# A creative approach to investigating refillable packaging systems

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## 1 Introduction

In recent years the environmental impact of packaging has become a prominent issue in the UK as it is a very visible product in the waste stream, making up around one-third of household rubbish (LRRA, 1996). The introduction of the European Packaging and Packaging Waste Directive in 1994, which requires Member States to ensure that all packaging placed on the EU market complies with certain 'essential requirements' relating to the manufacturing, composition and end of life of packaging, has made packaging a more important issue for consideration by many businesses. Over the past 40 years considerable efforts have been made to reduce the environmental impacts of packaging by focusing on issues such as light-weighting and material selection (Lewis et al., 2001, Holdway et al., 2002). However, although these redesign approaches are not having a radical effect on the overall impact of packaging. Whilst the weight of packaging per unit of product has decreased, demographic and lifestyle changes such as smaller family size and a demand for greater convenience (INCPEN, 2001) have led to increases in the total amount of packaging used. A key report identified that in 2003, the total packaging waste going to landfill in the UK rose to over 10 million tonnes per annum (Environmental Services Association, 2004).

The wide spread use of refillable packaging is recognised as having the potential to reduce the amount of packaging waste going to landfill (WRAP, 2004). However in the past, attempts to extend the use of refillables beyond a few traditional areas have met with little success. It is believed that recent advances in technology and the development of product service systems may provide the opportunity to re-evaluate the role of refillable packaging systems.

A two year Defra funded collaboration between Loughborough University and The Boots Company aims to address these issues and consider different ways of delivering refillable packaging systems for body wash products (shower gels etc.) with the intention of reducing packaging waste and enhancing customer convenience. This paper reflects on the key stages of the project as illustrated in Figure 1, reporting on the variety of approaches which have been taken over the last 15 months and the key outcomes to date. It then touches on the process which has been developed for the consumer testing phase and considers the future direction for the remaining eight months of the project.

