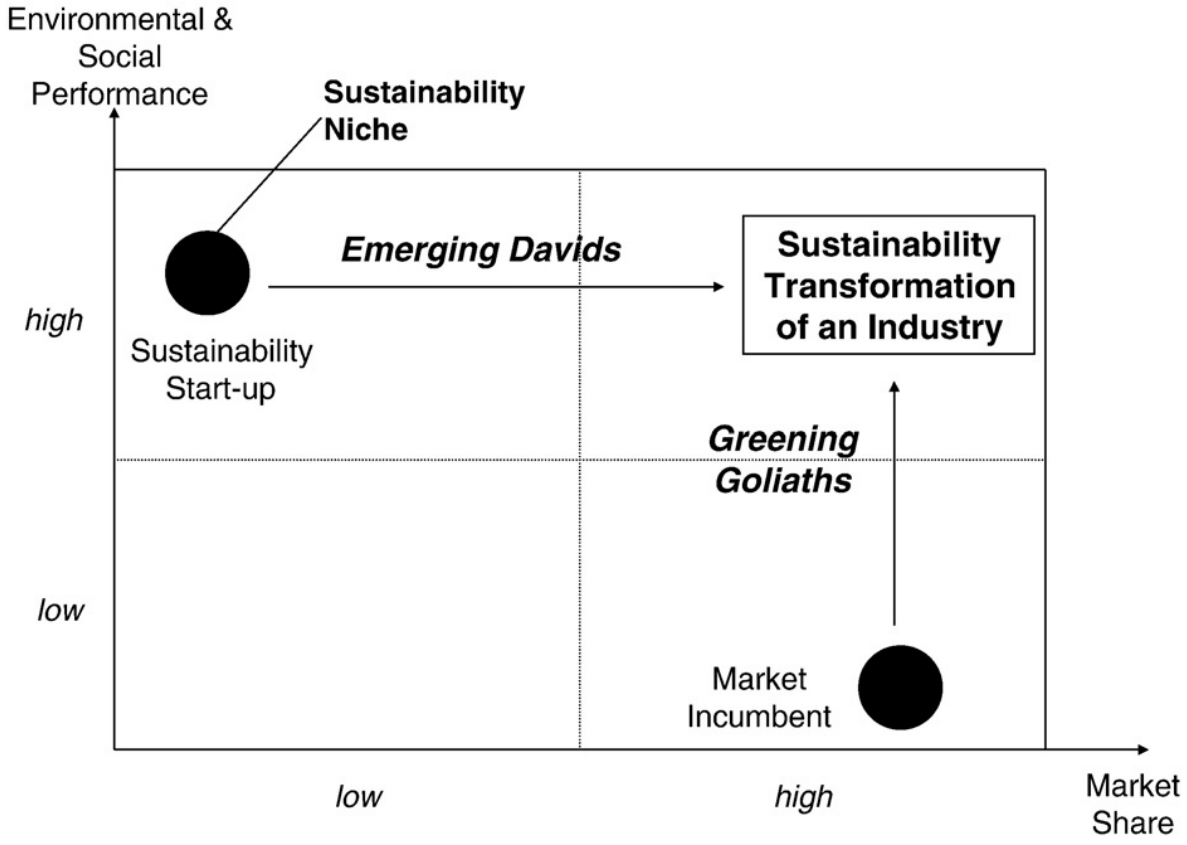

Figure 5. Co-evolution of sustainability start-ups and market incumbents towards the sustainability transformation of an industry. Reprinted from "Greening Goliaths versus emerging Davids—Theorizing about the role of incumbents and new entrants in sustainable entrepreneurship," by K. Hockerts, & R. Wüstenhagen, 2010, *Journal of Business Venturing*, *25*(5), 481-492.

Incumbents have the power to transform markets, but are less likely to engage in sustainability transitions from the start (Hockerts & Wüstenhagen, 2010). They resist innovations due to sunk costs and their disruptive nature. Consequently, incumbents tend to be stuck in usual thinking and are hold back by past investments.

Disruptive start-ups however, are good at product innovation and display high level of environmental and social performance (Hockerts & Wüstenhagen, 2010). New start-ups are not afraid to displace the market share of their prior products as incumbents are. They are often run by idealists who are more prone to try out innovative approaches. Given their status as newcomers, they can and will claim that they are part of the solution rather than the problem. However, the small start-ups still lack cost effectiveness and fail to have a large impact on the market.

Early adopters amongst the incumbents can catch up quickly, when incumbents are challenged by newcomers (Hockerts & Wüstenhagen, 2010). These incumbents will launch copy-cat products or corporate venture capital funds in order to integrate

disruptive start-ups. Moreover, while incumbents tend to lag behind on product innovation, they do have a stronger potential for process innovation. With stronger sustainability management systems incumbents have a higher potential for broad sustainability performance.

As the sustainable product becomes more defused in the market, a new type of start-up begins the emerge, the high growth David, more business-like and backed by investors (Hockerts & Wüstenhagen, 2010). They excel both at product innovation and process innovation and can truly challenge incumbents. When this happens incumbents that have not yet partook in the new sustainable products are drawn into the market as late entrants. Figure 6 show the growth of start-ups and incumbents over time.

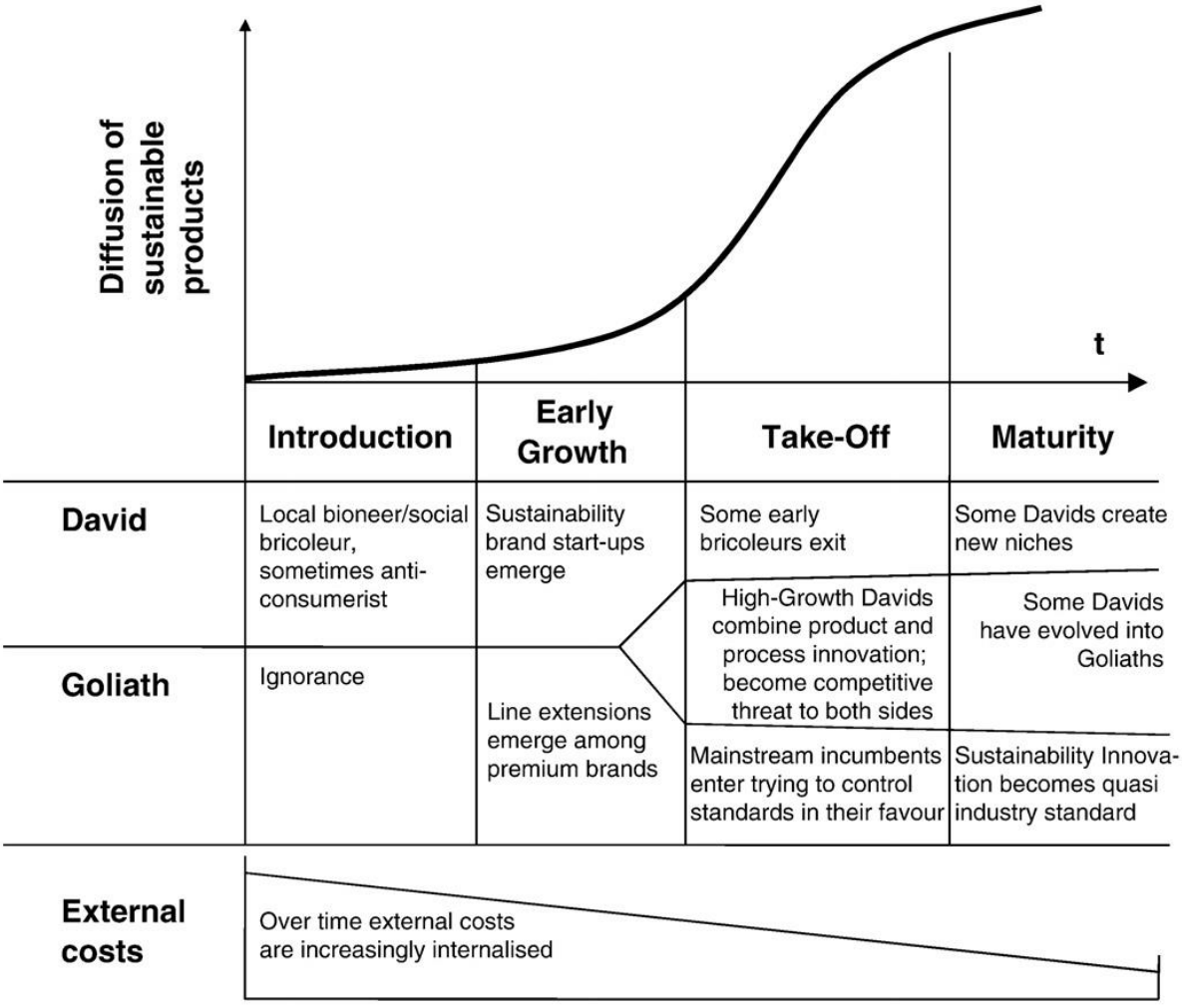

Figure 6. Emerging Davids and Greening Goliaths. Adapted from "Greening Goliaths versus emerging Davids—Theorizing about the role of incumbents and new entrants in sustainable entrepreneurship." by Hockerts, K., & Wüstenhagen, R., 2010, *Journal of Business Venturing*, *25*(5), 481-492.

2.6. Drives and barriers

For a transition to take place there have to be changes along different regime dimensions. There can be several drivers and barriers promoting or preventing the sustainability transition.

Several authors have written about barriers and drivers for firms in their transition towards a circular economy (CE) business model. Tura *et al.* (2019) identify environmental, economic, social, institutional, technological or informational, supply chain and organisational factors that can hinder or drive the transition of CE models (Appendix 2). Tura *et al.* (2019) found that the root cause for the rise of CE models is the pressure to reduce negative environmental impacts and to deal with resource scarcity. Economically, CE can provide costs savings, the possibility for new value creation and business growth. On the social side, market internationalization and stricter environmental regulations pressure companies towards CE models. New technologies can also help companies by avoiding and overcoming problems that are caused by current technologies. Benefits in the supply chain include the potential to reduce supply dependence and avoid volatile resource prices. The biggest barriers are economical; There is a large economic uncertainty because measuring the long-term benefits of CE is extremely challenging. At the same time financial capability and support is lacking, while new technologies are costly. Another deep-rooted barrier is that policies favour linear models, and companies themselves also still have a strong focus on linear models in their supply chain. Moreover, there is a lack of technologies, knowledge and information and 'know how' to transform the firm's current operations into CE models. Organisationally the hierarchical systems, silos between departments, and risk aversion of managers inhibits flexibility and innovation within firms. Kirchherr *et al.* (2017) also identified several barriers, and categorized these as cultural, technological, market and regulatory (note the strong overlap with the transition dimensions of Geels). They found that company culture, consumer interest and awareness, the linearity of the current system, high upfront costs, and the low price of virgin materials are the most pressing barriers (Appendix 2).

When discussing these drivers and barriers, it is important to note that, as Tura *et al.* (2019) argue, barriers and drivers for circular economy models are highly context specific. Business models that are successful in one setting can fail in another. The cultural and policy context differs per country. Moreover, reuse is a very specific form of CE, and packaging a unique segment.

There are some key findings from researchers that did distinguish amongst CE between reusing, reducing and recycling. Ranta *et al*. (2018) found that business models based on recycling are easier to implement, because these models require less change in the business models than reduce and reuse principles. In line with this, van Sluisveld and Worrell (2013) found that Dutch packaging producers, that feel the pressure to reduce plastic waste, tend to prefer local, low-effort and familiar concepts, such as thinner

packaging, that achieve only small waste reductions over more disruptive innovations, such as reuse.

With regards to the drivers specific to reuse models, the EMF (2019b) distinguished six benefits to reuse models: the potential to cut costs, adapt to individual needs, optimise operations through shared designs, build brand loyalty, improve user experiences and to gather intelligence trough smart systems (Appendix 3). What kind of benefits apply depend on the kind or reuse models that is used. The EMF (2019b) distinguishes different kind of reuse models: refill at home, refill on the go, return from home, return on the go (Appendix 4). Refill on the go is identified as a particularly good model for low-income markets and the replacement of single-use sachets. This model can accommodate small quantities at affordable prices in low income markets without relying on single-use sachets (EMF, 2019b). Its typical benefits include improved access for customers, who can enjoy a high customizability in quantity and content of the product, while businesses can save costs on transport and packaging and can more easily gather user data through smart systems.

Two out of four of the reuse models identified by the EMF (2019b) are based on refilling a reusable container. Lofthouse, Bhamra and Trimingham (2009) conducted a study on the drivers and barriers for refill systems in the United Kingdom. They conclude that differentiating further between refill types holds the key to developing more suitable and more successful refillable packaging systems as positive and negative attributes can be more accurately identified and responded to. For each of their categories for refill systems, they found a different set of drivers and barriers (Appendix 5).

2.7. Sustainability of the transition

What sustainable is in the sustainability transition is a question that is often neglected. Markard *et al.* (2012) do note that sustainability is normative and can change over time. Garud and Gehman (2012) found that the definition of sustainability matters for the transition. They show that showing how different a priori assumptions of actors about what is involved in the journey to sustainability result in different conclusions. Therefore, it is important to define what sustainable is in the context of reuse at the BoP from the start.

In the context of sachet packaging, this study has identified both social and environmental concerns. These issues are often regarded separately, but this study argues that sustainability lies in a combined solution. Both issues need to be taken into consideration when aiming towards sustainability in the transition. Raworth (2017) model of 'doughnut economics' for example, defines the sustainable operating space as being within a social foundation and ecological ceiling (Figure 7).

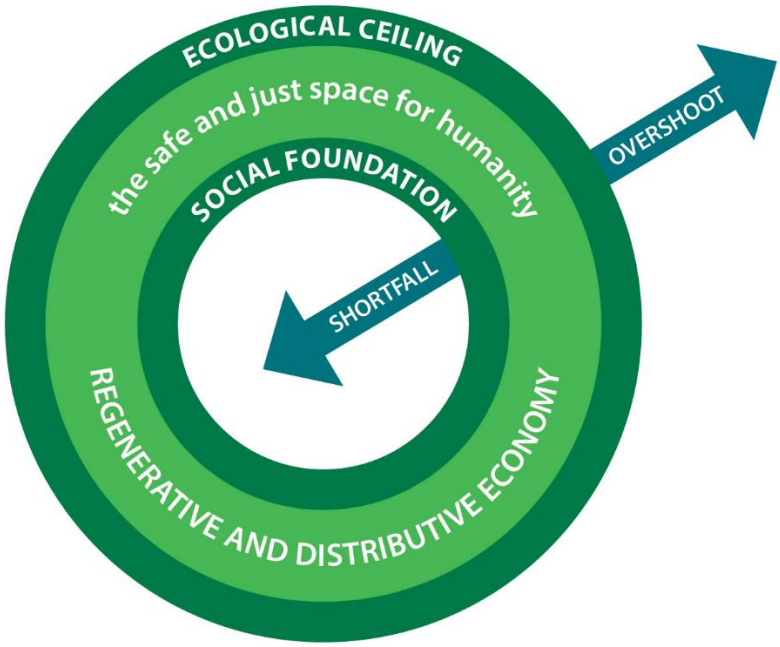

Figure 7. doughnut economics. Reprinted from "Doughnut economics," Raworth, K., 2017, White River Junction, VT: Chelsea Green Publishing.

With regards to environmental sustainability. This study posits that incremental solutions that keep up the linear model of single-use plastics, such as recycling and redesigning packaging, are not sustainable in the context of emerging economies where there is no waste management in place to process the waste. A more radical solution is needed in the form of reuse that truly makes the economy more circular and reduces the amount of waste.

This study also posits that it is important to consider the impact of reuse on the BoP. For reuse to truly benefit the BoP, the BoP needs to be involved as as local partners and cocreators. BoP initiatives would benefit from a more community centric and focus on building capacities in communities.

Keeping in mind that sustainability is a normative concept it must be said that, even though this study focusses on the role of multinationals in the transition towards reuse models, it is not a given that this end state will be the optimal sustainable socio-technical regime. Depending on your normative view of sustainability a transition towards local and organic suppliers, for example, may be a more preferable sustainable state.

2.7. Conceptual framework

The theories and concepts are synthesized, and their relations are visually represented in Figure 8. The figure shows several niche innovations for sustainable packaging, reuse models being one of them, who are competing to replace the dominant regime of single-use plastic sachet packaging. There are several transition pathways that come forwards

from the dynamics between start-ups and incumbents. On the pathway the regime dimensions of markets and user preferences, industry, policy, technology and science and culture can also be found. Different drivers and barriers exist along these regime dimensions, that can provide a window of opportunity for the transition or hold it back. On the top level, landscape developments can also put pressure on the single-use plastics regime. When the transition is realized, it must enter in the safe space between the social foundation and the ecological ceiling. New reuse models will need to have a minimal impact on the environment and be beneficial to the BoP in order to be a truly sustainable transition.

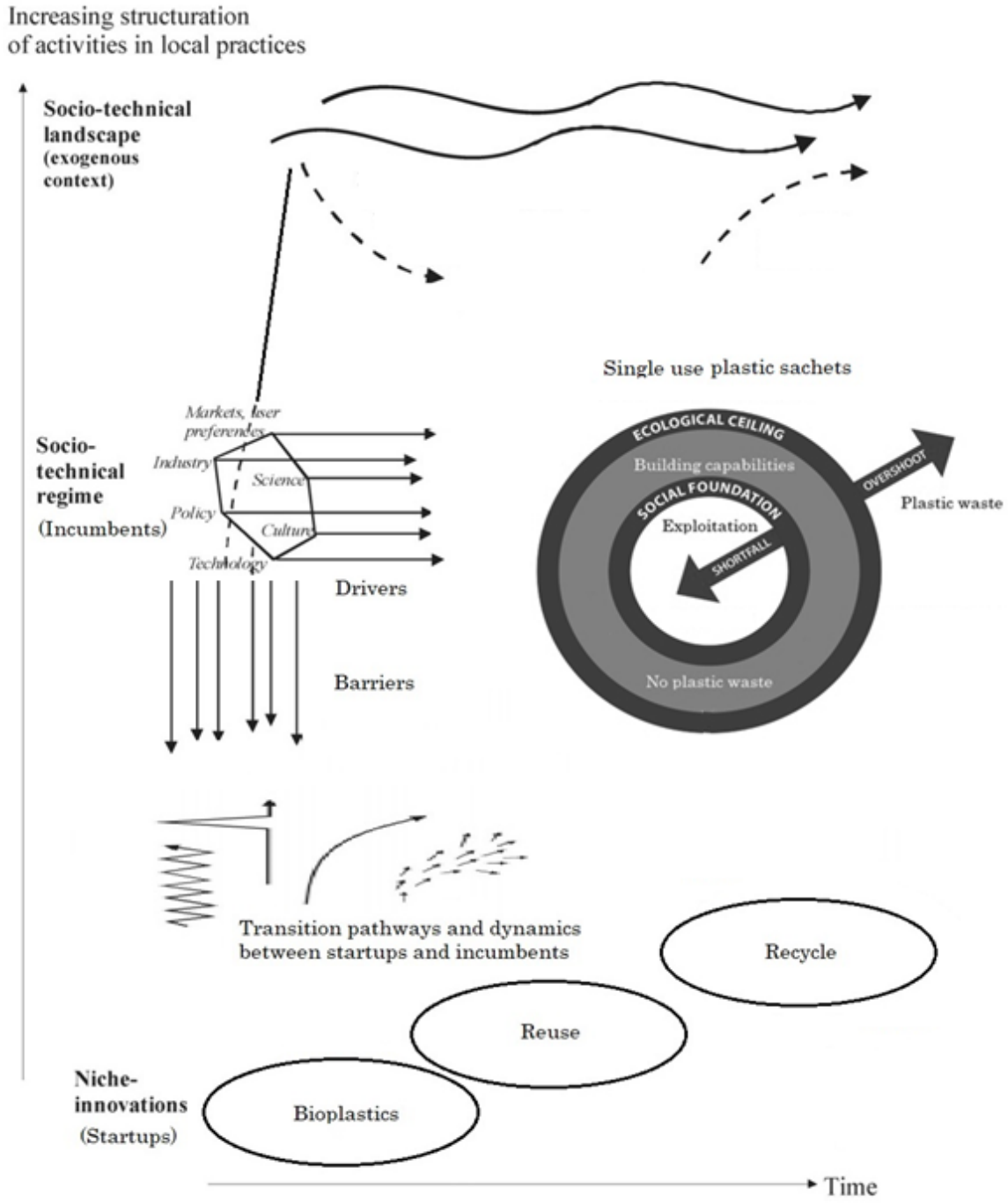

Figure 8. Synthesis of the theories and concepts that this study builds upon.