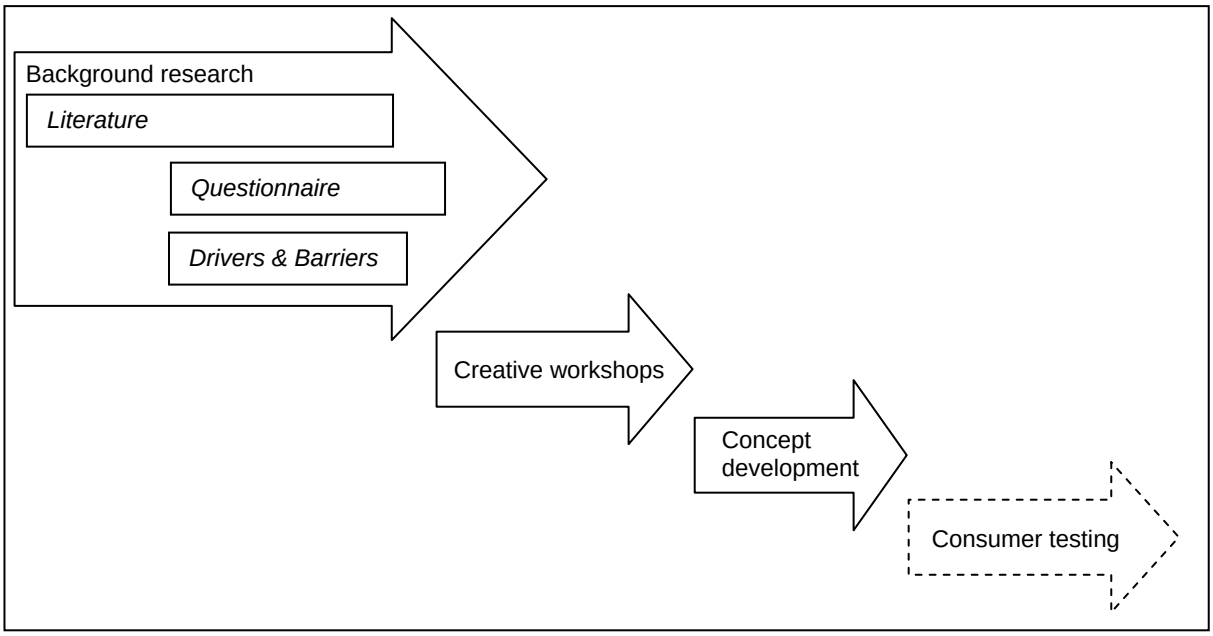



**Figure 1 Key stages of the DEFRA funded Refillable Packaging Systems project**

# 2 Background research

The early stages of the project involved a literature review, a consumer oriented questionnaire (Lofthouse and Bhamra, 2006b) and a workshop to investigate the business oriented barriers and drivers associated with refillable packaging (Lofthouse and Bhamra, 2006c, Lofthouse and Bhamra, 2006d). A wide range of useful findings, which were used to inform the latter stages of the project, emerged. These will be presented below in four categories: categorisation of refills; consumer perceptions of refillable packaging; drivers for refillable packaging; and barriers to refillable packaging.

## *2.1 Categorisation of refills*

An initial review and analysis of refillable product packaging solutions quickly highlighted that there are many different categories of 'refills' - each offering different opportunities and challenges to business, consumers and the sustainability agenda and each having different design and logistics requirements. Sixteen different types of refill approaches were identified (see Table 1).

| **Approach** | **Description** |
|---|---|
| Lightweight self contained refill delivered through dispenser | Customer buys a self contained (lightweight) refill which they take home and put into their durable dispenser. |
| Lighter weight refill through part reuse | Customer buys a new bottle of product and reuses the spray pump e.g. cleaning products |
| Empty packaging refilled in shop | Customer takes the original packaging back to the store for it to be refilled with the same product. |
| Self dispense | Customer takes reusable container back to the store where they refill it with the same product. |
| Original packaging swapped for new product | Customers return empty packaging to a unit where they leave it and pick up a new product. The old packaging is refilled for future use by someone else. |
| Door to door delivery – packaging replaced | Customer receives full packaging when required and leaves empty packaging for supplier to collect, when they are finished with. Returned bottles are refilled for other customer. |
| Deposit system | Customer returns empty packaging to supplier for a financial incentive. |
| Top up card | Customer pays for a service which is delivered on the production of the payment card. |
| Creation | Customer buys the constituent parts to make the product themselves. They buy refills to allow them to repeat the process |
| Door to door delivery – packaging refilled | Customer buys quantity required from a delivery van, using special containers and only paying for the quantity taken. |
| Refilled with different product | Once original packaging has been used it is refilled with a different product. |
| Dispensed concentrate | Customer buys a dispensing unit. They also purchase refills containing concentrated product which are delivered through the dispenser. |
| Dispensed product | Customer buys a dispensing unit. They also purchase refills which are delivered through the dispenser. |
| Concentrate mixed in original packaging | Customer buys a concentrated refill which they dilute with water and mix using the old packaging. |
| Fill your own packaging | Customers fill their own bottle with product in shop. |
| Bulk purchase | Customer buys in bulk and refills a sampler package at home. |

**Table 1 Sixteen different categories of refills (Lofthouse and Bhamra, 2006a)**

Recognising that there were differences between refillable packaging systems, and differentiating between them was key to ensuring clear communication with both consumers and business, and proved to be an important cornerstone of the project.

# 3 Consumer perceptions of refillable packaging

After recognising that there are different types of refills, the team developed a questionnaire which was administered through the Boots Evaluation Suite. Customers were asked to answer a range of questions aimed at investigating how they felt about different refillable packaging systems. A summary of the key findings relating to; the positive and negative attributes associated with refills, reasons for actively buying refills and consumer perceptions of the sustainability of refills are outlined in the sections below[1].

## *3.1 Summary of positive and negative attributes*

The study helped to provide some detailed insights into the attributes which have led to consumers having a positive or negative experience of refillable packaging. The key findings are summarised in Table 2.

| Attributes leading to a positive experience | Attributes leading to a negative experience |
|---|---|
| good product quality | expensive |
| convenient delivery | inconvenience |
| good value | hassle of maintenance |
| less waste | increased waste |
| easy to use | poor product quality |
| clean and hygienic | bad delivery |
| takes us less space | bad quality packaging |
| light to transport | 'fiddly' to refill |
| no mess | concerns over how long refill will be available for |
| cheap | incompatibility between systems |
| quick to use/refill | |

**Table 2 Attributes shown to have led to a positive or negative experience of refillable packaging**

## *3.2 Summary of reasons for actively purchasing refills*

A study by WRAP (Lofthouse, 2006) identified three different motivations for buying refills: altruism – ecozone/motivated consumers; cost – value; and innovation/technology/convenience – creative, looks and feels stylish. Although the findings from the DEFRA a study also identified altruism, cost and convenience as drivers for refills, it was recognised that altruism or the desire to be environmentally responsible had to be delivered *in association* with product quality, and/or cost. It also identified a number of additional reasons as to why people actively buy refills:

- People without cars report that they specifically select refills because they are smaller, lighter and easier to carry home.
- To reduce waste and/or actively reduce the amount of stuff they buy.
- Ease of use/delivery.
- Product quality.
- They have had a good past experience.
- Brand association.
- They take up less room.
- They are fun.
- They are considered the 'norm'.
- Price (only important if product quality is there).

The research showed that in the majority of cases a positive experience leads to customer actively purchasing a refill. However the findings also suggest that as long as the refill is its delivered well, people do not mind whether or not they are given a choice to participate.

[1] The full methodology is described in - Lofthouse, V. A. and Bhamra, T. A. (2006b) *An investigation into consumer perceptions of refills and refillable packaging,* Loughborough University, Loughborough.

### *3.3 Customer perceptions of the sustainability of refills*

Most respondents felt that refillable packaging was better for the environment, and a quarter of them had actively chosen specific refills because they were perceived to be better for the environment. Reasons they cited included that:

- they use less material,
- they generate less waste packaging to go to landfill,
- there is less impact through manufacturing, and
- they reduce the amount of different containers going into shops.

A number of the respondents also highlighted that they are actively engaged with curb side recycling. In recognition of this it would be unwise to develop refills which might be unwittingly recycled.

### *3.4 Reflection on findings*

An understanding of consumer perceptions was an essential starting point for the project, as it believed that an understanding of these perceptions can be used to develop more acceptable refillable packaging systems that will be commercially successful.

# 4 Drivers for refillable packaging

During the early stages of the study, a number of focus groups were held with a range of stakeholders (see Lofthouse and Bhamra 2006a, 2006b). From these a range of drivers for refillable packaging were identified and collated into three categories; business drivers, consumer drivers and sustainability drivers, these will be reflected on in the following sections.

### *4.1 Business Drivers*

From a business perspective there are a number of drivers for using refillable packaging. The first is the opportunity to develop closer connections with customers by tying them into a relationship with a product. This can be achieved in one of two ways:

1. The customer buys some form of 'parent' hardware (e.g. razor, coffee machine, or soap dispenser) often at a relatively low price with some 'free' refills thrown in. Subsequent refills, often designed to only operate with their intended 'parent', are then sold at a higher profit margin. This has the effect of tying the customer into the particular brand. These types of refills also often use lightweight packaging design which can be manufactured at a lower cost, use less materials and can lead to reduced transportation costs.
2. Customers' sign up to a service which 'binds' them to their selected supplier, as in the case of door-to-door milk delivery. Unless the company disappoints the customer in some way, it is likely that they will continue to supply the service in question. This type of high level buy-in is a key driver for service oriented solutions.

A further driver can be the innovation opportunities that new delivery systems create. Napster created a new market for delivering music to the masses through the creation of their 'top-up' card, which is sold in Post Offices around the UK. Other examples of new business opportunities derived from thinking about refills differently can be seen through the approaches taken by Allegrini S.p.A, an Italian producer of detergents and cosmetics, who developed 'Casa Quick' a service for the home delivery of detergents (Manzini and Vezzoli, 2002). Casa Quick products are taken from vans, which move from house to house on a regular route. Each family takes the detergents needed from the van in the quantity required using special containers and only pays for the quantity taken.

There are also less radical drivers for moving to refills. Lower costs, are a driver for companies to introduce bulk containers which can be used to refill packaging returned by the consumer. Bulk containers reduce overall material usage as well as reducing processing costs and the need for elaborate sales packaging. Similarly, refillable packaging that is returned to the manufacturer for reuse, also results in reduced materials and processing costs.

An improved sustainability image can also be an effective driver to encourage business to utilise refillable packaging. Many consumers recognise that refills use fewer materials and can generate less waste. As such, as long as product quality is maintained, refills can attract customers who wish to support companies who are projecting a more sustainable image in their packaging design.

## *4.2 Consumer Drivers*

Drivers for encouraging consumers to purchase refills can generally be divided into two categories, those which add value and those which reduce costs.