3. Methods

3.1. Host organisation

This research was conducted at Enviu, a foundation that builds sustainable companies worldwide. Enviu has built several start-ups based on reuse models in the Indonesia. Knowledge within Enviu is used as input for this study. A senior venture builder from Enviu supervised the research and found the research process to be "excellent" (Appendix 6).

3.2. Research strategy

This research consists of a case study that analyses reusable packaging at the Base of the Pyramid (BoP) in Indonesia from the point of view of start-ups and entrepreneurs. Indonesia was chosen because of the expertise and connections of the host organisation in the country, and the opportunity of this research to contribute to ongoing activities of the host organisation there. By zooming on this combination of subjects an 'on the ground' perspective is given. Specific examples, windows of opportunities, barriers and drivers can be given that can help the transition in Indonesia. Doing so contributes to knowledge about the global transition towards sustainable packaging, while remaining within scope of what is practically possible in this research.

The main research activities consist of a set of in-dept semi-structured interviews held with the relevant actors. In this case in-dept interviews are the best research strategy, because this study aims to uncover a deeper understanding of the transition dynamics towards reuse systems. Only a few experts can give this knowledge, and dept interviews well suited to convey insights (Bryman, 2016).

This research combines several research methods to supplement the interviews were this was needed. The global and Indonesian landscape was supplemented by desk research, because this method is well suited to provide general data on landscape factors such as oil prices and the Indonesian economy.

A basic content analysis of the sustainability report of multinationals that are active in Indonesia was also conducted, to supplement the overview of reuse activities of multinationals. Both the sustainability reports and websites of the multinationals were searched for the words 'reuse', 'reusable' and 'refill', the total usage was counted and categorised as general usage or specific usage in the context of emerging economies. In this way more of a rudimentary overview could be created on the extent and differences in reuse activities.

3.3. Sampling

The actors that were identified as relevant for this research are: reuse startups and multinationals that are active at the Base of the Pyramid (BoP) in Indonesia, packaging producers, knowledge institutions of packaging and the BoP, NGOs and policy makers. A total of 23 interviews were held with 26 respondents. Table 1 gives an overview of the interviews and respondents per actor and their role at the organization.

Interviews and actors	Categories	Respondents	Role
6 Reuse start-ups or initiatives	2 local reuse start-ups	7 respondents	4 entrepreneurs
	2 local reuse initiatives by local NGOs		
	2 start-up that are looking to expand to Indonesia		4 NGO projects coordinators
8 interviews at 6 FMCG companies	3 multinationals selling sachets in Indonesia	9 respondents	5 sustainable packaging directors or managers
	2 multinationals selling sachets outside Indonesia		2 (plastics) sustainability directors or managers
	1 multinational not selling sachets		2 sustainable business development leads or consultants
2 Packaging producers	2 global packaging producers	2 respondents	1 packaging ideation manager
			1 sustainability manager
3 Knowledge institutions	1 Dutch sustainable packaging knowledge institute	3 respondents	1 packaging expert
	1 global circular economy knowledge institute		1 circular economy researcher
	1 Dutch foundation on innovation at the BoP		1 BoP project manager
3 NGOs	1 global environmental NGO	3 respondents	1 researcher
	1 Indonesian environmental NGO		1 national coordinator
	1 Indonesian environmental policy NGO		1 policy expert

Table 1. Research sample

Contact was made with multinationals through a purposive sampling strategy. There are four multinationals that are active in Indonesia that have more than 1% of the value share of the Fast-Moving Consumer Goods (FMCG) market (Nielsen, 2017). A total of five interviews were held with three of these multinationals. To expand and triangulate the data, seven multinationals that sell sachets in other countries were contacted. News articles were used to estimate if multinationals were selling sachets or not. Interviews were held with three packaging managers of these multinationals.

Different people from different divisions were contacted within each multinational. The most relevant respondents were sustainable packaging managers, then sustainability managers and lastly business developers and marketeers. Different viewpoints for respondents with different roles within the company increase the quality of the data. It was taken into consideration whether multinationals were active in Indonesia when processing and analysing the data.

Multinationals were the main focus for FMCG companies. All multinationals in this research are based in Europe or The United States of America. Multinationals have a global presence and impact and are very active around the topic of sustainable packaging. However, local FMCG companies also have a considerable impact in Indonesia, the largest local FMCG has the same value share of the FMCG market as the largest multinational (Nielsen, 2017). Three local FMCG companies were contacted, two rejected interviews and one did not come through. Local FMCG companies seemed to be less preoccupied with sustainability than multinationals. They did not have sustainable packaging employees and responded in a more careful and protective manner to interview requests.

Contact with start-ups was made through the network of the host organisation. Three reuse start-ups were found in Indonesia. After this a snowball sampling strategy was employed. All respondents were asked if they knew more reuse initiatives in Indonesia. This resulted in two reuse BoP initiatives from Indonesian NGOs. It was decided that these were relevant, because they had knowledge of reuse systems at the BoP. Moreover, the comparison between start-up and initiatives could, and indeed did, provide extra insight into the innovativeness of start-ups compared to NGO initiatives. The sample was expanded with two start-ups based in emerging economies that are looking to expand to Indonesia. It was taken into consideration in the analysis if start-ups were from Indonesia or not. Additional efforts were made to find more start-ups using start-up databases, internet search machines and Instagram using terms as ‘reuse’, ‘refill’, ‘start-up’, ‘initiative’, and ‘Indonesia’, but this did not yield any results.

Packaging producers are relevant actors because they provide packaging and conduct research and development on packaging for multinationals. Two of them were interviewed to supplement the view of the innovation process of sustainable packaging and comment on the current reuse activities of multinationals.

The Ellen MacArthur Foundation is an important actor promoting reuse as a circular economy knowledge institute. They were asked about their role and their opinion on

reuse the BoP context. The other two experts could triangulate the data from the multinationals. An independent Dutch sustainable packaging expert could talk with more openness about the deliberation of the multinationals that he works with. And a BoP project manager had more insights on the possible impacts of reuse at the BoP. Two environmental NGOs were also used to triangulate the data from multinationals. They provided extra critical insights on the reuse activities of multinationals at the BoP. Lastly, an environmental policy expert was interviewed for the expert knowledge on policy developments surrounding plastics and reuse in Indonesia.

3.4. Operationalization

Concepts from theory are broken down into their elements in Table 2.

Concept	Definition or elements
Bottom of the Pyramid	Including the poor as consumers
Base of the pyramid	Creating fortune at the BoP by involving the poor. Building social capital within BoP communities through more community centric strategies where the BoP is included as equal partners as suppliers, producers, and/or employees and by building their skills and involvement of local agencies, NGOs and 'fringe stakeholders' with important knowledge, skills, and experience.
Development	Development as freedom, where the economic wellbeing of the poor is viewed through capabilities and functionings
Capabilities	What an individual can do
Functionings	What an individual may value doing or being
Sustainability transition	Sustainability transitions are long-term, multi-dimensional, and fundamental transformation processes through which established socio-technical systems shift to more sustainable modes of production and consumption.
Multi-Level Perspective	A transition framework, wherein transition towards radical innovation come about through the interactions between the landscape, regime and niche levels.
Landscape	Global exogenous environment there that cannot be influenced by the actors
(Socio-technical) Regime	Current established way of realizing a particular societal function. A regime exists of a multi-actor network of users, policy makers, societal groups, suppliers, scientists and the regime has technology, science, industry, markets and user preferences, cultural meaning and policy dimensions.

Niche	Spaces where start-ups emerge and where innovations are protected and can develop without the selection pressures that exist in prevailing regimes.
Strategic Niche Management	A framework that focusses on the deliberate creation and support niches. SNM argues for social learning, voicing and shaping shared expectation and social network building within niches.
Transition pathway	Paths for a niche innovation toward becoming a socio-technical regime. These pathways differ in combinations of timing and nature of multi-level interactions. There are four transition pathways: transformation, reconfiguration, technological substitution, and de-alignment and re-alignment.
Transformation	A pathway where there is moderate landscape pressure and niche innovations are not yet developed
De-alignment and re-alignment	A pathway where there is a large landscape pressure and niche innovations are not yet developed
Technological substitution	A pathway where there is moderate landscape pressure and where niche innovations are developed
Reconfiguration	A pathway where there is a large landscape pressure and niche innovations are developed
Start-up	A company initiated by an entrepreneur develop and validate a scalable business model. Start-ups are good at product innovation and display high level of environmental and social performance.
Incumbent	Companies within the established regime that possess a large market share.
Reuse	The reuse of packaging, by either returning or refilling the packaging by the consumer of company
Single-use packaging	Packaging where the packaging is discarded after use
Refill on the go	A type of reuse where consumers can refill at a physical store or dispensing point
Sustainability	Economic performance within the social foundation and ecological ceiling.

Table 2. Operationalization of concepts

The research questions were broken down into the smaller sub questions (Appendix 7). Interview guides were made per different actor based on these sub questions (Appendix 8). Not all the interview questions were covered in all interviews, because some respondents only had expertise in a few topics. A packaging R&D leader had more knowledge about technical barriers while sustainable business developer had more knowledge about the impact on inclusive business.

3.5. Data collection and materials

The interviews were semi-structured; the general topics were leading in the interviews and deviation from the order of questions was allowed during the interview to allow respondents to share their knowledge. This is constructive to the study because it promotes the sharing of new information and insights.

The semi-structured interviews were recorded. Interviews in the Netherland were held in person, other were held over the internet. At the start of the interview the participant was assured of their confidentiality and anonymity. Last of all, the consent for recording of the interview was asked and the confidential use and storage of the recording will be outlined.

3.6. Processing and analysis

The interview recordings were transcribed for data processing. The transcriptions were then analysed using open coding. Segments of connected data consisting of one or a few sentences were described using a single word or short sequence of words. Open coding is not based on theory, but uses grounded theory where meaning emerges from the data (Bryman, 2016). All codes were collected in a word processor. Next, codes were grouped into categories and subcategories. Appendix 9 shows the results of this grouping of codes in a coding tree. Codes from each category where stored in a word file that was used to write the results per (sub)chapter. When writing the results, respondents were anonymised as requested by most respondents.

4. Global and Indonesian landscape

The landscape of a transition provides the context wherein the transition takes place. This chapter explores the wider landscape developments in the global and Indonesian context. Landscape development around oil and plastic prices, economic development, political coalitions, environmental problems of plastic waste and social awareness of this issue provide a window of opportunity for reuse at the Base of the Pyramid (BoP), or instead prove to contribute to a system lock-in.

4.1. Global plastic boom and low oil prices

Global plastics production has seen a tremendous rise over the last eighty years (Figure 9). In 2015, 381.000 million tonnes of plastics were produced, for a cumulative total of 7.82 billion tonnes of plastics (Jambeck *et al.*, 2015). Most of this plastic production is from the packaging industry, who is responsible for 42% of the plastics that enter the market (Geyer, Jambeck, & Law, 2017).

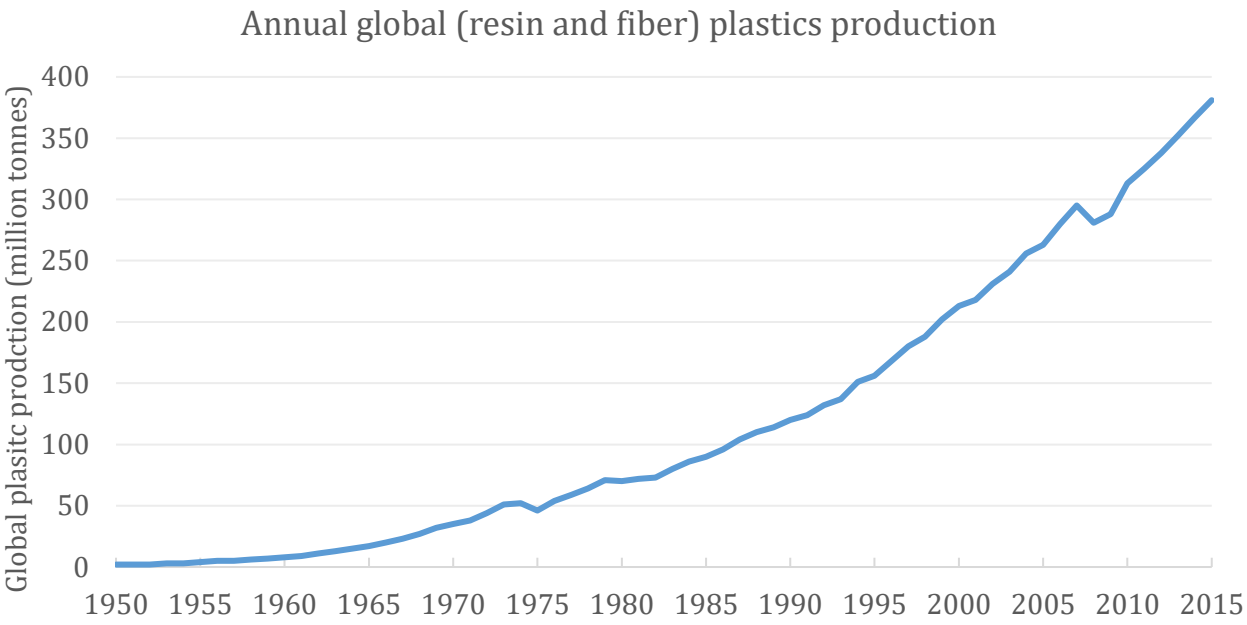

Figure 9. Annual global (resin and fiber) plastics production, measured in metric tons per year. Adapted from "Production, use, and fate of all plastics ever made," by R. Geyer, J. R., Jambeck, and K. L. Law, 2017, *Science advances, 3*(7), e1700782.

Low oil prices have done nothing to deter this trend. Crude oil prices have remained around $50 per barrel for the last five years, when the price fluctuated around $100 the seven years before that (Figure 10). The prices of plastic resin, the core ingredient for plastic products, closely follow the oil prices (Langan, 2011). Because of this the price of plastics has also been low for the last five years.

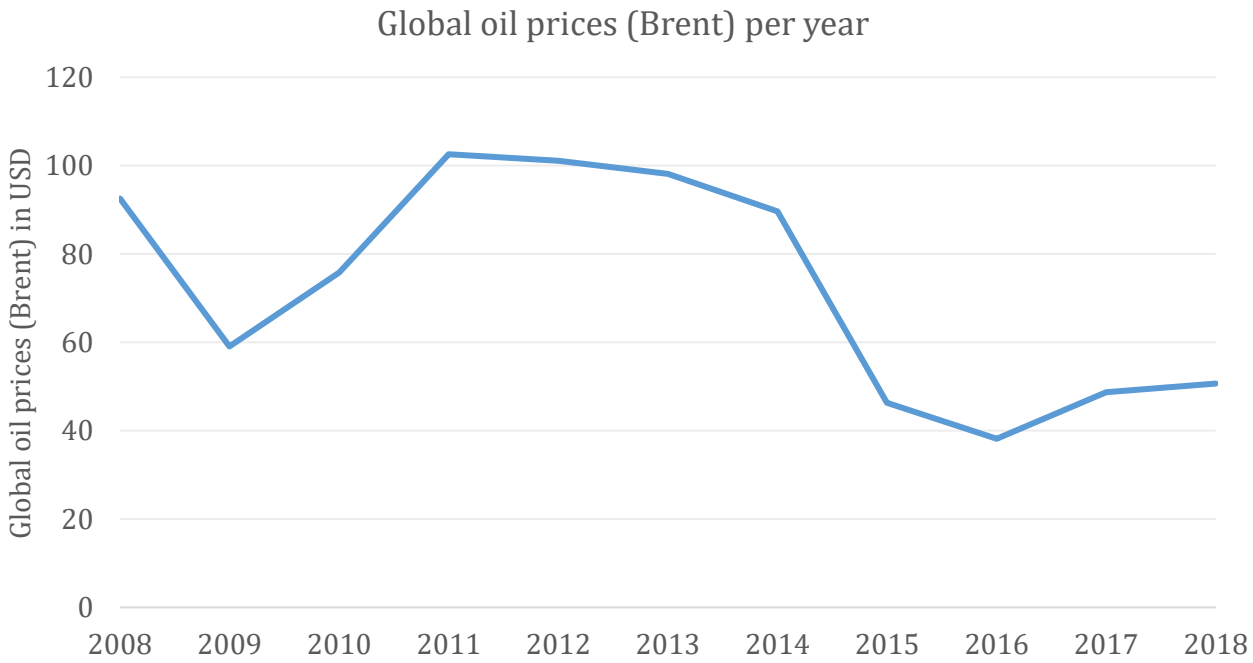

Figure 10. Global oil prices (Brent) per year. Adapted from *U.S. Energy Information Administration* website, 2020, retrieved from https://www.eia.gov/dnav/pet/hist/

4.2. Economic growth and retail developments

Indonesia is a country on the rise, its economy is growing strongly and steadily every year. Since 2000 the national GDP has increased almost tenfold (World Bank, 2019). The newly industrialized economy is South East Asia's largest economy and has 272 million inhabitants (World Bank, 2019). A rising consumer class supports this economic growth.

However, not everyone is benefiting equally from the economic progress. There is a growing income inequality between cities and rural areas (World Bank, 2015). The Asian Development Bank (2018) reports that 9,8% of the population lives below the national poverty line of $0.82 per day, they and the income group just above the poverty line are not benefitting from the economic growth in the country (World Bank, 2015).

Traditional retail markets still sell most of the food products in Indonesia. Traditional *warungs*, the local mom and pop stores, and the local markets still hold 83% of all the grocery retail sales (Figure 11). A reuse entrepreneur disclosed in an interview that she found that, in the cities, there is a *warung* every 15 meters for 100 people, meaning they serve about 20 families. On the other hand, hypermarkets, supermarkets, and minimarkets continue to develop in Indonesia as the consumer class is growing. The middle-class consumers prefer the new retail outlets as they are more organized, clean and one does not need to negotiate the price (Poggenpohl, 2018). However, relatively to other countries, the importance of these new retail channels is still low. The share of sales from these new retail channels lag behind on the Philippines is close to the level of Vietnam, that has a 'weaker' economy (Dyck, Woolverton, & Rangkuti, 2012).

4.3. FMCGs market in Indonesia

The sale of sachets through traditional retail channels are a huge market opportunity for Fast Moving Consumer Good companies (FMCGs). Emerging markets account for a large amount of the revenue of the multinationals that have tapped into this market (Figure 12). For Danone, Indonesia is the 6th largest market making up 5% of their revenue (Statista, 2019). There is no public data on the share of revenue that comes from Indonesia for other multinationals, but Packaging R&D directors from Unilever and Nestlé disclosed in interviews that Indonesia is a very important market for them. Emerging markets grow at a much higher rate than markets in the global north. Unilever for example saw an annual increase in revue of 12% in emerging markets, compared to 1% in 'western' markets between 2008-2014 (Euromonitor International, 2015a).