Added value can be provided in a number of ways - through increased quality, quantity, durability, choice, portability, availability and adaptability. For example, customers, who do not have the use of a car, report that they purchase some refills specifically because they tend to be lighter and smaller to carry home from the shops. Some refill designs also offer the consumer a degree of product customisation; this can be an attractive feature of refills from a consumer viewpoint. Other refills such as coffee machines and vegetable boxes offer customers increased product choice, variety and convenience.

Reduced costs will always be a key driver for some customers. A number of customers specifically highlighted the cost reductions which can be achieved on products such as baby wipes, by foregoing the dispensing unit and only buying the refill pack. The disadvantage of this behaviour from the business perspective (aside from loss of revenue) is the potential rebound effect if the quality of the product delivery is reduced as a result. Other refill systems provide consumers with a financial incentive, by offering money back on returned packaging as was the case with lemonade bottles, prior to the 1980s. This type of driver may encourage consumers with no interest in refillables to engage with the approach in return for financial rewards.

Finally, there is a growing group of 'green' consumers who recognise the sustainability benefits provided by refillable packaging and will actively seek out packaging of this nature.

### 4.2.1 Sustainability Drivers

From a sustainability perspective the main drivers for the use of refillable packaging centre on their potential to minimise packaging. This reduces overall material use and therefore reduces resource depletion. A lighter weight refill also reduces the environmental impact of distribution, as less energy is required to transport the product. In addition less material will end up in landfill if the refill is disposed of rather than recycled at the end of its life.

The use of refills can promote responsible behaviour in consumers and encourage them to consider resource efficiency and recycling or reuse of their products. By encouraging consumers to reuse their packaging significant environmental improvements can be made by reducing resource use, landfill and energy used in transportation. Refills can therefore be used to educate the public more widely about sustainability issues.

## *4.3 Barriers to refillable packaging*

As with the drivers three categories of barriers were identified; business barriers, consumer barriers and sustainability barriers.

### 4.3.1 Business Barriers

From a business perspective there are a number of potential barriers to adopting refillable packaging. Darlow (2003) specifically identified Health & Safety and Hygiene Regulations, the logistical complexities of a multidirectional supply chain, price of new packaging and customer behaviour. These barriers tend to be more relevant to some refill systems than others. For example Health & Safety and Hygiene Regulations will be especially relevant for any scenarios where packaging needs to be cleaned before reuse such as the case for milk bottles. In this particular example, the milk bottles are collected from the customer when a new product is requested. They are then returned to a depot where they are cleaned and refilled.

The project also highlighted other barriers associated with specific refills:

- For systems using lightweight refills it is often possible for the refill to be used without the parent pack, which means that the customer lock-in and brand loyalty that the refill was designed to create, is lost. In addition competitors may bring our similar lower priced products which also fit the 'parent' pack, unless the original design is novel enough to be protected via patent.
- For refills designed to be filled from bulk containers, additional space costs will be incurred by retailers as both large storage containers and small refill containers will have to be stored. Extra staff could also be required to run the 'refilling point' which is likely to be a slower transaction than

having the consumer selecting the product from a shelf and then paying for it. This approach may also have health and safety implications within store, as spilt products can be dangerous.

- For scenarios where manufacturers plan to refill returned packaging in store, there will be added costs associated with storage, transportation and staff time. In addition to this the return of packaging may not necessarily be linked to sales of new products.

### 4.3.2 Consumer Barriers

Inconvenience, which can manifest itself in a number of different ways, can be a key barrier to refillable packaging. For example some refills require consumers to undertake additional and sometimes complex operations in order to enable the refill system to operate. These tasks can include activities such as refilling smaller containers from bulk supplier, removing parts to enable containers to be refilled and even returning packaging to stores. Often these systems will require consumers to store larger containers of product within their homes in order to refill containers at a later date and the resultant perception of inconvenience can prevent consumers from using the product. Another barrier for consumers is the inconvenience of either being unable to purchase the required refill (due to lack of stock) or being unable to identify the correct refill whilst in store (and subsequently buying the wrong one). Customers can also become disenchanted with a product if they do not consider it offers flexibility, for example if it only one type of refill fits the dispenser. Consumers also indicate frustration at refills that need to be completely empty (and washed) before they can be returned for refilling. This can lead to the frustration of running out of the required product. Neither a financial incentive nor the price of the product are likely to be enough to encourage consumers to engage with a refill which is difficult and inconvenient to use.