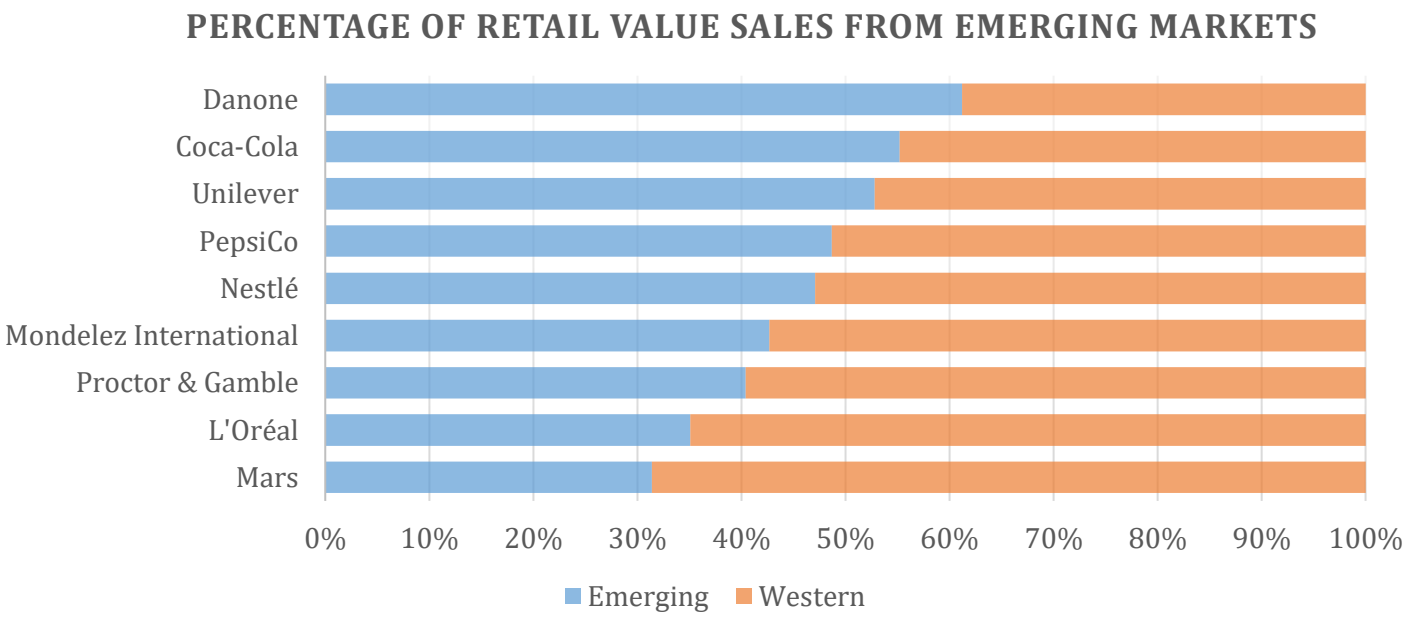

Figure 12. Percentage of Retail Value Sales from Emerging Markets. Adapted from *Euromonitor International* website, 2015, retrieved from https://blog.euromonitor.com/fmcg-companies-emerging-market-slowdown/

A report by Nielsen (2017) shows that Unilever, Danone, Nestlé and P&G are the multinationals with more than 1% of the Indonesian FMCG market (Table 3). Unbranded products, such as goods at the local markets and local FMCG companies, make up the rest of the retail sales, Indofood being the largest of them with 10.2% of the value share of the market (Nielsen, 2017).

FMCG company	Value share of Indonesia market (%)	Plastic waste found in Indonesia (KG)	Total plastic waste found (KG)	Total plastics production (Metric tonnes)
Unilever	10,1%	81	3284	610,000
Danone	5,1%	563	689	750,000
Nestlé	3,9%	138	4851	1,700,000
P&G	2,1%	12	1160	600,000

Table 3. Plastic waste and production per FMCG company. Adapted from "Top 20 companies Indonesia on FMCG," by Nielsen, 2017; "Branded: Volume II: Identifying the World's Top Corporate Plastic Polluters," by Greenpeace Philippines, 2019, and "Global Commitment - New Plastics Economy," by the Ellen MacArthur Foundation, 2019.

The presence of the multinationals was also measured by the plastic waste that is found. Greenpeace (2019) preformed a brand audit where teams all over the world collected plastic waste and counted the brands on the discarded packaging. These volumes are for

all plastic packaging found, and do include for example PET bottles, but it does give an idea of the relative plastic waste from the multinationals in Indonesia. Table 3 shows the amount of plastic found together with the total global plastic production as reported by the Ellen MacArthur Foundation (2019a).

The volume of small flexible packaging and sachets sold are enormous. There are no exact numbers for Indonesia. For India, a packaging expert at a packaging producer company disclosed in an interview a finding of 80 billion sachets per year for personal care alone. A personal case small packaging market share of 13% for Indonesia in compared to 25% in India, means 41.6 billion small packaging's in personal care for Indonesia per year (Euromonitor, 2015b). In Indonesia 62% of the personal care products are sold in small size, the largest amount in the world (Figure 13). For detergent Poggenpohl (2018) conservatively estimates that 5.5 million sachets are sold each day, based on one sachet per household living in poverty. In the Philippines a recent study of the Global Alliance for Incinerator Alternatives (2019) found a total of 60 billion sachets are sold per year.

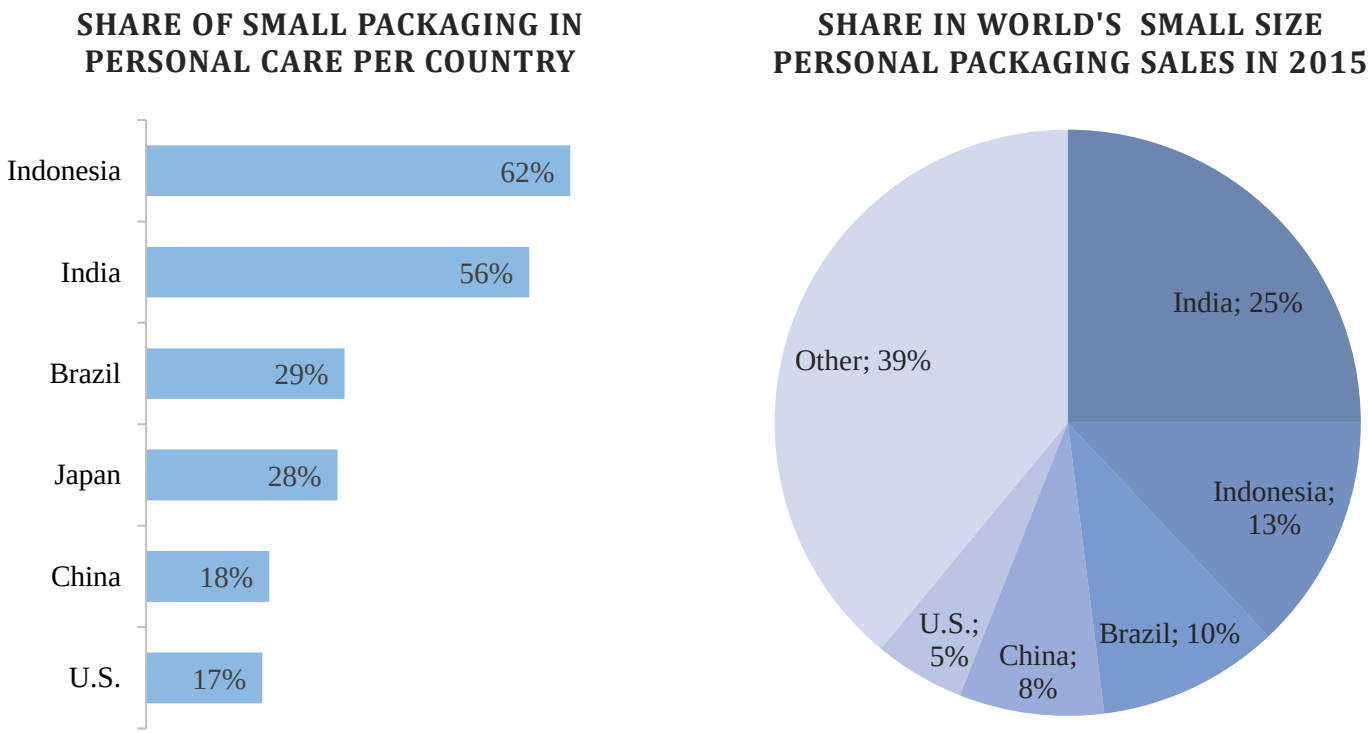

Figure 13. Mini merchandise, Massive Market: most-personal care products are sold in small packets. Adapted from *Wall Street Journal* website by Euromonitor International, 2015b, retrieved from: https://www.wsj.com/articles/loreal-tries-on-smaller-packets-for-size-in-india-1465405814

4.4. Environmental degradation, awareness and politics

Plastic waste is threatening Indonesia's unique terrestrial and marine biosystem. Littering is a large problem, especially for countries that do not have well developed waste management systems. Moreover, 81% of the waste in Indonesia that is collected is inadequately managed (Jambeck *et al*., 2015). Meaning that it is disposed in dumps or open uncontrolled landfills that cannot fully contain waste and will leak into the environment. Indonesia has the largest open landfill site in South East Asia (McDermott, 2016). Much of the plastic waste is also being burned at informal burning stations causing health risks (McDermott, 2016). Plastic waste is increasingly logging mangroves, rivers and eventually the ocean. Citarum river is one of the most polluted rivers in the world, and Indonesia is estimated to be the second biggest leakage point of plastics into the ocean globally (Global Business Guide Indonesia, 2014; Jambeck *et al*., 2015).

The problem of plastic waste has gained more attention since the Jambeck *et al.* (2015) publication, that calculated the waste entering from land made people aware of the scale of the problem and the volumes of plastics entering the oceans from land. The paper also had an effect in Indonesia, where it has awoken the awareness of the public according to an Indonesian NGO.

> So, I witnessed how dramatically people's behaviour and awareness on plastic waste changed since seven years ago. People are talking enthusiastically now about doing something about plastic waste. I can say that the peak moment was at the Dr. Jambeck research.

The current government has also been receptive to the call to combat plastic waste has set ambitious goals. At the World Economic Forum (2020) the Minister for Maritime Affairs and Investment presented a new plan that aims to cut marine plastic debris by 70% in the next five years. The plan aims to reduce the amount of plastics used and calls for a move towards a circular economy and for expanding waste management capabilities.

Overall the political landscape of Indonesia is fast changing and still unstable. There are major debates in the country on corruption and the Islamic influences on politics and some feel that the government is lacking vigour (Poggenpohl, 2018). Previous policies of the government that aimed to combat the plastic waste problems have proved to be ineffective, because policy enforcement is lacking (Poggenpohl, 2018). For example, the Waste Management Law of 2008 stated that all dumping sites should be closed by 2013, but many are still open.

Locally, municipalities and NGOs are increasingly more successful at combating plastic waste. One NGO has been advocating the ban of plastic bags in Indonesia and succeeded with this is several cities. However, over time the realization came that the problem is much larger. The ban on plastic bags became a starting point to talk about the problems of single-use plastics, a term that has gained more and more attention recently.

The NGO and one entrepreneur noted that there are considerably more sustainable initiatives emerging in recent years. Especially zero-waste and bulk stores are starting to emerge in the country according to the NGO and entrepreneur. However, overall this environmental awareness is not yet translating into a specific demand for reuse.

> It seems that people are more aware. And the companies say that they have heard from their consumers that the problem is important. But I do not think it is translating into a specific demand for reuse and refill. – Researcher at Environmental NGO

5. Current reuse activities

This chapter explores the reuse activities that multinational Fast Moving Consumer Good companies (FMCGs) and start-ups are currently undertaking. First reuse is compared to other sustainable packaging solutions to understand in how far companies are currently considering reuse. Then a closer look is taken towards the emergence of the reuse agenda and the role of specific actors in creating a window of opportunity for reuse. Lastly, an overview is given specific reuse activities of both multinationals and start-ups at the Base of the Pyramid (BoP) to understand the current status and level of the transition towards reuse.

5.1. FMCG companies and reuse

5.1.1. Sustainable packaging

Companies feel the need to make packaging more sustainable globally. Multinational FMCG companies also have made progress on making packaging lighter so less plastics is used. For one of the packaging producers that designs packaging for many of the FMCGs it was their main goal.

> Reduce and replace is probably the main focus for us. […] Our focus is really looking at what is the most sustainable packaging solution if we are transitioning away from some of the more resource intensive packaging solutions to a lighter, more flexible packaging.

Biodegradable plastics is being looked at, however these plastics only degrade while processed. This solution therefore only has a limited use in situations where it makes sense, such as coffee pads and tea bags that are collected for composition. In the context of Indonesia where waste management is lacking, FMCGs are not looking at biodegradables as a solution.

> We are not looking at a biodegradable solution as a solution to littering. It is not going to help resolve the waste management issues. – Packaging manager FMCG company

Globally, most of the attention has been on making packing recyclable. In Indonesia one FMCG company has opened a chemical recycling facility that can process multi-layered sachets. However, they have run in the same problem as with biodegradables: the necessary waste management is lacking.

> And we have you know, in Indonesia we have this pilot which is basically targeting sachet recycling. […] But to be honest one of the difficulties is to collect. The technology is there, so now it is proven that the technology can indeed get back the material from the sachet. But you still need to bring the sachet to the factory and the collect. – Packaging director FMCG company

An independent packaging expert recognizes that there has been mainly a focus on recycling both globally and in emerging economies. He argues that the focus on recycling is the result of a top down focus on a push towards sustainable packaging. During international conventions and 'plastics pacts' that are drafted by national governments, companies make voluntary commitments to become more sustainable.

> The large companies are mainly looking at recycling. Also because of the promises that were made one and a half year ago. The plastics pacts and such, were a 100% recyclable in 2025 looks to be a trend.

The focus on recycling has been so high that it has come at the cost of attention for reuse solutions, as was the case in this packaging company.

> In our company right now we are focusing on recycling. So, you know, we have to balance our manpower capacities. – Packaging expert from packaging company

Lately however, there has been a rise of attention for reuse.

5.1.2. Emergence of a reuse agenda

Reuse has gained considerable attention lately from the FMCG companies. This is the result of a deliberate effort by the Ellen MacArthur Foundation (EMF). They felt that attention for reuse was lacking. After the report was published there was immediate attention from companies.

> In this first month there was more than huge interest. And over the summer, we just had so many companies contacting us. – EMF researcher

This view is confirmed from the side of the FMCG companies.

> The agenda was raised really, really quickly in the last 18 months [...]. Our commitment, we were very clear about upgrading our commitment and packaging system and we were very clear that part of that remained the use of recycled material, but to reach these new commitments, this is not enough. So, we are we were also very public about the fact that reuse is also needed. – Packaging director FGCG company

The EMF seems to be hugely influential in guiding the activities of companies, with several of them disclosing in interviews that they closely follow the EMF when it comes to sustainable packaging.

> Most of the work we are doing on packaging reuse models is through the work at the Ellen MacArthur Foundation's New Plastics Economy Initiative. – Sustainability director packaging producer

> Because we're part of the EMF, so we closely follow this the mindset of EMF. – Sustainable packaging manager FMCG company

Because of the EMF report, one established reuse start-up said that they gained a lot of interest from FMCG companies.

> Since that report has come out, there's been a lot more interest. And when I say interest, I'm talking high level CPG [Consumer Packaged Goods] brand interest in exploring reuse. I've talked to quite a few people to quite a few different brands. And basically, I have heard that a lot of the major brands, probably most of the major brands, have R&D laboratories that are developing reusable distribution systems, have early vending machines to the distributors. So, I think I think there is definitely a very clear, robust corporate demand for reuse. But I think we're definitely in the early stages. There is a lot of people keen to bring them to market. – Reuse entrepreneur

5.1.3. Reuse activities

The attention for reuse translates into more activities around reuse at companies. A researcher at the EMF notes that she sees more and more reuse pilots that are launched by the companies worldwide. However, this is all still very early phase and most action is seen in the western context. The most notable activities that all FMCGs mention in interviews are with Loop. Loop is the most known reuse initiative that offers a groceries service in reusable packaging together with all major brands and is currently available in the United States and Paris. The EMF researcher also sees a focus on beverages, such as large water jugs or glass bottles.

Flexible packaging and sachets are however a very different packaging types that are sold in an emerging market. And as one FMCG packaging director put it, reuse will play out differently in different markets and context. Table 4 gives an overview of the reuse activities of multinationals selling flexible packaging and sachets in Indonesia. It shows FMCG companies have at least internally discussed reuse as a solution in context of emerging economies. It also shows that reuse is mentioned in sustainability reports, but mostly in the context of general goals, for example that 'all packaging will be 100% recyclable and reusable in 2025'.

Brand	Reuse and refill mentioned in sustainability report	Reuse or refill in emerging market mentioned in on website and sustainability report	Reuse activities at the BoP as disclosed in interviews
Danone	10	3	Looking for reuse solutions in 2020
Nestlé	7	2	Did a first evaluation
Unilever	6	3	Refill vending machine in Sri Lanka Pilot in a bulk store in Jakarta Pilot in shopping mall in Manilla Pilot in Singapore Partnership with Chilean reuse start-up
P&G	1	0	Not interviewed
Friesland Campina	9	0	Talking about it internally
L'Oréal	17	0	Has refill in some saloons, but no main focus on this in emerging markets.

Figure 4. Reporting on reuse and reuse activities of multinational FMCGs in emerging economies.

Despite these efforts, interviewees from a global environmental NGO's, a packaging knowledge institute and a reuse entrepreneur were critical of the pilots and the progress that has been made so far by the companies. The pilots are small, only temporary and do not target the right customers. Some pilots last barely long enough to be able to come back to the pop-up store to refill the packaging for a second time. After this there is no follow up and lessons are not translated into an immediate agenda according to a researcher at an environmental NGO. The pilots are also often conducted in high end shopping malls that are only accessible by high income consumers, and therefore only replace (recyclable) plastic bottles instead of sachets (Figure 14). A third critique is that the pilots lack ambition. They are small, remain limited to one product and location instead of engaging in big trials and partnerships with retailers.

Figure 14. All Things Hair Refillery setup. Reprinted from *Twitter* website, by CLLA, 2019, retrieved from https://twitter.com/ConsciousCapLA/status/1164547835825721344

Because of these criticisms, pilots are viewed as promotions or publicity stunts by a reuse entrepreneur and environmental NGOs. Despite their lack of impact, pilots are fully covered on the social media channels of the FMCGs.

> I just so I felt so bad when I saw the pop-up store with a refilling station that in a beautiful high-end shopping centre there. That is not your market what are you doing there? So they have, press releases, they have coverage, but if you look at it from a research standpoint, you realize that they do not have a long term plan on what they are really going to do when they say they want to solve or at least help reduce the use of single-use plastic by having the refilling station. – Reuse entrepreneur

FMCG companies see this differently. They express a genuine interest in reuse in their main market segment in emerging economies. However, they see too many problems to pilot at a larger scale. The multinational in the case of All Things Hair Refillery wanted to try the model as quickly as possible in a clean and safe environment.

5.2. Entrepreneurs pioneering reuse at the BoP

There are a few initiatives that have been identified that are pioneering reuse for the lowing income households in Indonesia: two start-ups that are active in Indonesia, two reuse initiatives from local NGOs, and two reuse start-ups that are from outside Indonesia who are potentially interested to working in the country.

5.2.1. Hepi Circle

Figure 15. Hepi circle pilot project setup

Enviu, a foundation that builds sustainable ventures, started Hepi Circle together with an Indonesian entrepreneur. Hepi Circle is a start-up that aims to reduce single use sachets by selling detergent in refillable packaging. Hepi Circle started out by selling detergent in reusable bottles at local *warungs*, and also has a delivery system powered by women on bikes (Figure 15). Bottles are swapped when returned and have a deposit on them. The pricing is the same as sachets, but customers gets rewards such as a free refill or for return buys. Hepi Circle has problems with returns, with people using the bottles to store spices. Moreover, there were problems with attaining funds to scale up. The Indonesian entrepreneur therefore pivoted the business model towards middle- and upper-income households where the business case is a little less complicated. She is piloting a digital platform business model where a variety of products can be delivered to people's homes and also serves businesses such as laundry stores and zero waste stores. Meanwhile Enviu is working on a new business model to tackle single use sachets.

5.2.2. Zero Waste Warung

Figure 16. Zero Waste Warung pilot project design

Zero waste Warung is a pilot by Enviu that takes the learnings from Hepi Circle to improve the business model. A blockchain system is added to refillable pouches of different sizes for detergent (Figure 16). To refill, both the pouch and refill container have to be scanned, preventing counterfeiting with unbranded products. The closed pouch and scanning system ensure proper usage and prevents contamination. Moreover, the digital system provides useful data for FMCG companies. The old reusable packaging is still swapped for a new one, and customers get rewards for return buys that is based on blockchain points. The swapped packaging will be cleaned at a specialized location.

5.2.3. Siklus

Figure 17. Siklus pilot setup

Siklus is a pilot that that provides a refill station at local *warung* stores. They sell a variety of home care products such as detergent, dishwashing, laundry softener, floor cleaning liquid, but also oil. They are currently at an early pilot phase where they buy refill packs that they buy at retail stores to try out the model (Figure 17). They offer a 10% discount over conventional sachet prices. Consumers bring their own containers, but they are also looking at providing containers or pumps that people can install on their own bottles. They are fundraising in 2020 to see if they can run a bigger pilot with vending machines and are looking at a mobile setup.

5.2.4. YPBB

Figure 18. YPBB refill setup at their office

Yayasan Pengembangan Biosains dan Bioteknologi (YPBB) is an Indonesian environmental NGO that has two refill programmes. YPBB offers refill in their office in Bandung (Figure 18), but also at local *warungs*. The refill service at the local office attracts mainly middle- and higher income households, while the *warungs* reach the lower income households. YPBB fills bottles and stocks these at participating *warungs* and take back returned bottles. Of the six *warungs* that joined initially, only one *warung* is left because there was not enough demand for the bottles.

5.2.5. Divers clean action

Figure 19. Divers clean action visiting a bulk store in Jakarta

Divers clean action is a local NGO that operates a bulk store in the Kepulauan Seribu Islands near Jakarta. There they serve the lower income communities on the Island, were waste management is lacking. The environmental youth NGO gained significant attention for their goals. The bulk store is part of a broader program that is funded by USAID that aims to establish a circular economy for solid waste management on the islands. They are in contact with Unilever and Nestlé and sell their detergent and soaps. People bring their own packaging to the bulk store to refill. They opened the bulk store in 2019 and are still evaluating the first results. They hope to open more bulk stores on other islands.

5.2.6. Refeel

Figure 20. Refeel prototype in the Philippines

Refeel is a refill vending machine for shampoo for *sari-sari* stores (Pilipino mom and pop stores). A basic prototype was initially piloted in the Philippines (Figure 20). The entrepreneur is currently looking for investors for his business plan, possibly in Indonesia. The machines in the new plan can be refilled with shampoo in water soluble container made from seaweed. The machine is connected to the Internet of Things (IoT) to gather usage data.

5.2.7. Algramo

Figure 21. Algramo vending machine in the neighbourhood store (left) and mobile tricycle (right)

Algramo is an established Chilean start-up, that is interested in expanding to Indonesia in the future. Algramo started by selling basic commodities such as rice and beans (Figure 21). Algramo 1.0 provides vending machines to *almacenes*, the neighbourhood stores in Chile. They provide a container for each product that can be refilled. Algramo launched a new business concept next to the old one in partnership with Unilever and Nestlé. Algramo 2.0 works with electric tricycles from where they sell homecare and pet food. The reusable containers are tracked with RDIF technology, and when the customer returns with the container they get a 10% discount. They have reached maximum price effectiveness and provide their products 30-40% cheaper than single use packaged alternatives. Algramo is also looking to install dispensing machines in large apartment buildings.

6. Drivers and barriers along the transition dimensions

This chapter analyses the different drivers and barriers that are found along the transition dimensions of technology, industry, policy, markets and user preferences and culture. By doing so it becomes clear in which dimension windows of opportunities for reuse lay, and where there are lock-ins keeping single use plastics in place.

6.1. Overview of barriers and drivers in tables

Technology	Policy	Industry	Markets and user preferences	Culture
Hygiene and contamination	Company liability for contamination	Past investments in single-use	Less suited for food products	Brand sensitivity
Cleaning	Safety regulations for refilling	Complexity of reuse value chain	Less suited for products with a high variety of brands	
Counterfeiting	Unclarity about safety laws	Large infrastructural changes and investments needed for reuse	Low price of sachets	
Small size of (refillable) packaging	Economic priorities trumping	Company culture towards faster returns on investments	Reuse is less convenient because consumers need	

	environmental policies		to bring containers	
Less potential for branding	Vagueness of extended producer responsibility laws	Risk averse company culture	Mistrust of basic reuse setups	
Branding vs standardisation of packaging	Uncertainty about sachet ban	Rigidness due to large company size	Reuse needs volume	
		Decentralisation of tasks		
		Geographical distance to the environmental problem		
		Focus on easy solutions (recycling)		

Table 5. Barriers for the transition that were found in the interviews

Technology	Policy	Industry	Markets and user preferences	Culture
New technologies provide safety	No strict hygiene laws	Business case (reuse can replace 20% of single use)	Detergent and home care fit reuse well	Consumers already used to refilling
Tracking technologies	Possible sachet ban		Brands with a large market size fit reuse well	Indonesians are open to trying out new things
Data gathering	Possible extended producer responsibility laws		Low income consumers are price sensitive and react well to discounts and rewards	
Potential for reward systems and building			Low income consumers don't mind the extra effort and time	

consumer loyalty				
Reusability and durability of container			More control over dosage	
Reclosability of container				

Table 6. Drivers for the transition that were found in the interviews

6.2. Safety and technology

The main concern that respondents from every FMCG mention is the safety of reuse in the BoP context. Sachets are safe, because the packaging cannot be contaminated when it is closed, and it is clear when they are opened. For refilling FMCGs are worried about counterfeiting, hygiene, contamination and the regulations that are connected to these issues. These issues are especially pressing because of the of the uncontrolled retail location of the mom and pop store.

Open refill systems are vulnerable to tempering. In the past FMCG companies have had major issues with their products being diluted or being refilled with brandless products by store owners.

> It is difficult to manage storage of open systems. And we have a lot of issues with counterfeiting in those markets, where some fake products are sold in our brandings. So, there you really open the door if you think about it in an open bulk system, like the bulk shops that you can see in those regions […] and that is really not something we can really afford. – Packaging Manager FMCG Company

Contamination is a similar issue. When open systems are placed in unhygienic situations, then there is the problem of it getting dirty. Contamination can also happen when the reusable packaging is not clean when it is refilled. This is especially an issue with food.

> How do you how do you ensure that the packaging is absolutely clean in an environment, which is not necessarily clean? So, and that that's a big concern. – FMCG Packaging Director

Connected to this is the problem of cleaning. Contamination can occur when the reusable packaging is dirty or when the refill container is not cleaned. Cleaning on the spot is not enough to guarantee that the product is clean according to the FMCGs, so the packaging needs to be sent to a sperate cleaning station, which makes the set up more complex and costly.

> Yes, generally one of the issues with refillables is hygiene for us. […] So, packaging that has to come back should then be cleaned on the spot or actually exchanged for another reusable package. And then you have to keep track of stock. That makes it slightly more difficult to use this kind of reusable solution. – FMCG packaging specialist

Even when the product is cleaned, you need to use the refillable packaging or container for the right product again. Any leftover product might mix to cause contamination.

> You could imagine that at some point someone will take a container of this type home for the oil, and that it then comes back in the chain. Then it arrives at the cleaning station. So, you actually always want to inspect it before you refill it. That is actually the essence. But how can you do that sensibly? Imagine, such a jerry can, there is, for example, lavender shampoo in it that you still smell, but for example another product with the same odor, how are you going to detect it, and how am I going to wash it, what do I do with soap and water consumption and things like that. So, if you look at shampoo, the worst thing that can happen is that you smell lavender shampoo like orange. It can be even a step worse that ingredients bite into each other and that, if something could happen, the worst thing is that someone shows up bald. Then you go quite far, but in the longer term you will want to think about this.

Zero Waste Warung however, is innovating to overcome some of the safety problems. The blockchain system of Zero Waste Warung prevents counterfeiting, because both the pouch and refill container need to be scanned for a refill.

Zero Waste Warung, Refeel and Algramo are also using new advantages that technologies can provide. Reuse is more suited for these technologies, because of their long lifespan they can capture the advantages that these technologies offer better.

> Some people will say that IoT [Internet of Things], RFID tracking technology, NFC [Near Field Communication Technology], are not that exciting for fast-moving consumer goods products, but when you make it into reuse those investments in IoT and NFC and RFID, they basically they become justified because you are using the same using that technology to capture data dozens of times or hundreds of times potentially. – Reuse entrepreneur

Data gathering trough blockchain, RFID, Near Field Communication Technology and connecting the vending machine to the Internet of Things, such as the vending machines of Refeel can provide FMCG companies with useful data.

> Anything that happens at traditional retail, they [FMCG companies] do not really have any data to where it goes. So that would be really helpful. IoT devices can capture data on the frequency of usage, the preference of the brand, the location, the supply chain and distribution of the of the shampoo and things like that. – Reuse entrepreneur

This data can also help FMCG companies with the planning and logistics, because they know in advance where they will have to provide new refill containers. A connected system also enables the companies to send push notifications or offer discounts to retail owners when the containers are almost empty.

> So, for the FMCG companies, it is quite interesting because it kind of creates a direct communication and sales channel towards those bottom stores. So, you can offer discounts to that and everything. People can exactly see what kind of purchases happen when they go through the system and that is of course very valuable to have for big companies. To kind of target and channel their sales for the bottom owner. – Reuse entrepreneur

The Zero Waste Warung blockchain system also improves a reward system that will ensure consumer loyalty and return buys. Blockchain and RFID tracking can also enable sure that provided refillable containers are actually returned so that the environmental benefit of the reusable packaging remains intact.

Changing from single-use packaging to a reusable container also has its technical advantages and barriers. A FMCG packaging director sees that if that you add an extra functionality to packaging, by making it reclosable you add extra value to the packaging. Also, you use it more times. On the other hand, small packaging formats are hard to make reusable from a packaging design point of view. Moreover, leftovers are more of an issue with small packaging according to another FMCG packaging director. Most refillable packaging in the western context have been larger so far according to the FMCG packaging director.

Small size also provides an issue of branding. Companies want their band to be visible and on display on their products. This is harder to achieve for reusable packaging that is small.

> And the branding issue. So, with reuse systems, for example with bulk, sometimes you lose it [the branding]. And this has been a barrier for our brands, obviously. – FMCG Packaging manager

Moreover, reusable packaging benefits from standardisation where a container can be used for multiple products (such as a standardised reusable beer bottle), but branding makes this harder.

6.3. Regulation and policy

Respondents from multinationals note that safety concerns are especially problematic because of legal issues. In some countries there are regulations in place that ensure hygiene. These are not believed to be a in force in Indonesia by a FMCG packaging director, but overall there is unclarity about regulations in different countries. Even if regulations are not an issue, respondents from FMCGs fear that they will be liable for any contamination, even when the fault lies with the consumer who brings a dirty container.

> It is very much linked to safety as well as to who is liable when it comes to having an issue with the product. So, this is very important for us as big brand to be able to trace back any issues that can occur with a product. – FMCG Packaging Manager

In Indonesia, policy support for reuse or policy preventing single-use has been insufficient according to an Indonesian policy advocate. There is however a policy in the making in Indonesia that could ban sachets in 10 years. This policy has been 5 years in the making and it is unclear when it will go in effect, but the advocate expects "sooner rather than later". The policy will also include Extended Producer Responsibility (EPR) over plastic packaging. Companies will have to follow a waste reduction plan, but may choose to do this though reducing, recycling or reusing. However, the current definition of recycling from the Indonesian government is unclear, opening the door for what the advocate calls 'toxic recycling' that is actually harming the environment. Another issue is that policy from the Ministry of Environment and Forestry is often blocked by priorities from the Ministry of Industry and Trade. This could mean that the policy in development can be weakened or delayed further. However, even the talk about a ban could be enough in the eyes of an independent packaging expert.

> Sometimes just talking about a ban is enough to make large parties think. Ten years is not enough, then they are not really going to start moving, but if it comes to a ban in two years, or another kind of system, for example, a deposit, then things will really start moving. – Packaging expert

6.4. Industry, retail and logistics

FMCG companies are attracted to reuse because of the business case. The EMF estimated conservatively in their report that reuse can tap into 20% of the packaging market. This is a number that is mentioned by respondents from FMCG companies for the business case of reuse.

However, there are several business factors holding FMCG companies back from investing large scale into reuse. The sachet value chain is relatively straightforward, and sachets are very cheap to produce.

> The sachets are very simple, you keep shifting the boxes and then you can continue as it works. You cannot blame a big party for that, their system runs on it. They have invested millions of euros in a machine that makes sachets, yes you want to write them off and you want to make sales, so you keep spitting them out. – Packaging expert

Switching to reuse requires a lot of logistical changes for FMCG companies. The reuse value chain can become quite complex with the return and cleaning of reusable packaging, but also for example the replacement of pump systems that can break over time. Complexity makes the investment case harder, while company culture is shifting towards faster returns on investments in recent years.

> And even with regard to that investment, if you have such a pump system, then you also have to invest in a pump package. And that is often a problem with such a business case. If it does not get cheaper on money, maybe even more complex, and you have to invest. Then large companies quickly say, ROI uncertain, that depends on the growth. That is also difficult to predict. Then marketing will take another look. 'Yes, maybe we will sell two a week.' That is very difficult to predict. So, in that way it is really understandable that it stopped here in the past. Business cases are about how quickly can I earn investments back. You used to have 5 years for that. The last couple of years it seems to go to 2 or 3 years, under pressure from investors and results that have to be attained. – Packaging expert

Company size can also be a barrier. One packaging specialists noted that he would love to work with reuse, but that these decisions are up to the marketing department in their company. Another sustainable business developer noted that she finds the reuse solutions from start-ups quite exiting, but that multiple people have to sign off before a similar pilot can be run within the company.

> Yes, I am sure that more can be done. In such a large company, everything is always very slow, and everyone must always give his approval. While I see start-ups who immediately have all those nice things, but you can't just do that. – FMCG Sustainable business developer

This intercompany fragmentation can also provide barriers over geographical distances. The headquarters of the multinationals that operate worldwide are located in western countries, and the packaging directors and managers work over there. A reuse entrepreneur argued that this makes FMCG companies less sensitive to the problems of single-use packaging in emerging countries and less likely to transition towards reuse over there.

Another challenge that FMCGs face when evaluating reuse models in the BoP context is collaboration with the local retailers. FMCG companies do not own retail stores themselves, which makes it harder for them to roll out reuse projects at a large scale. Packaging directors from FMCGs were wondering if mom and pop store owners were willing to change their store and selling habits for reuse. A particular concern for one packaging director was that they sell a great variety of products, while the mom and pop store space is limited.

> But I would be really interesting to understand how those shops accept the change and if they would be willing to modify completely their shop setup with these types of systems. From first evaluation that we did actually in the Philippines we saw that this was really difficult. The space is really limited, because the hygiene in those sari sari shops is quite low. For them to manage kind of open systems is a bit difficult – FMCG packaging manager

6.5. Markets and user preferences

When it comes to the retail market for the BoP, most reuse initiatives use the *warung* as a retail outlet. However, Divers Clean Action is trying out a bulk store targeted at the BoP and Algramo is using a mobile setup that Siklus is also exploring. All of these setups are aimed at consumers, but one FMCG packaging manager noted that there is also opportunity for reuse in the business to business market.

The size of the reuse market is linked to certain products. Some products also lend themselves better to reuse than others. Detergent and home care products could be piloted by Siklus and Zero Waste Warung, because cleaning is less of an issue for them. However, for food related FMCG companies hygiene and contamination becomes more of a problem. Despite this, all food related packaging directors showed in interest in exploring reuse. One packaging manager mentioned dry foods are a good opportunity. Brand variety also matters. Some brands have managed to establish a monopoly for certain products. Reuse entrepreneurs find that these brands are well suited for reuse, because they only require one refill setup. Laundry detergent and dishwashing liquid for example have one popular brand, while for shampoo some families like to use one brand per person in the household.

When it comes to user preferences, reuse entrepreneurs mention two main drivers for wide scale adoption of reuse at the BoP: cost and convenience. The bulk stores, that are also coming up in Indonesia, are often more expensive and cater to higher- and middle-income households. A reuse entrepreneur found that Indonesian low-income households are very price sensitive, and therefore a discount is required.

> Reuse is always going to be very appealing to people that are environmentally conscious, but it is something that's only maybe five to 10% of the population in a given market. Our view is we want to make it economically attractive as well. And that is we see that is like kind of the secret sauce to wide scale adoption, not just for the fringe population segment with strong environmental concerns that are adopting this. – Reuse entrepreneur

Algramo has achieved a 20 to 40% discount on all products, and this is also necessary from their experience in Chile to reuse to be successful.

> We are quite happy with those numbers and from the people that I've talked to at some CPG brands, they figure that 30 to 40% is kind of a magic number you want to 30 and 40% in this business as usual, to make reuse appealing to la wider market segment. If you have a reuse model that's kind of business as usual price are slightly more expensive, I think you're going to have a pretty limited uptake on it because reuse does create some extra work for the consumer they need to manage their packaging essentially. And it is obviously simple. It is easiest to just throw away your back to the recycled or whatever, you know, not have to deal with the packaging. So, in order to get people to you know, be responsible and

> clean their packaging, reuse the packaging, economic incentives are quite an important factor.

However, Indonesia is another context entirely. The low virgin cost of plastics is already a barrier for reuse, but for Indonesia sachets are particularly cheap. A reuse entrepreneur found that people even buy large strips of sachets, because this is cheaper than larger packaging. A packaging expert from a packaging company mentioned that normally the costs go up with smaller packaging, however sachets are exceptionally cheap because of their simplicity in production and distribution, low margins for *warung* owners, and lower price setting to reach poorer consumers.

Another reason why Algramo could offer much lower prices is because they started out by selling simple unbranded goods, before they moved to branded products in their partnerships with FMCG companies. However, in the experiences of Siklus, Zero Waste Warung, YPBB and Divers Clean Action it is very hard in Indonesia to work without brands, because consumers prefer branded products.

> People just love brands here. I am not sure whether it is a status symbol thing, a lot of advertising or something else, but they are attached to brands. But for rice and oil, they are not. We sell oil, but the thing is that the margins are not very high here for these products and I hear it is very hard to enter the rice market. We initially thought of providing rice but no longer want to do that. – Reuse entrepreneur

Despite the low prices and brand sensitivity in Indonesia, Siklus has been able to provide a 10% discount in their pilot in Indonesia up until now. In their experience, the 10% discount seems to be sufficient for the price sensitive Indonesia consumer. However, whether this discount can be maintained when scaling up remains to be seen.

> My partner was working for a FMCG company. And people there seem to think that the 10% is doable, but we do not really know yet. How does supply chain work for example? If we can do it at a large scale and change some of the distribution systems, then I think that there is a potential of getting it 10% cheaper.

Zero Waste Warung found that a reward system works equally well as an incentive. YBPP however did not offer an incentive and found their sales lacking.

Convenience is another major driver for reuse. Consumer have to bring their own container requires some effort from their part. When the consumer buys several products in refill, the question is how many containers is the consumer willing to carry. Moreover, if refilling happens that the *warung* the process might take some more time. Zero Waste Warung and Siklus thought this would be a barrier, but they noticed that consumers do not mind so much to bring their own containers, and spending some more time on refilling in the case of Siklus, as long as there price incentive.

> Warung places it is usually very proximate to your house, it is probably about 10 meters and a maximum of 50 meters, that you have to walk. And what we see there

> is, as soon as people get something extra or reward or something for free, they are quite willing to do that. And since it is so close, even if people forget their container they just go home. That does not feel like a huge burden or a hassle. People do not even mind if it takes a bit longer because they like to chit chat at the *warung*. It is not just a store where you purchase products, but it is actually place that you want to go every day. Because it is about chit chatting. It is about exchanging most news about the community, the neighbours, the friends. So, it is also a meeting place. I think mixing it in a supermarket is a lot more challenging. Because it is just a different user journey. – Reuse entrepreneur

Another convenience driver that is found is the flexibility and control over the size. Sachets actually also provide some control for the consumers. A FMCG company noted that consumers like to use so called mono-dose sachets for this reason.