Cost is another potential barrier to refillable packaging. When considering a service type of system, customers may deem the overall cost to be too high to engage in. Customers also recognise that buying refills for pre-purchased 'parent' dispensers can be expensive. To combat this, some other value-added incentive needs to be provided.

Finally, ineffective communication can be a barrier to refillable packaging. For example, if customers do not realise that packaging can be refilled they may simply dispose of it or recycle it, rather than allowing its full potential to be reached.

### 4.3.3 Sustainability Barriers

A key barrier to refills from a sustainability perspective, relates to when the system fails. In these cases they can lead to the generation of more, rather than less waste. For example, in refill systems where a 'parent' pack or dispenser is sold at a relatively low 'introductory' price as is often the case with razors and razor blades in the UK, consumers may not end up buying the refill, but instead opt to purchase another parent pack and dispose of the high value, original pack.

In some cases sustainability benefits can be very minimal due to the way in which the refill system has been designed. This can act as an additional barrier to some retailers. In addition some refill design faults may result in customers stockpiling full packaging at home just in case there refill runs out before they can get to the shop therefore there may be no reduction in material use or waste to landfill.

## *4.4 Summary*

The initial stages of the research project have shown there are many barriers that have to be overcome in order for refillable packaging systems to be successful. However, it it also clear that there are a number of positive drivers for the use of refillable packaging and clear communication of these driver may encourage increased use of refills.

# 5 Creative workshops

Following on from the background research element of the project, two a half day creative workshop were run to help facilitate the creation of potential refillable packaging system concepts for body wash products for the Botanics range at Boots (www.Boots.co.uk/Botanics). The key challenge of developing the creative workshop was to determine how to encourage the participants to think about the different types of refills available, outline the attributes of body wash products, feed in other sources of inspiration (Lofthouse, 2004), and provide the group with the time to generate ideas which

met the refillable packaging systems brief. In order to meet these requirements, a series of activities, generated from a range of external stimulus were combined together to create the 'creative workshop' illustrated in Figure 2 (Allan et al., 1999, Cave, 1999, The Grove Consultants International, 2003, Creative Advantage Inc., 2006).

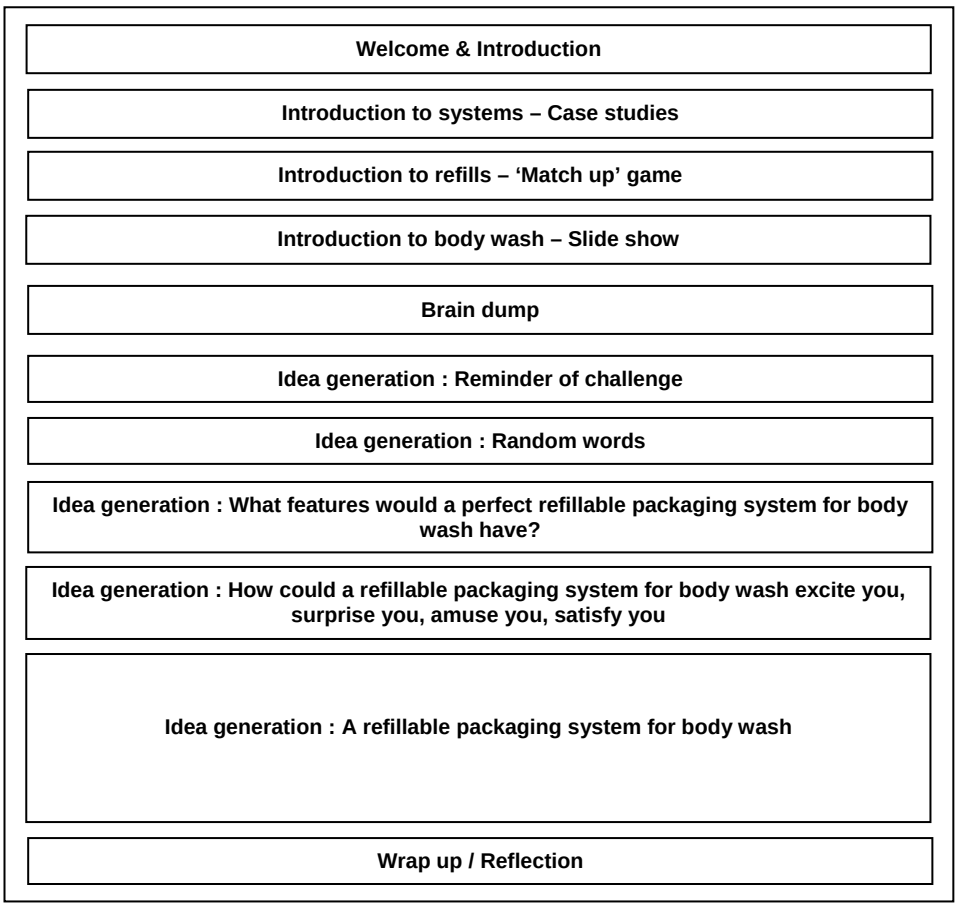



**Figure 2 Creative workshop plan**

A wide range of different ideas emerged from the two creative workshops, including: 'Twisting tin'; 'Choc soap'; 'Keep sake' box; 'Wobble'; 'Tea bags' and 'Labels'. More examples of the outputs from the workshops can be accessed via the project website www.refillable-packaging.org.uk.

# 6 Concept development

Following the creative workshops, the findings were compiled, developed and presented to Boots for evaluation. Several ideas, emerged as having potential, but specifically 'Dissolvable Test Tube' and 'Snip Test Tube' two variations on a theme were identified to be carried forward into the prototyping and consumer testing stages. Figures 3 and 4 illustrate how each of the ideas work.