> What we see is that the consumers like single dose because they can manage the dosing of the product at home. And they can avoid overconsumption as a family, they need to manage their kids as well. – FMCG packaging manager

FMCGs found out that consumers open a sachet, use some of its contents, and roll up the rest of the sachet for later usage. Moreover, a reuse entrepreneur found that people sometimes buy a refill pack (large sachet) cut them open and occasionally use some product.

Reuse can potentially provide more convenience with regards to control and flexibility than sachets. When asking what kind of reusable container people would want to use, consumers mentioned to Siklus that want a transparent container that has measurement marks on the side, so they can see and track usage better. Reuse also has the potential added benefit that consumers can fill their containers with the exact amount they want. This is especially useful for dosages larger than the sachet size, but smaller than the bottles. A size where Zero Waste Warung noticed a growing demand for, and argues that this demand will grow as Indonesia will continue to develop economically. One last advantage is the potential reclosability of reuse containers that interested the respondents working in packaging at FMCGs.

However, these benefits do not mean that consumers will automatically change their behaviour towards reuse. YPBB encountered some trust issues from their basic setup where they place refilled bottles at *warungs*. This shows that the perceived legitimacy of reuse set-ups is important.

> And also people tend think that we added some water in there or some other type of liquid soap or detergent, so trust is an issue there. Unlike in the higher income community where the people who come to our in our office, they just buy the product without any trust issues.

A very important note here is that all start-up have run their pilots in or near urban areas. YPBB argues that user preferences could be different in rural areas, a large target group for sachets.

> I think low income communities in the cities are quite different compared with villages in Indonesia. In the city they tend to be more careful I think with the product and cannot easily trust something new unless many people already use it, I think.

6.6. Culture

Another reason why convenience is less of an issue in Indonesia is because refilling is already in the Indonesian culture to some degree. The sachet revolution of the nineties has been within the lifetime of many Indonesians, who used to refill themselves at traditional markets as a respondent from an Indonesian NGO argues. The NGO aims to bring back this behaviour of the consumers through its activities.

> Because some of our history our lifestyle is reusing. I still remember how in my childhood we reuse everything, if we want to buy something, we would bring our own jar, our own packaging. In traditional society in Indonesia it is the actual bulk store and refill centre, since a long time ago before we use plastics.

Secondly, Indonesians do already refill themselves to some degree, as the entrepreneur from Siklus found. Indonesians also refill some products from their sachets into other containers at home. Dishwashing liquid sachets are often used to refill plastic bottle with a hole in the cap, so that the liquid is diluted, and the user can control the dosage (Figure 22). Body wash and oil are products are also bought to refill a container at home (that is sometimes very dirty).

Figure 22. A homemade container for dishwashing liquid

Culture also plays a role in the choice of products for reuse. One reuse entrepreneur found that refill is already in the culture for basic commodities such as oil.

> We chose oil, because refilling is already the culture in some sense. because tend to lead by these you go for a lot of oil you go to the container with oil and they pack it into like a plastic bag. – Reuse entrepreneur

Another cultural element that both Zero Waste Warung and Siklus noted when they entered the Indonesian market, was that Indonesians are very open to try out new things. This made it easier for the start-ups to try something new.

> And I think in general, what is really great about Indonesia is that people are very excited and open to do something new. And so that just creates a lot of space also to experiment with. – Reuse entrepreneur

7. Niche development and multilevel dynamics

The Multi-level Perspective posits that it is the interactions between different levels that brings about a sustainability transition. This chapter explores these interactions and how they contribute towards the transition to reuse. First, a closer look is taken at the role of start-ups compared to incumbents, and by doing so an understanding is created about what social learning and niche development means in the case of reuse at the BoP in Indonesia. Sharing lessons and networking are further explored in the next chapter that describes the relations of reuse entrepreneurs with non-incumbent regime actors. The interactions between start-up and incumbent are analysed in the last paragraph, where it is explored how collaboration can further the transition.

7.1. Niche development

When comparing incumbents and start-ups it is striking that incumbents do not dare to launch reuse pilots in the BoP context, while entrepreneurs and NGOs do. FMCGs are concerned by technical barriers, regulations and big investments, and don't see it as their job to innovate.

> I have been in some meetings where companies have said very explicitly though, that business case is not on us to seek and quantify that has to be up to somebody else. We want that business case proven before will adopt the technology. – NGO researcher

Entrepreneurs on the other hand take risks, dare to innovate and are more agile. Siklus for example took a risk with shampoo which payed off.

> We did not think that shampoo and body wash were the best options, just because the regulations really tough and because people are very, very attached to their brand. But then we thought we might as well add it, and it actually does sell well.

For small pilot setups it is still a problem that people bring dirty packaging, but Siklus found cleaning on the spot is sufficient for now, while Hepi Circle did not clean the containers, because this is less of an issue for them with detergent. Small initiatives enjoy some niche protection because they are less hindered by regulations. Refeel specially encountered less issues with regulations in the Philippines than FMCG companies.

> The government wanted to regulate it. So, if it is something that this done in a small store, it is okay, but if it is going to be something like Unilever or Procter and Gamble and setting up pop up stores all over the Philippines, they said that they will not allow it, because they cannot be consistent with the results.

Pioneering at the local scale, several of the start-ups are using new technologies to their benefit or to overcome some of the safety problems. Zero Waste Warung has a blockchain system in place to prevent counterfeiting, thereby innovating to overcome one of the safety barriers of FMCGs. Here the added value of niche innovations really comes it light. In comparison the initiatives by the NGOs do not innovate in this manner and were therefore less successful than their entrepreneurial counterparts who innovate business models other than the bulk store or bottle model. Reuse entrepreneurs are considered to be more agile by the FMCG companies, because of their small size they more easily start small pilots, are able to pivot and change up their setting.

However, being a small international start-up can also present difficulties of its own. Many start-ups found it hard to start a business in the emerging market context. Refeel had some difficulties registering in the Philippines.

> Just to register a corporation took me more than seven months. I am not even setting up a business, just to register seven months! And then I was able to have the certificate in one month, while in the US and in Europe you could register an LLC in one hour. But it took be more than one year just to get a receipt so that I can issue invoices. – Reuse entrepreneur

7.2. Niche-regime interaction

With regards start-up relations with non-FMCG actors, the emerging market can also be restrictive in terms of funding.

> I think for Indonesian landscape, funding support, grant support or support in general, it is still a bit of a challenge. – Reuse entrepreneur

When looking at investors for funding, entrepreneurs have difficulties finding investors that are willing to invest in sustainable start-ups.

> If you look into the actual investments it becomes quite challenging. Investors are excited about the idea of social impact, but are overall still very traditional. They are very commercial and mainly look at things from a growth model perspective. And I would say they are a little bit risk averse from what we have been seeing. – Reuse entrepreneur

Investors need to support the sustainability goals of a start-up. Not only because these investors are willing to take on a riskier investment, but also because investors have considerable influence on a start-up. Algramo therefore argues that investors are the main risk for the sustainability goals of start-ups. Algramo did find sustainable investors that have been a great help to them, because wanted to support the circular economy and the sustainability goals of the start-up.

With a lack of investors international grants and awards become an important source of income some start-ups that are developed enough and have the resources to apply for these competitions.

> The plastic topic is getting a lot more attention in media, meaning you can also find more awards or opportunities to apply for as a start-up. So, if start-ups have the possibility access support at the global level, it is going to be easier for them. The philanthropy sphere has Indonesia on the map quite a bit. And I think having access to such a network will give these start-ups the resources to scale up. – Reuse entrepreneur

These competitions and awards are also an important platform for start-ups learn from each other and to exchange knowledge. The entrepreneur from Zero Waste Warung for example competed in the same challenge to win a grant as Algramo. International sustainability organisations also play a role as investors and as knowledge platforms. Algramo has been able to get funding and public exposure trough organisations such as the World Economic Forum and World Wide Fund for Nature.

Enviu, the foundation that is behind Zero Waste Warung, has created the Zero Waste Living Lab with the intention of bringing reuse entrepreneurs together and connecting them to other actors. They also bring in NGOs and policy makers that can provide a new perspective and insights. However, it is mostly the established start-ups that partake in the platform.

> What we currently do in the Zero Waste Living Lab is also to really foster learnings by having quarterly meetups. So, there we actually bring together entrepreneurs that work on reuse and also bring in NGOs. And that has been usually a very exciting exchange, because the NGOs and policy experts can provide local context. And they can also learn from one another as entrepreneurs and just start collaborating and talking to each other. But it is not very accessible for smaller entrepreneurs. We mostly see start-ups at the global level that been in this field a little bit longer and really build up their brand. Early stage pilots are also interesting and sometimes they pop up and it works out. And of course, everybody

> is looking for them and is curious. So, I do think there is quite an openness towards learning and really seeking those solutions that work, because we see a lot of things happening, but nobody has the silver bullet yet. And there is enough space for everybody to come up with a good model that works. – Reuse entrepreneur

Smaller start-ups do not participate in these platforms, awards and challenges as much. However online exposure that is generation trough these mediums can inspire entrepreneurs. Both Refeel and Siklus saw Algramo as an example for refill at the BoP, and looked at their business model for inspiration.

The EMF also plays an important role as knowledge platform and gives out grants and awards. Their award helped Algramo on its way in 2017. More importantly, they created a common language around reuse by categorising it different varieties and mapping current solutions. Moreover, they also have the network to push FMCG companies towards reuse.

> The Ellen MacArthur Foundation is a very interesting and valuable player, because they compile a lot of learnings from what they see, and they have the connections to push other players to act. – Reuse entrepreneur

7.3. Start-up-incumbent dynamics

There is interaction going on between incumbents and start-ups. Incumbents are actively searching for sustainable packaging start-ups; each of the FMCG companies in this research has a database with start-ups. Although some admitted that their knowledge of start-ups in emerging economies is lacking. Entrepreneurs on the other hand also try to get into contact with FMCG companies with varying success. Siklus and Zero Waste Warung had some connections with FMCG companies, but this was limited. Both start-ups have been connected by the researcher to FMCG packaging and sustainability directors who showed a genuine interest in collaborating. Figure 23 shows all the connections between start-ups and incumbents.

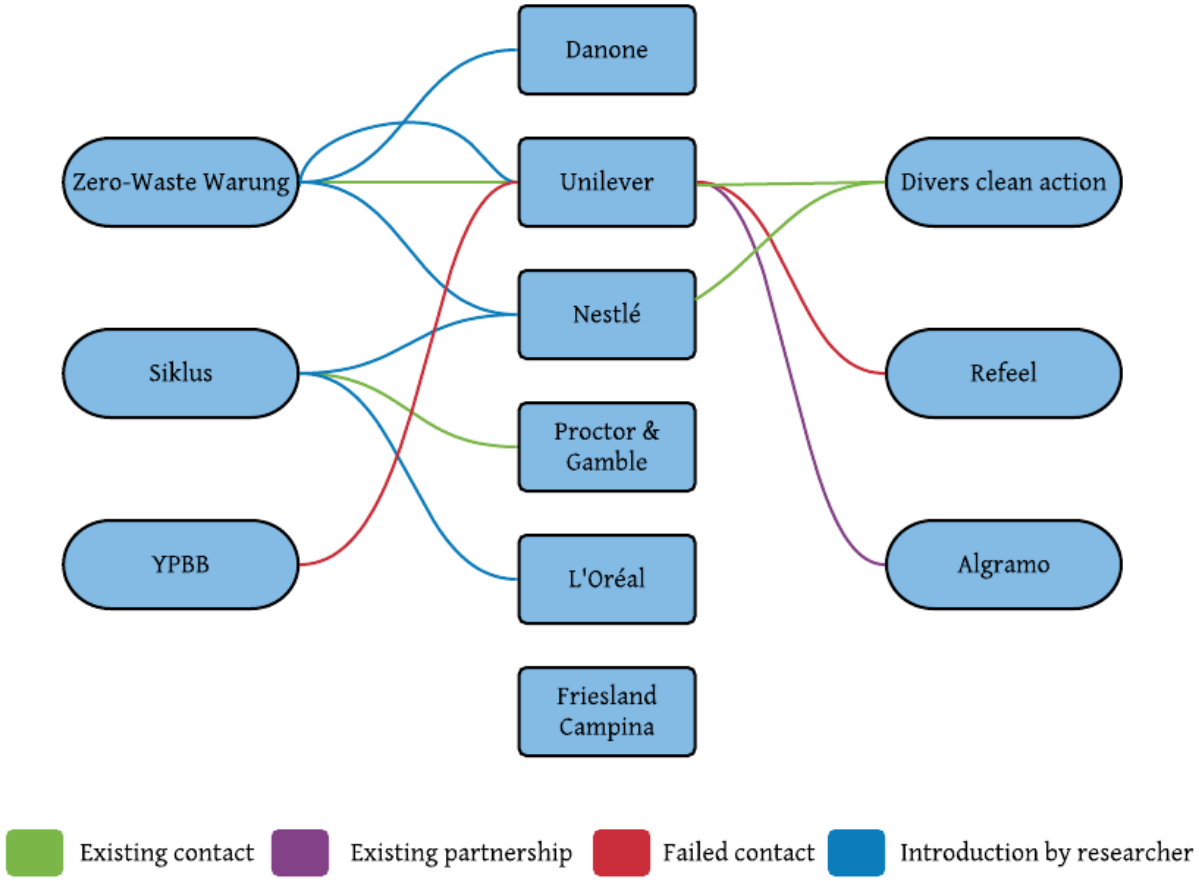

Figure 23. Connections between start-ups and incumbents

Start-ups and initiatives experience difficulties in getting the attention of the FMCGs, and have problems getting in contact with the right person. Refeel for example has been in contact with the local subsidiary of an FMCG, but got send back and forth and did not find any interest there in the end.

> And I attempted to meet with the people from [a FMCG]. And I realized that it is becoming more of a publicity stunt, because I keep scheduling a meeting with them and they keep changing the schedules until finally I got frustrated because I realized that they are not really that serious in in finding an alternative, because I spoke to the brand manager I met with him briefly in the store where they had the pop up store for the refill station. And he said that they already had the concept of a refilling station in the 90s, so it is practically 20 years ago. And they realize that it is not going to work because of a lot of things.

The decentralisation and fragmentation of tasks within companies forms a barrier for the dynamics between start-ups and incumbents. It is therefore important that relations are manged properly by FMCGs when connections are made. One FMCG has a system in place to ensure that start-ups have a clear relationship with the company.

> One thing we have to be very careful is when we interact with a start-up, we understand also that our size and the way of working can be crushing. And so we really interact a bit differently. We started try to not overload them, for example, we try very quickly to find who is going to be the lead category interacting with them, because if not, they will have repeated discussions with many, many different categories. And this this is basically overloading them and preventing them to go faster to the market. – FMCG packaging director

Another FMCG company has a system in place to ensure that their company is friendly towards sustainable start-ups.

> At a group level, there is very high consciousness about it. And with most of the new projects what we are driving we clearly see the sustainability angle of it. So this is very strong in the company, and we have our own tools to measure if the new project launches are sustainable or not. It is very consciously driven right now. You know, for marketing they cannot bypass the system so easily. – FMCG packaging director

Collaboration can offer FMCG companies for example a way to adopt solutions to the technical barriers that they have encountered for these markets.

> We have the opportunity to evaluate very small step solutions in those regions quite easily, I would say, but they need to be robust enough to provide a kind of an answer to all the [safety] issues that I just mentioned. And for now, we did not find any start-ups. So very happy to discuss the opportunities if you have any solutions that could fit our needs. You know, if you hear about or issue, I don't know how we could work towards scouting more solutions or developing of concepts. – FMCG packaging director

Moreover, FMCGs can test out if the reuse models are attractive for their consumers.

> We were trying to see if there are opportunities that start-ups are working on these kind of concepts, to plug them and try and see because we like to test all these concepts with consumers, whether our real consumers, the brand loyal consumers as well as new buyers, are interested in these concepts or not. – FMCG packaging director

FMCG companies can offer start-ups several benefits though a collaboration. This can be information, investments or access to markets. Reuse models need volume to be successful, and FMCG companies offer a large industrial set-up and presence in many countries.

> I have talked to Zero Waste stores in Europe. And one of the main things that most of them say, one of the biggest kind of limits to scaling, is basically not having relationships with global brands. […] So I think a really important part of the reuse equation is to bring the big brands into the equation so that we have a product

> that is well known by the masses, not just a product that appeals to 5, 10, 15% of people there have strong environmental beliefs. – Reuse entrepreneur

However, one entrepreneur argued that start-ups have to be very careful with early investments from FMCG companies. As a small start-up they can gain control and limit the development of your start-up.

> So that is a key danger to being a small company. So, you got to be careful about the exclusivity that you give to the big brands. They can push you around quite a bit, so basically bend things in their favour. You also have to be careful too, if you have a relationship with the brand for a couple years, and then they basically knock you out of the equation, take your technology and throw you out of the picture. That is something that people will do, that start-ups need to be careful about as well. – Reuse entrepreneur

Partnerships can be useful at a later stage. Algramo had to become established before FMCG companies truly started to notice them, and only then were they able to negotiate a favourable partnership then.

> But basically, it took us six years, a network of 2000 stores, we have got to financial breakeven, reuse rates from 10% up to 80%. And that's the kind of success that caught their attention.

The main thing reuse entrepreneurs can provide at a later of development is more than the reuse innovation, they can provide a platform for reuse. One entrepreneur realized that he had to offer more than just the innovation for a partnership with the FMCGs.

> What we actually should be looking at is not just the containers, but also the distribution system. So, for FMCG companies to put notice is not to offer simply a product or a packaging solutions, but it has to be a the whole distribution system. […] It is not just vendor machinery, not just the *warung*, but it is also being strategic on gathering the market.

This is also the added value of entrepreneurs over packaging producers who are also looking redesign packaging. As a packaging expert at a packaging company put it, reuse is more than the hardware, it is a service. Therefore, the question for scaling up becomes, what should this service look like.

> A system where Unilever and P&G could actually put their product on this, whether it is a physical platform like Algramo in a store, or a digital platform like Loop online, this enables brands to take this solution and actually positively engage. So, what would the same look as for sachets in Indonesia? What type of platform would we need to develop for their brands to buy into it and for the customers to positively interact? I think that's the question to really crack. – Reuse researcher and expert

8. Sustainability of the transition

This chapter explores how the transition can take place while retaining or attaining sustainability. First, the variables that influence the environmental sustainability of reuse models in Indonesia are explores. Secondly, the factors that impact the social developmental impacts in the consumers and retailers are explored.

8.1. Environmental sustainability

The main benefit for reuse is the environmental benefit. However, an important note with reuse is several environmental factors should be considered carefully. Many start-ups provide a refillable package and return rate of the packaging has to be high in order to achieve environmental benefits. Algramo, Zero Waste Warung and YPBB all had, in their initial set-ups, problems with return rates. Algramo and Zero Waste Warung have been able to achieve very high return rate in later models with the help of tracking technologies. Siklus has so far chosen to let people bring their own containers, but it remains to be seen how scalable this model is. Siklus is therefore also looking at providing containers.

At the end of the lifetime, the containers have to be recycled. One packaging expert argues that this should also be true for jerrycans or containers that are used as refill points at the store. Siklus for example uses such containers. Moreover, if they have some pump system or dispensing machine, then these will need maintenance. One advantage the packaging expert sees here is that big and rigid containers are more recyclable, can be used many times and will not end up in the environment at that time. Initiatives as Zero Waste Warung and YPBB swap refilled packaging that is refilled at a central location, this also has its environmental considerations.

The sustainability of the logistical set-up should also be considered. Cleaning and transport also have an impact on the environment. Overall these environmental impacts should also be taken into consideration when evaluating the impact of reuse models.