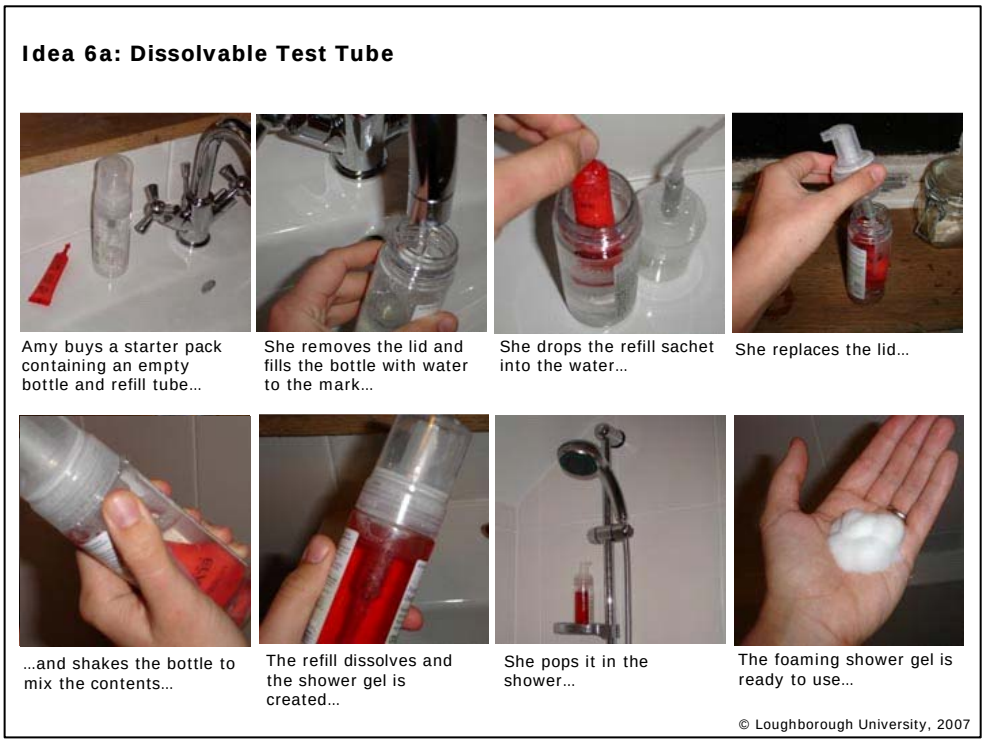



**Figure 3 Dissolvable Test Tube**

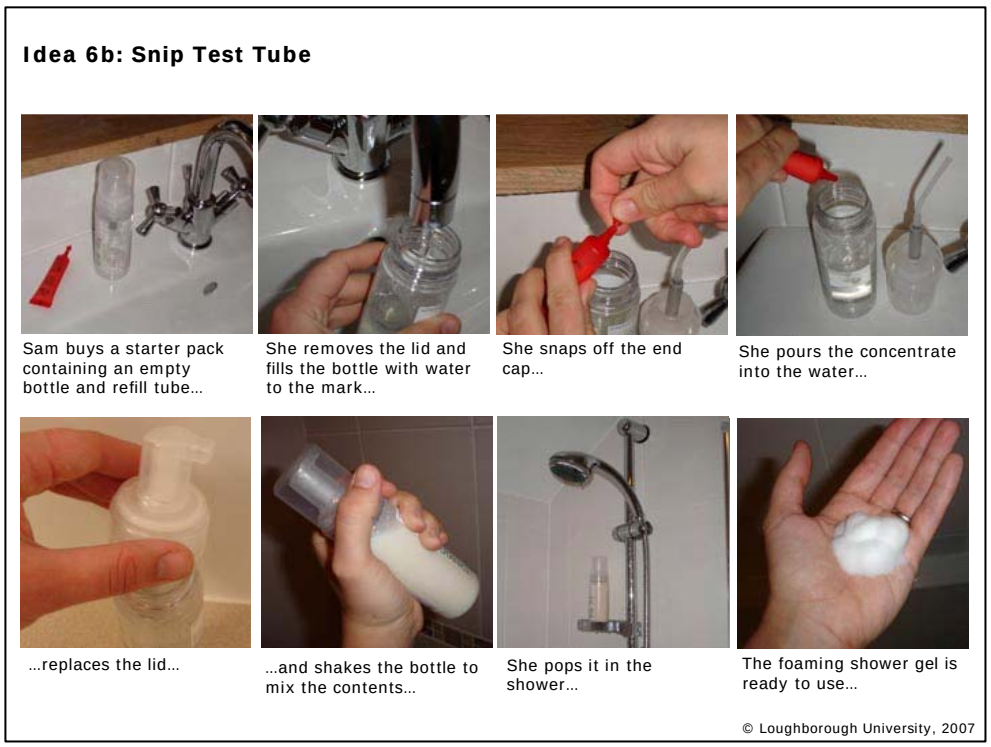


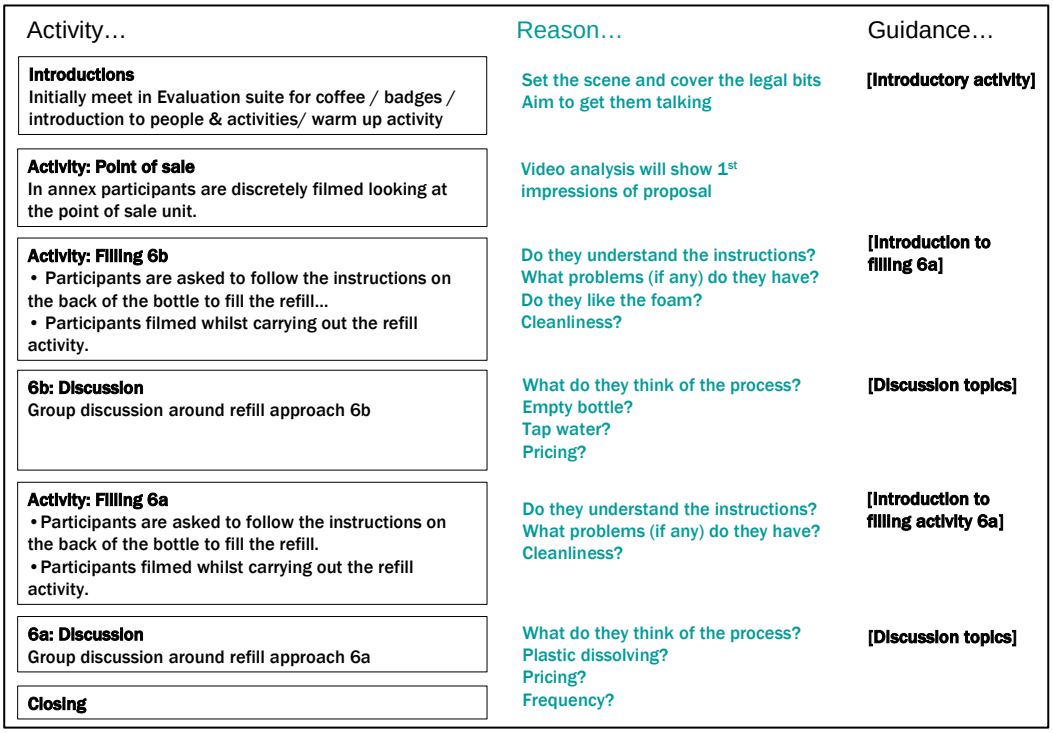

**Figure 4 Snip Test Tube**

# 7 Moving onto Consumer testing

In order to test the feasibility of the two different concepts with typical Botanics customers (females, aged 21-40), a consumer focus group workshop, drawing on empathic design techniques (Evans et al., 2002), was developed (see Figure 5). In the development of the workshop, the consumer

perceptions findings and the consumer focused drivers and barriers discussed earlier used to ensure that the right messages are identified and communicated. The activities aimed to understand, amongst other things, what elements of the process consumers instinctively understood, and what they needed to be told about.