> We have very high ambitions there but it entails on having fully recyclable containers with as littles mixed materials as possible. And logistics around cleaning, we still have to determine how we structure this, creating as little water usage as possible and ensuring that water is filtered that goes back into the sewer systems and rivers. All these kind of things are quite hard to figured out, we do not have an answer for all these things yet. But we have them in mind in the way we set it up and design. – Reuse entrepreneur

8.2. Social development

The main argument FMCGs make for sachets is that they provide a benefit for the BoP, because they make products more accessible because of their low price. Respondents from NGOs see this argument as a marketing strategy. They argue that companies are only looking at profit. However, even if it is limited, cheaper prices do provide some benefit for the BoP.

Smaller packaging is often more expensive, therefore increasing the cost of living for the BoP. This is what Algramo call the poverty tax, that amount to 40% of the price in Chile.

> Poorer people typically buy from family and neighbourhood stores, not from large corporate super stores, which means more inefficient supply chains, more expensive products. And then on top of that, you have what we call the poverty tax. When you do not have the money to buy the big format but buy the small formats and you are buying in a place that has an inefficient supply chain, that also inflates the price of the product. – Reuse entrepreneur

In Indonesia the effect of the poverty tax is limited, because of the low price of sachets. However, reuse can be even cheaper than sachets. Silkus is currently a 10% discount, and Zero Waste Warung is providing rewards. Reuse therefore potentially benefit the purchasing power of the BoP more.

The impact that reuse will have on the retailers is still very unclear. The FMCGs had not thought about this issue for reuse in yet. Only a few of the business developers in charge of retail responded to interview request, most referred to packaging manager, because reuse is not applied to their retail customers yet. Moreover, none of the FMCG companies had an ongoing 'BoP 2.0' project with capacity building or collaboration with retailers going on. One sustainability manager did mention that they take the livelihoods of their retailers into the holistic equation though.

Reuse entrepreneur saw some potential negative and positive impacts for the livelihoods of retailers. One reuse entrepreneur is worried about putting mom and pop stores out of business with vending machines. Algramo however was able to continue working with local business owners, often women in Chile, by putting their vending machines in their neighbourhood stores. Algramo share their profits with these microentrepreneurs and supporting them in this manner. Another retail option is the mobile setup that requires a salesman, or in the case of Hepi Circle a 'woman on bike delivery' system, but this would go at the cost of *warung* owners.

Another entrepreneur mentioned that reuse overall can provide local benefits, because the distribution system is decentralized.

> If you look at these kind of reuse model and refill models from a more systemic perspective, what happens is that you relocate a lot more power. Reuse distribution systems operate on a local level and are more decentralized, which in general, will lead to a more thriving community, because there is going to be more

> jobs, more opportunities of employment locally happening and directly close. – Reuse entrepreneur

Another important point to consider is that there are many waste picking projects currently worldwide. These often FMCG funded projects aim to 'empower' waste pickers by setting up associations and ensuring better livelihoods for them. A subsidiary of one FMCG company was able to convince the government to prevent a ban on sachets in Ghana by focussing on waste picking. Sachets are normally not picking up, but one FMCG is working to change this in order to chemically recycle the sachets in Indonesia. Transitioning from single-use towards reuse will compete with these waste picking projects and have an impact of waste pickers.

9. Discussion

9.1. Discussion of the results

The transition towards reuse at the BoP in Indonesia is still at a very early phase. Start-ups are in the introduction phase of Hockerts and Wüstenhagen (2010) model of 'Greening Goliaths versus emerging Davids', they are still piloting and experimenting on a local scale. FMCG companies are in between the introduction and early growth phase, they are not in ignorance of reuse anymore, but there are no line extensions at the BoP from frontrunners yet. While the transition is in an early phase, there are several windows of opportunity emerging that could propel the transition further.

At the landscape level, awareness around the issue of plastic waste, both globally and in Indonesia, is putting pressure on the regime. From the scientific community the Jambeck *at al*. (2015) publication had considerable impact, and environmental NGOs also brought the issue to the attention to the consumers and the rest of the regime network. A push specifically for reuse as an solution was also being made from within the regime network by the EMF, an influential actor in the regime network.

When it comes to implementing reuse in Indonesia, the analysis of the transition dimensions shows some dimensions pose barriers to the transition, while drivers in other dimension provide windows of opportunity. There were considerable safety and regulation issues for multinational FMCG companies, showing that the geographical context of emerging economies influences the transition. At the same time new technological solutions that are well suited make reuse more attractive than previously creating a new windows of opportunity. From a market perspective, the low costs of sachets make reuse harder in Indonesia. However, when entrepreneurs can offer lower prices or a reward incentive, the people are very open to reuse. Reuse can provide a convenience benefit over reuse for the BoP, moreover, the people are culturally open to reuse. It should be noted that these findings are mostly for (semi-)urban areas, and future research for rural areas is recommended. At the policy level a possible sachet ban might provide a huge window of opportunity for reuse in the future.

Some of the drivers and barriers that were found were already described in the literature. However, there were also new drivers and barriers uncovered that were specific to packaging and reuse and the BoP context (Figure 7 & 8).

	Found in the literature	New in the reuse context	New emerging market context
Technology		Hygiene and contamination	
		Cleaning	Small packaging size
		Counterfeiting	
		Branding	
Policy	Obstructing laws and consensus	Company liability for contamination	Economic priorities trumping environmental policies
	Unclarity about safety laws	Vagueness of extended producer responsibility laws	Uncertainty about sachet ban
Industry	Company culture	Focus on easy solutions	Geographical distance to problem
	Complexity of value chain		
	Past investments in linear models		
	High upfront investment costs		
	Too few large scale projects		
	Standardisation		
	Decentralisation		
	Rigidness due to large company size		
Markets and user preferences	Consumer interest and awareness	Less suited for food products	Mistrust of basic set-ups
	Limited funding for circular business models	Less suited for products with a high variety of brands	
	Low costs of virgin materials	Convenience	
		Reuse needs volume	
Culture			Brand sensitivity

Table 7. Barriers found in the literature and new barriers

	Found in the literature	New in the reuse context	New emerging market context
Technology	New technologies	Reusability and durability of container	
		Reclosability of container	
Policy	Directing regulations and standard requirements		No strict hygiene laws
Industry	Business case		
Markets and user preferences	Reduced packaging costs	Detergent and home care fit reuse well	Low income consumers are price sensitive and react well to discounts and rewards
		Brands with a large market size fit reuse well	Low income consumers don't mind the extra effort and time
		More control over dosage	
Culture	Encourages consumer loyalty		Consumers already used to refilling
			Indonesians are open to trying out new things

Table 8. Drivers in the literature and new drivers

As one of the first MLP analysis on packaging, the research also showed interesting results. Sustainability transitions mostly involve expensive slow moving goods, such as cars or energy. Packaging on the other hand is unique in this regard because it is very fast moving and is a good that contains other goods. This brings with it unique transition characteristics. This study also showed that pioneering in the emerging markets brings its own unique barriers and opportunities.

The findings also show that applying the Multi-Level perspective to a transition in process can prove valuable insights. Important prerequisites for FMCG companies to get involved were identified, as well as opportunities for enhancing collaboration between FMCGs and start-ups. These findings can speed up the transition if acted upon.

When it comes to niche development, niches are described by Smith, Voß, & Grin (2010) as being a protected space. For example, lead markets, subsidized projects or a specific cultural milieu for early adoption and experimentation would protect start-ups. This study did not have strong findings on protection. Instead start-ups were shown to be less vulnerable because they were found to be more agile and able to pivot and adapt to new findings faster, and able to innovate to overcome barriers and to gain an advantage. In light of this study being small and less constrained is what gives the freedom to try things out without reaching price efficiency yet, not some market protection. These findings

agree more with the advice of Strategic Niche Management (SNM) that state that social learning is crucial for the development of start-ups.

Moreover, SNM states that sharing expectations and networking is important. In the context of a sustainability transition it was found that finding sustainable investors was very important. With a lack of funding for investments, awards and challenges were found to be important to attain funds, but also to exchange knowledge with other start-ups.

Multi-level interactions were found to be indispensable for the transition. Start-ups and incumbents supplement each other strengths and weaknesses. Start-ups are more agile, take more risks and can innovate to overcome problems, but are small. Incumbents are rigid and risk averse, but can provide scale, financial power and market access. Therefore, as the 'start-up and incumbent' model describes, the sustainability transition should be realized by the interplay of sustainability start-ups and market incumbents. On their own, these two actors do not have the ability to transform the existing systems.

When looking at the dynamics between start-ups and incumbents one can see the beginnings of transformation pathway taking place. Start-ups are still too small to replace the single-use packaging regime. Incumbents see these small start-ups as symbiotic and look for them to learn and adopt solutions. Until now the small start-ups are incrementally learning and innovating to overcome barriers in new pilots. However, a breakthrough strategy that follows a more radical reconfiguration pathway could be realized if the more established Algramo would enter the market.

By zooming in on start-ups and incumbents as actors, this study provided valuable insight into the power and agency dynamics of a transition pathway. While solutions from start-ups are seen as symbiotic, start-ups have to be careful with early involvement from FMCG companies. The size of the companies can simply overwhelm the small start-ups with information, or more problematic companies can get too much control and even push out an entrepreneur. This shows the power imbalances that are present within this dynamic.

With regards to the relations, the FMCG actors were all willing to try out reuse with the entrepreneurs. However, start-ups had difficulties getting into contact with incumbents. There is no clear contact point, because of decentralization and the fragmentation of tasks. A recommendation is therefore for FMCGs to have a clear contact point and a system in place that is more friendly towards start-ups. This shows that the transition pathway is not an automatic process. Agency plays a role, and collaborations must be actively pursued by actors.

Geography also proved to be an important factor in the transition. Multi-nationals are active globally and have their headquarters in western countries. This causes them to be distanced from the problems in emerging markets. It also makes it more difficult for start-ups in Indonesia to get into contact with them. Moreover, this study showed that for reuse there are several unique barriers and drivers in the understudied emerging market context.

With regards to the sustainability of the transition, it was found that there are many factors other than reusing the packaging that play a role in the environmental sustainability of the packaging. The set-up of each start-up also differs, it is therefore important that each set-up evaluates their activities carefully and preforms an environmental analysis that includes all factors of their reuse business model.

There are also many possibilities with regards to the developmental impact of reuse. The specific reuse retail model can impact the *warung* owners negatively or positively. Some set-up might replace *warung* owners but might create other jobs. Other setups provide micro-entrepreneurial opportunities. Changes in logistics and distribution might also entail more local jobs. These changes will have to be taken into consideration as reuse models grow.

The issue of developmental impact of sachet or reuse is currently not being considered by FMCGs, they do not have a BoP 2.0 strategy. This correlates with the finding of Hart, Sharma, and Halme (2016) that creating fortune at the BoP is very rare. Providing accessible products for the BoP is mainly a business decision from the FMCG companies. In terms of accessibility, it was found that reuse can potentially provide more of a benefit than sachets, because of lower prices or rewards, even if this developmental benefit is limited.

An interesting indirect developmental impact is that reuse might replace waste pickers. Some FMCG actors now support waste pickers. From a developmental perspective it is very important to support the informal sector. At the same time, it can also be questioned if, in the words of Sen (1999), it is anyone's functioning to pick up someone else's discarded waste. The bar could perhaps be set higher, with the creation of better quality jobs. It would therefore be prudent to evaluate the impact on livelihood of supporting reuse instead of waste picking. Moreover, in this evaluation it should be considered that FMCGs undertake the waste picking strategy to prevent bans on sachets. By supporting waste picking FMCGs are maintaining the environmentally damaging practice of single-use plastics. These findings provide a good opportunity for future research.

Lastly, it is important to note that while this study talks of a 'transition' towards reuse the impression is given a successful pathway towards reuse is predetermined. However, this does not have to be the case. Reuse, and especially the refill variant, is not a new concept and has not reached widescale adoption in the past. This study identifies several new windows of opportunity that enable the transition to take place now. For the transition to materialize actors need recognize and act on this opportunity and have the courage to embrace the more radical solution of reuse.

9.2. Discussion of the research

During the conduction of this research the sample criteria were widened to find more respondents. FMCGs and start-ups were included that where operation outside of Indonesia, and reuse initiatives of NGOs were included. Normally this would have implications for the validity of the data. However, it was found that the data from these extra respondents mostly confirmed previous findings of the respondents and did not result in significant new data. Moreover, by including non-Indonesian start-ups, an established start-up and NGO initiates the experiences and activities of the Indonesian start-ups could be compared to these new respondents, which proved to be valuable.

The similarities between the findings Indonesian and outside actors point towards a possible generalization of the research towards other emerging markets to some degree. Although important differences were found, for example culture, user preferences and markets. Algramo could for example offer a bigger discount because packaging is more expensive in Chile.

With regards to the generalizability of the research, it is also important to note that this study looked specifically at the flexible packaging and sachet and reuse context. The transition described in this research takes place within the global space of multinational FMCG companies and packaging producers and the transition towards sustainable packaging. The FMCGs are also considering reuse for other packaging formats and products. They are also working on other 'sustainable' alternatives that were only covered briefly in this research, such as redesigning, recycling, and biodegradables. With regards of the current status of the transition, it is important to keep in mind that some reuse start-ups in other countries are a bit further in their development than the Indonesian start-ups at the BoP. The results are thus mostly valid for this specific context and should be understood as being part of a bigger transition towards reuse.

It is important to note that this study did not conduct a comprehensive MLP, due to the limited scope of this research. The research focusses specifically on start-ups and multinationals. There were important findings on policy, culture and user preferences from respondents from FMCGs and start-ups. However, a more comprehensive study that dives deeper into these issues from the perspective of consumers and societal actors, will most probably uncover more relevant findings on this matter.

With regards to the completeness of the start-up sample, it cannot be said with complete certainty that all start-ups were found. This study relied on previous scouting efforts and a database from Enviu to find the entrepreneurs, and relied on snowball sampling. It is likely that all visible reuse initiatives at the BoP were found. The knowledge of the reuse landscape of Enviu and other entrepreneurs was quite extensive. Moreover, all respondent were asked if they knew more start-ups of reuse initiatives at the BoP in Indonesia, which resulted in the same initiatives being named. However, it is possible that there are other initiatives out there that are outside of the network of the respondents, most likely Indonesian local initiatives.

The data gathered from respondents of FMCG companies was influenced by the response. People working at packaging were generally more open to interviews. Business developers might also have important insights for the meaning of reuse on the relations of FMCGs with retailers and the impact on the retailers, and marketing divisions and the board make important business decisions that influence the adoption of reuse. However, because reuse is still an emerging topic, many of these divisions were not preoccupied with reuse, and consequently were not interested in interviews. When the transition is at a further stage it will become important for future research to include the views of different positions of the FMCG companies.

Interview were held with respondents from many countries. A few interviews with a packaging and BoP expert, and with multinationals with a headquarter in the Netherlands could be held in person. Other interviews were held over the internet. While holding an interview over the internet, it is harder to build up rapport due to a more impersonal mode of communication. For some interviews this influenced the openness of the respondent.

There were a few limiting factors for the interviews with FMCG companies. Interviews that were held were sometimes limited by time constraints. The respondents that were interviewed often had functions high up on the corporate ladder and had limited time in their agenda. Another issue is that, because the reuse agenda has only been raised recently, some interviewees did not have expertise about all issues around reuse.

Categorizing multinationals that were not active in Indonesia as not selling sachets in large quantities relied on desk research and an estimation of the researcher. It could be that some of these companies do sell sachets. The exact packaging activities of FMCG are often not disclosed online, specifics on this issue often became apparent in interviews. Future research should evaluate this issue more methodologically.

It was initially the idea to also include a few local FMCG companies. Three large Indonesian FMCG companies were contacted, but they declined or did not follow through on interviews. The local FMCG companies were less preoccupied with sustainability than the multinationals, and did not for example have sustainable packaging research and development employees. They also come over as more careful and protective around the issue. This is a shame because in terms of impact, the brand audit found a lot of plastic waste from these local FMCGs. It is important to consider how these local FMCGs can also be involved into reuse solutions, and future research should try to include these local FMCGs.

10. Conclusion

The transition towards reusable packaging will be important for countries such as Indonesia, that suffers from a waste problem due to the large amount of small sachets that are being sold to people at the Base of the Pyramid (BoP) and because of inadequate waste management. This research explores using a Multi-Level Perspective (MLP) how the transition towards reusable packaging at the BoP in Indonesia can be made from the perspective of two actors: start-ups and multinationals.

The transition is being set into motion due to pressures at the global landscape. Awareness of the plastic waste problem is growing, and companies feel the pressure to do something about it. The Ellen McArthur Foundation is channelling this pressure into a global call for reuse.

However, it was found that the transition from single-use flexible packaging and sachets at the BoP in Indonesia is still in a very early phase. There are some start-ups and initiatives that are piloting reuse, but they are not developed yet. The multinationals are all looking at reuse, but do not dare to launch pilots at the BoP.

Along the regime dimensions, there are factors that are holding the transition towards reuse back, and factors that drive the transition. A main barrier proves to be major concerns about safety and regulations, due to hygiene at the mom and pop stores, contamination, cleaning and counterfeiting. Multinationals are found to be risk averse, decentralized and rigid. Consequently, they do not want to change their industrial and logistical setup for reuse. Start-ups are more agile, can pivot and are willing to take risks. New technologies that they use are a major driver that make reuse more attractive compared to previous times. By pioneering reuse, they have found that reuse is already in the Indonesian culture and that the convenience costs of reusing do not matter that much, reuse can be more convenient, due to flexibility and control over the portion size. Indonesian consumers are also very price sensitive and are very willing to adopt reuse with a price incentive or rewards system. High discounts are however not possible, due to the very low prices of sachets, that is also linked to low global oil and plastic resin prices.

Start-ups at the BoP in Indonesia do not find themselves in a protected niche, but face problems scaling their business in Indonesia where it is hard to start a business and acquire funding. The international sustainability community proved to be a important multi-level relation for start-ups. They can gain funds and support from awards and international organisations. During these meetings and on platforms start-ups also exchange knowledge about reuse where they learn more about each other.

Multilevel interactions drive the transition. The start-ups are very small and need the financial power and market access of the multinationals to scale up. The multinationals can benefit from the start-up's innovative power and test out reuse in more safety. Start-ups can innovate to overcome safety issues and build op logistics needed for cleaning.

Multinationals see the smaller start-ups as symbiotic and therefore a path towards a transition would be for them in include the solutions of the start-ups in their business practices. To achieve this, the relations between the start-ups and multinationals will need to be improved. Respondents from multinationals were very willing to try out reuse with the start-ups but were not aware of the start-ups. Current start-ups had difficulty connecting to the multinationals, because of the lack of a clear contact point. Efforts to overcome this gap this need to be made for better collaboration. Start-ups need to be careful in this, they do need to attain some size to set up the logistics and become a platform for the brands to use. Only when start-ups grow can they gain the attention of the multinationals and have to barging power to close a good partnership. The transition towards reusable packaging at the BoP in Indonesia can only be realised when start-ups and multinationals work together towards it.

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Appendix 1: Transition pathways

Main actors and (inter)actions in transition pathways

Transition pathways	Main actors	Type of (inter)actions	Key words
1. Transformation	Regime actors and outside groups (social movements)	Outsiders voice criticism. Incumbent actors adjust regime rules (goals, guiding principles, search heuristics)	Outside pressure, institutional power struggles, negotiations, adjustment of regime rules
2. Technological substitution	Incumbent firms versus new firms	Newcomers develop novelties, which compete with regime technologies	Market competition and power struggles between old and new firms
3. Reconfiguration	Regime actors and suppliers	Regime actors adopt component-innovations, developed by new suppliers. Competition between old and new suppliers	Cumulative component changes, because of economic and functional reasons. Followed by new combinations, changing interpretations and new practices
4. De-alignment and re-alignment	New niche actors	Changes in deep structures create strong pressure on regime. Incumbents lose faith and legitimacy. Followed by emergence of *multiple* novelties. New entrants compete for resources, attention and legitimacy. Eventually one novelty wins, leading to restabilisation of regime	Erosion and collapse, multiple novelties, prolonged uncertainty and changing interpretations, new winner and restabilisation

Figure 24. Main actors and (inter)actions in transition pathways. Reprinted from "Typology of sociotechnical transition pathways," by F.W. Geels, F. & J. Schot, 2007, *Research policy*, 36(3), 399-417.

Appendix 2: Drivers and barriers of circular economy models

Category	Drivers - Emphasis areas	Barriers - Emphasis areas
Environmental	• Resource constraints and potential for preventing negative environmental impacts Andrews (2015); Ellen MacArthur Foundation, 2013; European Commission, 2014a; Ghisellini et al. (2016); Kok et al. (2013); Lacy and Rutqvist (2015); Linder and Williander (2015); Moreno et al. (2014); Murray et al. (2015)	N/A
Economic	• Potential for improving cost efficiency, finding new revenue streams and gaining profit • Potential for new business development, innovation and synergy opportunities Andersen (2007); Dong et al. (2016); Esposito et al. (2015); Ghisellini et al. (2016); Kok et al. (2013); Linder and Williander (2015); Liu and Bai (2014); Murray et al. (2015); Pitt and Heinemeyer (2015); Rizos et al. (2015); Schulte (2013); World Economic Forum, 2014	• High costs and lack of financial capability and support • Lack of tools and methods to measure (long-term) benefits of CE projects Bechtel et al. (2013); Gumley (2014); Ilić and Nicolic (2016); Rizos et al. (2016); Xue et al. (2010)
Social	• Increased internationalization and worldwide awareness of sustainability needs • Potential to increase workplaces and vitality European Commission, 2014a; Mathews and Tan (2011); Zhu et al. (2011)	• Lack of social awareness and uncertainty of consumer responsiveness and demand • Lack of market mechanisms for recovery • Lack of clear incentives Adams et al. (2017); Bechtel et al. (2013); Liu and Bai (2014); Planing (2015); Radamaekers et al., 2011; Xue et al. (2010)
Institutional	• Directing regulations and standard requirements • Supportive funds, taxation and subsidy policies Bai et al. (2015); Desrochers (2002); Dong et al. (2016); Ilić and Nicolic, 2016; Stahel (2013); Velis and Vrancken (2015); Witjes and Lozano (2016); Yu et al. (2014)	• Complex and overlapping regulation • Lack of governmental support • Lack of CE know-how of political decision-makers Bechtel et al. (2013); Gumley (2014); Ilić and Nicolic (2016); Radamaekers et al., 2011; Studer et al. (2006); Xue et al. (2010)
Technological and informational	• Potential for improving existing operations • New technologies • Increased information sharing through enhanced information management technologies, e.g. platforms Ellen MacArthur Foundation, 2013; Feng and Yan (2007) Ghisellini et al. (2016); Lacy and Rutqvist (2015); Mathews and Tan (2011)	• Lack of information and knowledge • Lack of technologies and technical skills Adams et al. (2017); Bechtel et al. (2013); Radamaekers et al. (2011); Rizos et al. (2016); Suocheng et al. (2007); Trianni and Cango (2012)
Supply chain	• Potential for reducing supply dependence and avoiding high and volatile prices • Open collaboration and communication practices • Multi-disciplinarity, increased availability of resources and capabilities • Management of (reverse) networks Adams et al. (2017); Andrews (2015); Ellen MacArthur Foundation, 2013; Esposito et al. (2015); European Commission, 2014b; Ghisellini et al. (2016); Kraaijenhagen et al., 2016; Kok et al. (2013); Lacy and Rutqvist (2015); Linder and Williander (2015); Moreno et al. (2014); Pitt and Heinemeyer (2015); Schulte (2013); World Economic Forum, 2014	• Lack of network support and partners • Strong industrial focus on linear models • Lack of collaboration and resources Bechtel et al. (2013); Gumley (2014); Kraaijenhagen et al., 2016; Rizos et al. (2016); Suocheng et al. (2007)
Organizational	• Potential for differentiation and strengthening the company brand • Increased understanding of sustainability demands • Circularity integrated in company strategy and goals • Development of skills and capabilities for CE Bocken et al. (2016); Ellen MacArthur Foundation, 2013; Geng et al., (2012); Kok et al. (2013); Lacy and Rutqvist (2015); Linder and Williander (2015);	• Incompatibility with existing (linear) operations and development targets • Silo thinking and fear of risks • Conflicts with existing business culture and lack of internal cooperation • Heavy organizational hierarchy and lack of management support • Lack of CE knowledge and skills Adams et al. (2017); Bechtel et al. (2013); Lacy and Rutqvist (2015); Liu and Bai (2014); Rizos et al. (2016)

Figure 25. Framework of circular economy drivers and barriers. Reprinted from "Unlocking circular business: A framework of barriers and drivers," by N. Tura *et al.*, 2019, *Journal of cleaner production,* 212, 90-98.

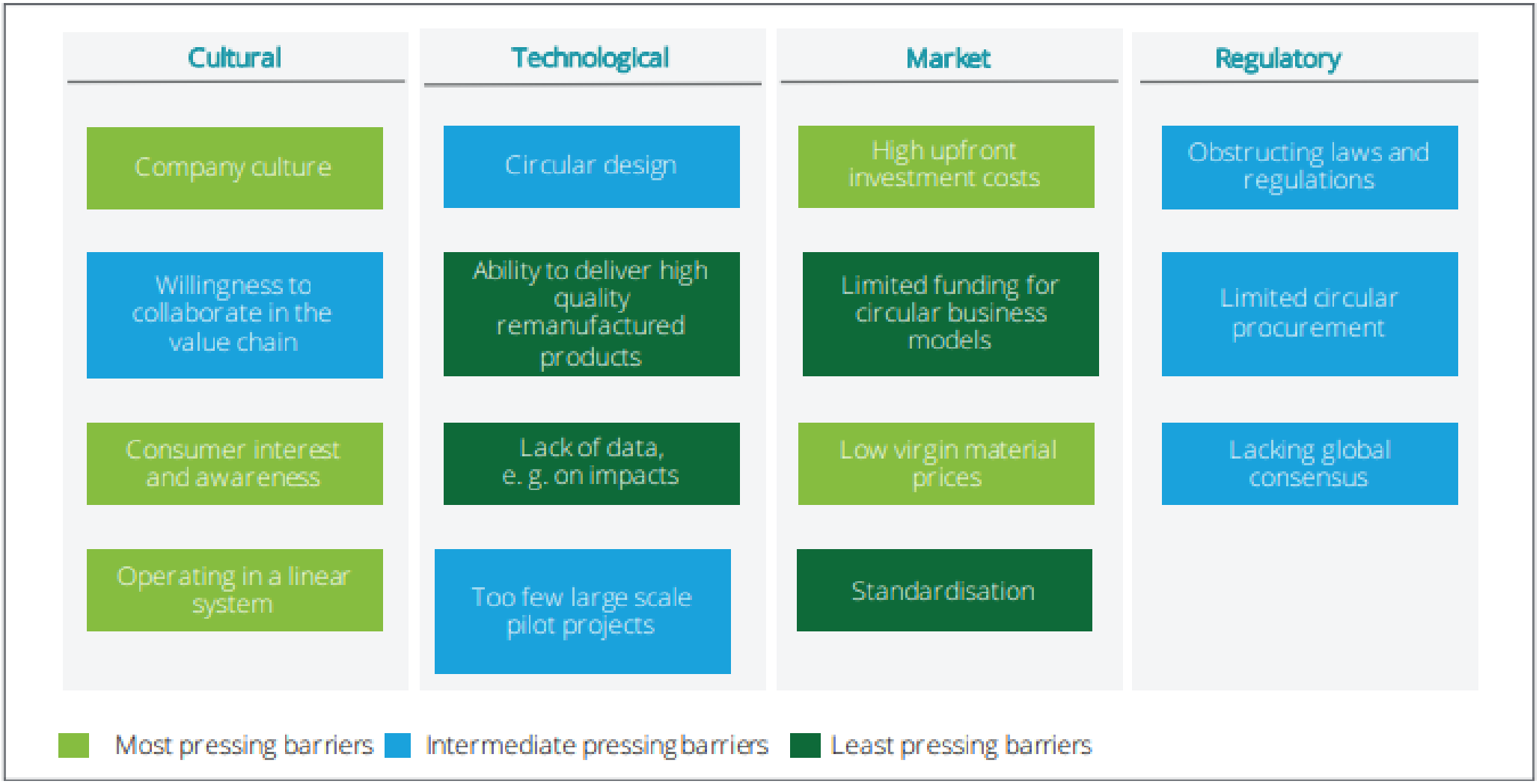


Figure 26. Heatmap of Circular Economy Barriers. Reprinted from "Breaking the barriers to the circular economy," by J.W. Kirchherr *et al.*, 2017, retrieved from https://www.uu.nl/en/files/breaking-the-barriers-to-the-circular-economy-white-paperwebpdf

Appendix 3: Benefits of reuse systems

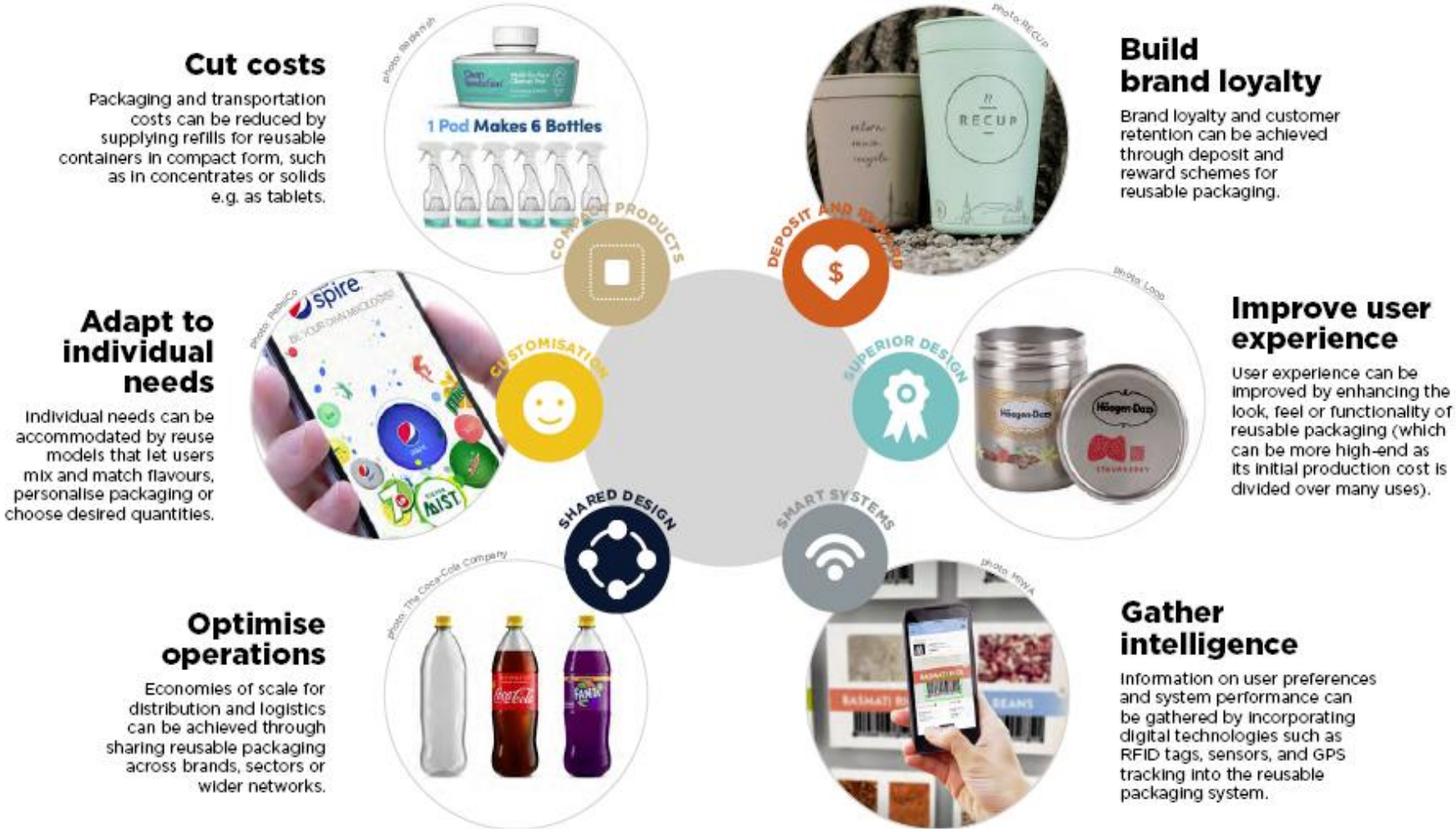


Figure 27. Reuse can…. Reprinted from "Reuse: Rethinking Packaging," by Ellen MacArthur Foundation, 2019, retrieved from https://www.ellenmacarthurfoundation.org/publications/reuse

Appendix 4: Typology of reuse models

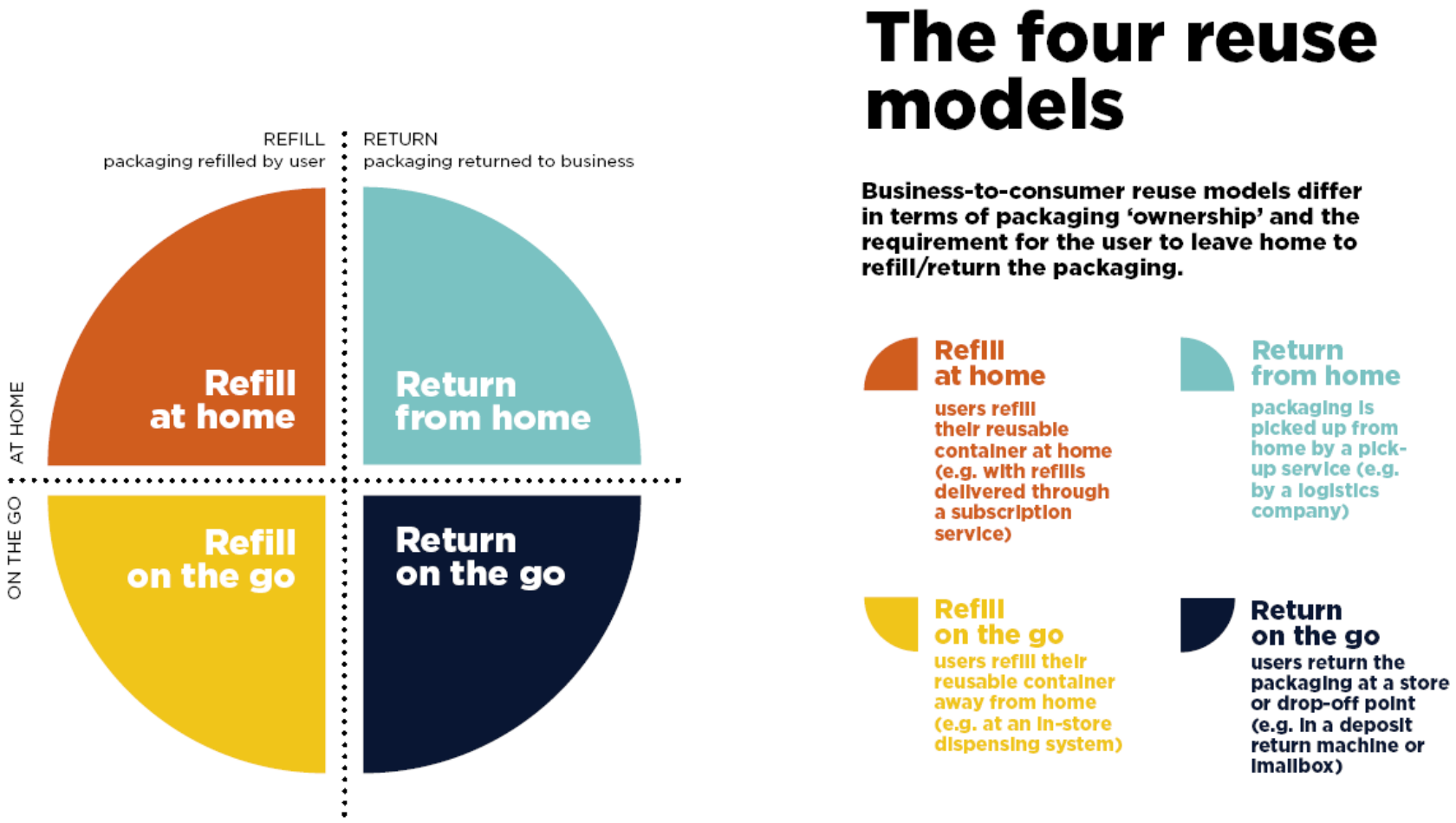


Figure 28. The Four Reuse Models. Reprinted from "Reuse: Rethinking Packaging," by Ellen MacArthur Foundation, 2019, retrieved from https://www.ellenmacarthurfoundation.org/publications/reuse

Refill on the go

WHERE IT WORKS

Refill on the go requires a physical store or dispensing point, which makes it better suited to traditional retail outlets and urban environments. In low-income markets, the model can accommodate customers' needs for small quantities at affordable prices without relying on single-use sachets.

Current examples of **Refill on the go** include:

- Traditional retail outlets for products like beverages, cooking essentials (e.g. grains, flours, oils), personal care, and home care.
- Cities for coffee to go or water fountains.

TYPICAL BENEFITS

CUSTOMISATION — Users' individual needs can be accommodated with dispensing systems that allow them to choose desired quantities and personalise content.

SMART SYSTEMS — Businesses can obtain user intelligence through dispensing systems that recognise the user and collect data on preferences.

COMPACT PRODUCTS — Businesses can reduce transportation and packaging costs by supplying products as concentrates to be mixed with water on the spot in the dispensing machine.

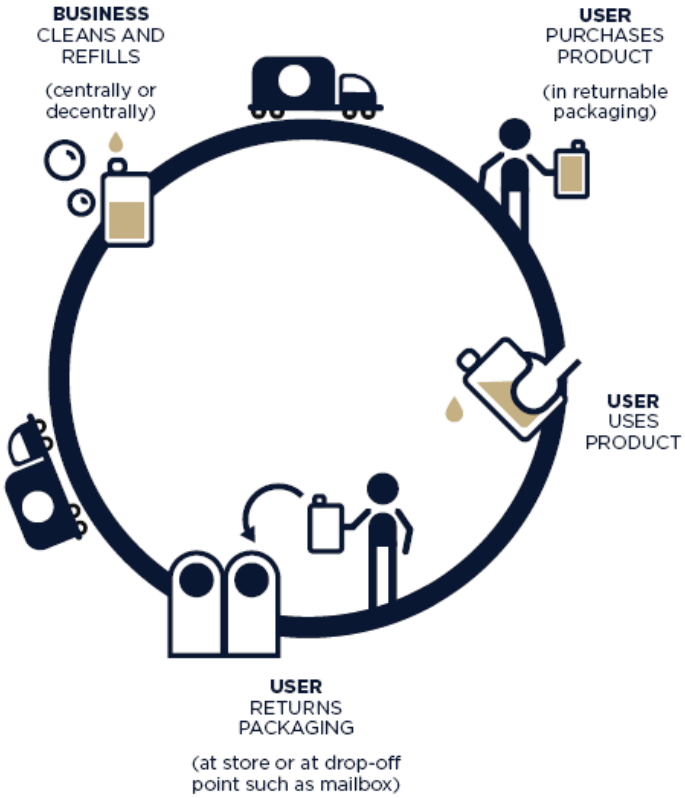
Users can benefit from improved access to products if dispensing systems are mobile or placed in public spaces.

POTENTIAL CHALLENGES

- Motivating users to carry and clean their own containers.
- Ensuring that the dispensing system is easy, safe, and mess-free to use, and that it lives up to the expected brand experience.
- Ensuring brand protection, e.g. that branded dispensers are filled with the right products.
- Building up the required distribution network, including integrating dispensing systems at retailers.
- Complying with product safety standards, policies, and regulations specific to bulk sales.

Figure 29. Refill on the go. Reprinted from "Reuse: Rethinking Packaging," by Ellen MacArthur Foundation, 2019, retrieved from https://www.ellenmacarthurfoundation.org/publications/reuse

Return on the go



WHERE IT WORKS

Return on the go is widely applicable as it can substitute most single-use packaging without changing the fundamental purchase situation.