A pilot study was run with seven women recruited through The Boot's Evaluation Suite and the process was refined. A wide range of very useful insights, only possible to identify with hands on testing and discrete observation, came out of the workshop. These have not only helped the team to refine the workshop but also provided some initial insights into the suitability of packaging of this nature, along with potential success factors and stumbling points.



| Activity… | Reason… | Guidance… |
|---|---|---|
| **Introductions**<br>Initially meet in Evaluation suite for coffee / badges / introduction to people & activities/ warm up activity | Set the scene and cover the legal bits<br>Aim to get them talking | **[Introductory activity]** |
| **Activity: Point of sale**<br>In annex participants are discretely filmed looking at the point of sale unit. | Video analysis will show 1st impressions of proposal | |
| **Activity: Filling 6b**<br>• Participants are asked to follow the instructions on the back of the bottle to fill the refill…<br>• Participants filmed whilst carrying out the refill activity. | Do they understand the instructions?<br>What problems (if any) do they have?<br>Do they like the foam?<br>Cleanliness? | **[Introduction to filling 6a]** |
| **6b: Discussion**<br>Group discussion around refill approach 6b | What do they think of the process?<br>Empty bottle?<br>Tap water?<br>Pricing? | **[Discussion topics]** |
| **Activity: Filling 6a**<br>• Participants are asked to follow the instructions on the back of the bottle to fill the refill.<br>• Participants filmed whilst carrying out the refill activity. | Do they understand the instructions?<br>What problems (if any) do they have?<br>Cleanliness? | **[Introduction to filling activity 6a]** |
| **6a: Discussion**<br>Group discussion around refill approach 6a | What do they think of the process?<br>Plastic dissolving?<br>Pricing?<br>Frequency? | **[Discussion topics]** |
| **Closing** | | |

**Figure 5 Summary of consumer focus group activities**

The next stage of the project will be to run a second consumer focus group to collect more date regarding the suitability of these refillable packaging systems in the personal care market. These findings will then be analysed and fed back to the team for evaluation.

# 8 Conclusions

This paper has aimed to demonstrate the creative process that the project team have engaged in to try and create a new way of delivering shower gel.

The findings from an initial questionnaire helped to build a better picture of the perceptions that consumers have in relation to refills. By taking these into consideration it is hoped that a more acceptable type of refillable packaging system can be developed. It will be especially important to ensure that effective communication is used in order to address some of the issues highlighted. This will include ensuring that the positive attributes of the product are promoted e.g. that this approach will actively save them money, and the negative attributes are mitigated against e.g. that customers know it is easy to refill, not messy and not expensive.

Whilst it is generally believed that the increased use of refills would lead to sustainability benefits for many sectors of industry it is clear from the analysis of the data from a number of focus groups that many barriers need to be overcome before this can be successful. At the same time the research has shown that there can be positive drivers for industry and consumers to encourage the increased use

of refills. In order that these benefits can be realised future design of refills and the systems in which they operate must take on board these findings to ensure that the barriers are designed out and the drivers are enhanced.

This project is now focussing on applying the lessons learned to the development of a refillable packaging system for 'body wash products' and have developed a number of prototypes for testing with consumer groups. In addition to understanding consumer acceptance it will be important to ensure that the proposed concepts can fit into the existing supply chain and to ensure that they lead to an overall environmental improvement. Opportunities for further developing this technology will then be investigated.

# Acknowledgements

The author wishes to thank the rest of the project team at Loughborough University (Dr Rhoda Trimingham and Dr Tracy Bhamra) and The Boots Company (Andrew Jenkins, Dave Fowler, Tam Sharpe and Dr Janet Palin) for their continued commitment to the project and interest in the development of refillable packaging systems. Also thanks are extended to DEFRA for their financial commitment to this project.

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**Bibliography (200 words)**

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**(Photo attached)**