Current examples of **Return on the go** include:

- Traditional retail outlets for beverages where the model has been proven to work at scale in several geographies (e.g. Latin America, Japan, and Europe).
- Cities and events for products on-the-go such as takeaway coffee, beverages, and food.

TYPICAL BENEFITS

Businesses can improve brand loyalty by incentivising the return of the packaging through deposit and reward schemes.

Businesses can optimise operations through the standardisation of packaging or shared drop-off points, logistics, and cleaning facilities across brands, sectors or wider networks, e.g. in combination with a third-party packaging/service provider.
Users can benefit from improved convenience as a higher density of drop-off points can be obtained through network collaboration.

Businesses can gather intelligence via smart packaging and drop-off points that recognise the user and collect data on preferences.

Users can have a better experience through improved functionality and/or aesthetics of the packaging.

POTENTIAL CHALLENGES

- Developing the right deposit and reward scheme. The scheme needs to incentivise the return of packaging without scaring customers away with a very high initial deposit.
- Ensuring ease of return for users - e.g. by increasing number and density of drop-off points
- Establishing a take-back infrastructure and storage of empties, e.g. retailers need to buy into this from the outset.
- Establishing a local reverse logistics, cleaning, and refilling infrastructure to ensure economic and environmental feasibility.
- Developing a system to keep track of deposits and handle payouts.

Figure 30. Refill on the go. Reprinted from "Reuse: Rethinking Packaging," by Ellen MacArthur Foundation, 2019, retrieved from https://www.ellenmacarthurfoundation.org/publications/reuse

Appendix 5: Drivers and barriers of refill systems

Driver / Type of refill	Lightweight self contained refill delivered through dispenser	Self dispense	Original packaging swapped For new product	Deposit system	Top up card	Dispensed concentrate	Dispensed product	Concentrate mixed in original packaging
Reduced resource depletion	✓	✓	✓	✓	✓	✓	✓	✓
Reduced impact of distribution	✓				✓	✓	✓	✓
Reduction in the amount of waste going to landfill	✓	✓	✓	✓	✓	✓	✓	✓
Demonstrates responsible behaviour		✓	✓	✓			✓	
Reduces packaging costs	✓	✓		✓	✓		✓	✓
Encourages customer loyalty	✓			✓	✓	✓	✓	✓
Provides new marketing opportunities	✓				✓	✓	✓	✓
Offers the opportunity to use reverse vending machines			✓	✓				
Opportunity for eco branding	✓	✓	✓	✓	✓	✓	✓	✓
On demand delivery of service					✓			

Figure 31. A summary of the drivers associated with different types of refills. Reprinted from "Investigating Customer Perceptions of Refillable Packaging and Assessing Business Drivers and Barriers to Their Use," by V. A. Lofthouse, T. A. Bhamra, & R. L. Trimingham, 2019, *Packaging Technology and Science*: An International Journal, 22(6), 335-348.

Barrier \ Type of refill	Lightweight self contained refill delivered through dispenser	Self dispense	Original packaging swapped For new product	Deposit system	Top up card	Dispensed concentrate	Dispensed product	Concentrate mixed in original packaging
Possible loss of brand lock-in	✓							✓
Increased SKUs	✓	✓		✓		✓		✓
Increased costs of two manufacturing systems	✓					✓	✓	✓
Possible increase in use of resources	✓	✓		✓		✓		
Health and safety risks		✓						✓
High initial cost and difficulty in maintaining enduring appeal						✓	✓	
Possible inconvenience of maintaining system		✓	✓			✓		
Dependency on technology					✓			✓
Need for financial incentive				✓				
Perceived as old fashioned		✓		✓				
Costs of refilling, returning, cleaning or refurbishing packaging		✓		✓				

Figure 32. A summary of the barriers associated with different types of refills. Reprinted from "Investigating Customer Perceptions of Refillable Packaging and Assessing Business Drivers and Barriers to Their Use," by V. A. Lofthouse, T. A. Bhamra, & R. L. Trimingham, 2019, *Packaging Technology and Science*: An International Journal, 22(6), 335-348.

Appendix 6: Research process evaluation by supervisor from host organization

To: Utrecht University

From: Sanderine van Odijk, Enviu

Subject: Thesis & Research process Wiebe Bor

Date: 23-1-2020

To whom it may concern,

From 9-9-2019 to 8-2-2020 Wiebe executed his thesis research on Releasing the Reuse Revolution in the Global South in collaboration with Enviu, a venture building organization with a dedicated program on reusable packaging innovations. Wiebe performed an excellent job with his research: aside of working highly independently and proactively, he has contributed direct value to our program on developing reuse ventures in Indonesia by sharing his research insights, connecting us with relevant stakeholders and supporting the ideation of the new business models. We are thankful for his provided contribution and wish him best of luck in pursuing the rest of his career.

On behalf of Enviu,

Sanderine van Odijk,

Senior venture builder and program lead Zero Waste Living Lab

Appendix 7: Operationalization in sub-questions

1. What is the background of flexible packaging and sachets in Indonesia?
   1.1. What is the history of sachets in Indonesia?
   1.2. What is the volume of sachets sold?
   1.3. Brands are involved in selling sachets to the BoP?
   1.4. Who are the producers of sachets in Indonesia?
   1.5. What is the history of reusable packaging?
2. What is the current status of the sustainability transition towards reusable packaging?
   2.1. How many start-ups are currently replacing sachets through reusable packaging?
   2.2. What is the current level of development of start-ups
      2.2.1. Phase: introduction, early growth, take-off, or maturity?
      2.2.2. Price and performance of product?
   2.3. What kind of reuse models do start-ups use and do multinationals use and consider?
   2.4. What brands are involved in selling reusable packaging to the BoP?
   2.5. What is the level of involvement of incumbents in reuse models?
   2.6. What transition pathway is taking place?
   2.7. In how far do companies and start-ups feel the need for a transition?
      2.7.1. How big is the outside pressure against the use of single-use plastic packaging for incumbents?
      2.7.2. Do multinationals experience an erosion of the current regime taking place?
3. How do start-ups and multinationals view the case for a sustainability transition towards reusable packaging?
   3.1. How do multinationals view reuse models as a solution comparted to other alternatives to single-use plastic sachets?
   3.2. Do multinationals and start-up see a match with current regime along the transition dimensions?
      3.2.1. Can current marketing strategies for BoP be used?
      3.2.2. Can current logistics be used for reuse models?
   3.3. Landscape development opening a window of opportunity or a system lock in? (oil prices, economic growth, wars, immigration, broad political coalitions, cultural norms, environmental problems)
   3.4. Which barriers to reuse models to start-ups and multinationals see? (markets and user preferences, culture, technology, industry, policy)
   3.5. What benefits do multinationals see? (Cut costs, adaptivity, optimising operations, brand loyalty, improving user experiences or intelligence gathering seen?)
   3.6. In how far do start-ups and incumbents see a sustainability transition taking place?

4. What opportunities do start-ups and multinationals see to advance the transition?
    4.1. How can start-ups scale up?
        4.1.1. What kind of reuse models are best suited for start-ups to scale up?
        4.1.2. How can strategic niche management be used to nurture current reuse start-up growth? (Social network building, voicing and shaping shared expectations, social learning?)
    4.2. How can current lock-ins and barriers be overcome according to multinationals and start-ups?
    4.3. How can multinationals promote the sustainability transition?
        4.3.1. What is needed for multinationals to increase their adoption of reuse models for BoP products?
        4.3.2. Which reuse models are best suited for multinationals?
        4.3.3. How can firm best combine the adoption of reuse models with capacity development? Do they consider this when implementing reuse models? In what way, and is this sufficient to be beneficial for the BoP?
        4.3.4. Can base of the pyramid marketing strategies be translated to promote reuse models?
    4.4. What reuse models have the biggest potential according to multinationals and start-ups?
    4.5. How can support be improved?
        4.5.1. Improvement of enabling technologies?
        4.5.2. What can policy makers do to speed up the sustainability transition?
        4.5.3. How can knowledge institutions best aid the transition?
5. How are the current dynamics between start-ups and multinationals?
    5.1. Wat is the current dynamic between start-ups that use reuse models and incumbents?
        5.1.1. Do firm consider niche innovations to be symbiotic or disruptive?
        5.1.2. Are start-ups and multinationals working together, and at what level? Are multinationals emulating or copying start-ups and how many multinationals are emulating or working with start-ups, only frontrunners or are more following?
    5.2. Do start-up notice resistance from the current regime
6. How can the dynamics between start-ups and multinationals contribute to the transition?
        6.1.1. Link-up
        6.1.2. Involvement
        6.1.3. How can the transition take place, while retaining the environmental and social benefits?
    6.2. How can the dynamic between start-ups and multinationals be improved in a beneficial way for the sustainability transition?
    6.3. What actor has the biggest potential to change the system?
7. How can start-ups and multinationals make the transition while contributing to environment and the BoP?

7.1. How sustainable is reuse according to the multinationals and start-ups?
7.2. What elements affect the sustainability of reuse models?
7.3. What benefits at the BoP from reuse do multinationals and start-ups see?
7.4. How do multinationals view the importance of capacity building and creating local partnerships?
    7.4.1. Do multinationals consider creating fortune for the BoP?
    7.4.2. Are the poor seen as partners and co-creators?
    7.4.3. Are there plans of building skills for employees?
    7.4.4. Are fringe stakeholders involved?

Appendix 8: Interview guides

Interview guide for FMCG companies and packaging producers

Introduction

1. Introductions
2. Explanation of my work and research
3. Permission for recoding and anonymity?
4. What are you responsibilities in the company?

View on sustainable packaging

5. Importance of sustainable packaging for the company?
6. Why move away from single-use packaging?
   Probes: feel outside pressure, how much, whom, since when, seen changes because of this, push by other actors for change, suppliers, policy makers, NGOs?
7. Do you consider alternatives for single-use plastics sachets?
   Probes: why, for how long, to what extent, how fast?

Experiences with reusable packaging

8. Are there reuse activities in company?
   Probes: how, level of involvement / how far, pilots or more, experiences, lessons, follow-ups?
9. Who decides to pursue reusables in the company?
10. What kind of reusable packaging?
    Probes: for what products, refill, return, why best suited, problems with one or other?
11. How attractive do you consider reusable packaging to be compared to other alternatives for single use plastic sachets?
    Probes: biobased, recycling, preference, product specific, market specific, changes in preference, trends?
12. Barriers that you encounter or problems preventing you from using reusable packaging?
    Probes: within the company, technological, policy and regulation, in the market, consumers preferences and cultural? Reasons why it wouldn't work, how can these be overcome?
13. Do you see advantages?
    Probes: EllenMcArt benefits, why these, others, to what extent looked into
14. Do you see opportunities for reusable packaging?
    Probes: technological, policy and regulation, in the market, consumers preferences and cultural? Reasons why it would work, what sector, what element of reuse, future possibilities?
15. What is needed to start considering them more?

Relation with brands (for packaging producers only)

16. How much can you change in the system as a packaging producer?

17. What is the relationship with brand holders in changing packaging?

View of reusable packaging market / regime trends

18. Developments that you see in the market towards reusable packaging?
    Probes: research, policy, user preferences ect. see areas
19. Easy of transitioning from single-use to reuse
    Probes: changes needed in supply chain and stakeholder network/partners, organisationally, logistically, technically developed enough, enough information, user preferences and markets there yet
    a. Can BoP marketing strategies and logistics be used for reuse models?

Relationship with innovative start-ups

20. Do you view innovation as important?
21. View on reusable packaging start-ups?
    Probes: keep track of, seen as viable, source of inspiration, act on / emulation or just learning, what start-ups do you know at the BoP in Indonesia
22. Are you work with reuse start-ups? Is cooperation with start-ups important for you company?
    Probes: why, what do you get out of it experience, potential, improvements, partnerships, sponsorships, cooperation, competition, what do you get out of it, importance

Reuse and sustainability (mainly for multinationals)

23. If not treated as benefit: view on environmental benefits?
24. Does company create developmental benefits at the BoP? In what way?
    Probes: making products accessible, poor as partners, co-creators, skill building, involvement of NGOs
25. How does reuse relate to local capacity building
    Probes: more potential, local supply networks

End

26. Do you have anything to add?
27. Can I ask questions later?
28. Would you like me to share my research?
29. Thank you.

Interview guide for start-ups

Introduction

30. Introductions
31. Explanation of my work and research
32. Permission for recoding and anonymity?
33. What are you responsibilities in the company?

Their business

1. At what stage is your company?
   Probes: piloting, growing, gaining attention, price competitiveness, performance?
2. What kind of reusable packaging?
   Probes: for what products, refill, return, why best suited, problems with one or other?
3. For what products and brand choice?
   Probes: why these, cultural elements, suitability in BoP context?

Experiences with reuse

4. Barriers that you encounter or problems preventing you from using reusable packaging?
   Probes: from companies, technological, policy and regulation, in the market, consumers preferences and cultural? Reasons why it wouldn't work, how can these be overcome?
5. Do you see advantages for reuse over single-use?
   Probes: Ellen MacArthur benefits, why these, others, to what extent looked into
6. Do you see opportunities for reusable packaging?
   Probes: technological, policy and regulation, in the market, consumers preferences and cultural? Reasons why it would work, what sector, what element of reuse, future possibilities?

Reuse market and scaling

7. What where your lessons as a start-up?
   Probes: social learning, adapt, pivot, technological, policy and regulation, in the market, consumers preferences and cultural?
8. Do you see a market for reusable packaging – see growth?
   Probes: where, what market segments, attraction from companies, future developments?
9. Do you see developments, that might create new openings for reuse?
   Probes: Technological, policy and regulation, in the market, consumers preferences and cultural? Reasons why it would work, what sector, what element of reuse, future possibilities?
10. How is it to do business in an emerging countries?
    Probes: ease of doing business, problems starting up, language, culture, finance?
11. How can you scale up
    Probes: need volume, scalability of the model, logistics, consumers ready, finance, accelerators, partners?
12. Wat is needed for wide scale adoption for reuse?

Cooperation

13. Do you have contact with other entrepreneurs?
    Probes: voicing and shaping shared expectations, inspiration, sharing lessons?
14. Interest from multinationals?
    Probes: dynamic, contact from you or them – how interested, helpful, what are they interested in?

15. Does cooperation benefit you?
    Probes: how much, in what, what are you looking for?
16. Are there problems coming from cooperation?
    Probes: power problems, any copycat products, emulation?
17. How can connection with multinationals be improved?

Sustainability

18. How sustainable is reuse? What elements must be considered here?
    Probes: containers refillable, recyclable, return rate, number of uses, less total plastics, logistics, other considerations?
19. What is the social or developmental impact of your business?
    Probes: for consumers, for retailers, new job opportunities, replacement of jobs, how does it impact the warung owners?

Interview guide for experts, policy makers and NGOs

Introduction

1. Introductions
2. Explanation of my work and research
3. Permission for recoding and anonymity?
4. What are you responsibilities in the company?

Problem

5. What is your take on the problem of plastic waste (from sachets and flexible packaging) in emerging countries?
6. What is your organizations role in combating this problem?
7. *Probes: why this approach, next steps?*
8. What is the way forward in your opinion?
9. *Probes: solutions, why these, what is needed to achieve this?*

Companies

10. What is the attitude of multinationals towards the plastic waste problem?
11. *Probes: recognize the problem, offer solutions, genuine solutions or greenwashing/CSR/PR?*
12. What would be needed for them to become more sustainable/circular?

Reuse

13. Are you familiar with reusable or refillable packaging?
14. What do you think of reuse as a solution to replace flexible packaging and sachets (as compared to recycling, biodegradables)?
15. *Probes: what works, where does it work, what is the potential?*
16. Do you see barriers for these types of solutions?
17. *Probes: from companies, technological, policy and regulation, in the market, consumers preferences and cultural? Reasons why it wouldn't work, how can these be overcome?*

18. Do you see opportunities for these types of solutions?
19. *Probes: technological, policy and regulation, in the market, consumers preferences and cultural? Reasons why it would work, what sector, what element of reuse, future possibilities?*
20. What would be needed to make reusable or refillable packaging successful?

Entrepreneurs

21. What role do you think that entrepreneurs can play in reuse solutions?
22. Know of more initiatives that use reusable packaging or refills to replace sachets and flexible packaging?

Policy makers

23. What is currently done by policy makers for reuse?
24. Policy in place that is a barriers for reuse?
25. Are they doing enough?
26. *Probes: why this, what is helping or driving it, is it enough, what is needed, at what level?*

Social sustainability

27. How sustainable is reuse? What elements must be considered here?
28. *Probes: containers refillable, recyclable, return rate, number of uses, less total plastics, logistics, other considerations?*
29. Multinational brand owners argue that flexible packaging and sachets have developmental benefits for the poor because they make products accessible to them, what do you think of this?
30. *Probes: really a benefit, how big, advertising, CSR?*
31. Do you think that reusable or refillable solutions can offer developmental benefits?
32. *Probes: for consumers, for retailers, new job opportunities, replacement of jobs, how does it impact the warung owners?*

Appendix 9: Coding tree

- Landscape
    - Low costs virgin materials
    - Awareness
        - Pressure consumers against plastics
        - Awareness since Jambeck
        - Plastic bag ban
        - More bulk stores
        - Awareness not translating into call for reuse
- FMCG activities
    - Non-reuse
        - Mix of solutions
        - Focus on recycling
        - Focus on redesign
        - Biodegradables
        - Focus on recycling
    - Reuse activities
        - Reuse attention since EMF report
        - Reuse activities at BoP
            - Talking about reuse internally
            - Piloting reuse
            - Want to start reuse pilots
            - Partnership
        - Focus on other sectors
            - Reuse mostly in western countries
            - Focus on beverages
        - Critique on FMCG reuse activities
            - FMCG pilots small scale
            - FMCG pilots in wrong place for short time
            - FMCG pilots lack ambition
            - FMCG pilots are publicity stunts
- Transition dimensions
    - Technology
        - Hygiene
        - Contamination
        - Cleaning
        - Counterfeiting
        - Traceability
        - Small size
        - Reclosable

        - New technologies
    - Policy
        - Laws and regulations
        - Policy in the making
            - Plastic ban
            - ERP
        - Deposit
    - Industry
        - Branding and reuse
        - Business case
        - Many changes needed
        - Reuse complex
        - Shop space
        - Retail cooperation
        - Decentralisation
    - Market and user preferences
        - Product suitability
        - Indonesia is important market for multinationals
        - Large sachet volumes in India
        - Cost and convenience
        - Low costs of sachets
        - Low income consumers is price sensitive
        - BoP don't reuse for the environment
        - Discount is possible
        - Reward system works
        - Convenience less of a problem for BoP
        - Brandless products well suited
        - Reuse catches on quickly
        - Bring containers not convenient
        - Sachet refilling at home
        - Reuse already exists
        - Consumers want single dose
        - No trust reuse
        - People like reuse
        - FMCG can change behaviour
        - Difference city and rural
        - Flexible dosage
    - Culture
        - Culture and brand choice
        - Need to work with brands
- Niche protection
    - Initial advantage / problems
        - Free hours from entrepreneurs

        - Challenges setting up in emerging economies
        - Start with brandless products
    - Innovation over FMCGS
        - Start-ups willing to take risks
        - Start-ups unregulated
        - Start-ups are agile
- Collaboration
    - Start-ups other actors
        - Hard to find funding
        - Sustainable investors
        - Multilateral organisations
        - Challenges and grants
        - Platform
        - Inspired by Algramo
    - Start-up incumbents
        - FMCG looking for start-ups
        - FMCG open to reuse
        - Connection problems
        - Power problems
        - Start-ups need brands
        - FMCG need start-ups
        - Become platform for brands
- Sustainability
    - Environment
        - Providing containers
    - Development
        - FMCG don't do it to help
        - Sense of community
        - Machines replacing mom and pop stores
        - Support micro entrepreneurs
        - Poverty tax
        - Mobile set-up
        - Inclusive waste picking
        - Holistically