Refill systems have the potential to significantly reduce both retail packaging waste and product waste. This study examined existing systems in use in the USA, Australia, New Zealand, mainland Europe and the UK.
WRAP helps individuals, businesses and local authorities to reduce waste and recycle more, making better use of resources and helping to tackle climate change.

Written by: James Ross Consulting Ltd and Butcher & Gundersen

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Executive summary

Refill systems have the potential to significantly reduce both retail packaging waste and product waste. This favours the selection of high volume products that show significant potential weight savings. Such systems involve the initial sale of products in a dispensing container such as a trigger spray or a pump dispenser, with customers encouraged to purchase a simple container to refill the original dispenser. In their simplest form, refill systems could be a pack where the spray or pump can be transferred from the original container to a new container of the same size and design as the original but with a screw cap in place of the dispense mechanism.

To optimise the cost and waste savings for retailers and consumers, the refill pack needs to be carefully designed to provide added value to the consumer. It will typically be of a different construction to the original pack. Where possible the refill should be a bulk pack capable of multiple refills to maximise the savings.

This study examined existing systems in use in the USA, Australia, New Zealand, mainland Europe and the UK. Potential refill systems and products suitable for such dispensing were evaluated for their suitability for use within the UK retail sector using the information obtained from this survey.

The report presents a range of refill concepts suitable for the UK supermarket retail sector, giving the advantages, disadvantages and potential commercial benefits for each concept in order to make a case to retailers that such systems are commercially feasible. The report also identifies potential barriers and constraints to the wider implementation of refill systems in the UK and proposes solutions that may overcome or mitigate these barriers and constraints.

A number of possible products (food and non-food) suitable for refillable packaging are presented and a range of potential pack types are proposed for each of the three target markets selected – grocery (food and non-food), health & beauty and DIY.

A range of shopping malls, speciality food shops, conventional supermarkets, DIY stores and health food stores were visited in the USA, Australia, New Zealand and the UK. The evidence from these visits (observations, interview responses and photographs) was used to review the short-listed concepts for feasibility and to construct a decision matrix for each one.

For any new system to meet the demands and acceptance of the retail sector it must offer added value/profit to retailers and be perceived as value for money by consumers. This can be achieved by offering:

- a product at a lower cost;
- a premium product at ‘standard product’ price (upgrading); or
- an added value service.

Any technology used must be safe, simple and ideally transferable to other products/market sectors.

The overseas study revealed that refill packaging is most common in the non-food fast moving consumer goods (FMCG) category (e.g. detergent, cleaners, baby wipes, etc.); although examples exist in the food category, they are not as common. Reusable packaging is encouraged in the Australia Packaging Covenant, while Australian and New Zealand consumers are well-informed of the environmental benefits of reuse/refill. Because US consumers purchase mainly on lowest price, the lower cost refill packs have a good market acceptance – particularly relatively low cost bulk refills. This is part of the US culture, where people usually shop less frequently than in the UK and thus tend to buy in bulk as part of a normal shop.
In most markets refill packs are sold alongside the primary packs. Specific zones or dedicated shops for refill packs were not observed during the survey. Refill packs generally provided value for money for consumers. Observations showed refill packs can provide up to 67% savings for the consumer, although the average found was 26.2% across all categories.

In the UK the availability of refills is not widespread and appears to depend on store size/available shelf space as well as demand. In terms of pricing, the refill pack was often only marginally cheaper – if indeed at all – than the primary pack. It may be that pricing is a deliberate business policy rather than reflection of the cost, but it does not currently offer a significant incentive for the purchase of refills in the UK.

There are many products in the UK that could utilise a refill system in both the food and non-food sectors if:

- suitable pack technologies were available; and
- various consumer issues and concerns could be overcome.

The use of elegant or highly desirable primary packs that offer functionality with style coupled with a simple refill pack would allow the primary pack to command a premium price and encourage consumers to continue to buy the refill.

Within the food sector there could be opportunities for a well designed, ‘kitchen counter friendly’ primary pack, thus providing perceived added value. Within the health & beauty sector, ‘bathroom friendly’ packs could be used. The use of product concentrates as refills (transferred to the primary pack then diluted with water by the consumer) offers the ability to reduce the size of the refill pack significantly. This could be critical in the UK due to the limited size of kitchens and storage space available in most modern homes.

The use of technology to provide refills that limit, or eliminate, spillage during product transfer will offer added value to the consumer. The use of ergonomic design principles to solve problems relating to unscrewing dispensers/caps would make refitting easier and help to overcome any potential consumer dexterity issues.

The study identified a range of pack proposals and then estimated the probability of success, potential cost savings and potential waste savings for each concept. Two concepts were deemed to have a high probability of success:

- using a glass jar as the primary pack with a flow-wrap or pouch refill (examples were seen for coffee and jam in overseas markets); and
- a primary pack with a pump dispenser where the refill had a screw cap instead of a pump (many examples were seen, mainly for soaps and hair care products).

Three further concepts deemed to have a good probability of success were:

- a primary pack fitted with a trigger spray used with a refill minus the trigger spray;
- a primary pack that used a pump dispenser used with a pouch refill; and
- a stick deodorant pack that uses a replacement deodorant cartridge.

A number of other concepts were identified where it was felt that a change in consumer behaviour or significant development of the pack would be required before such systems could be implemented.

The study concluded that there is a large potential market in the UK where refillable packaging could be used. Such packaging could:

- divert a significant quantity (thousands of tonnes) of discarded packaging from landfill each year;
- provide significant savings for the retailer; and
- provide added value to the consumer.
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1.0 Introduction

Refill systems have the potential to significantly reduce both retail packaging waste and product waste. Such systems involve the initial sale of products in a dispensing container such as a trigger spray (see Figure 1) or a pump dispenser, with customers encouraged to purchase a simple container to refill the original dispenser. In their simplest form, refill systems could be a pack where the spray or pump can be transferred from the original container to a new container of the same size and design as the original but with a screw cap in place of the dispense mechanism.

The project's main objective was to determine the potential commercial benefits of introducing refill packs that are:

- able to reduce the amount of waste arising from discarded packaging and/or product;
- profitable to the retailer;
- acceptable to the consumer; and
- technically feasible.

Figure 1 Trigger spray packs and refills

This study examined the extent to which the concept is currently used in the UK and its adoption overseas. The report describes the general range of product options suitable for refills for both the food and non-food retail sectors, and discusses:

- the practical dispensing of the products;
- in-store merchandising;
- hygiene; and
- pricing.

The report presents a range of refill concepts suitable for the UK supermarket retail sector, giving their advantages, disadvantages and potential commercial benefits in order to demonstrate to the design community, manufacturers, brands and retailers that such systems are commercially feasible.

Finally it discusses potential barriers and constraints to the wider implementation of refill systems in the UK, and proposes solutions that may overcome or mitigate such barriers and constraints.

The main part of this study was undertaken by James Ross Consulting Ltd (www.jrconsulting.com). Initial concept design was undertaken by James Ross Consulting and Butcher and Gundersen (www.bgundersen.com). Basic marketing information was also supplied by Butcher and Gundersen.
2.0 Methodology, Target Markets and Concept Selection

2.1 Methodology

The study began by identifying and short listing food and non-food products suitable for refillable packaging.

To review existing systems worldwide, a range of shopping malls, speciality food shops, conventional supermarkets, DIY stores and health food stores were visited in the USA, Australia, New Zealand, mainland Europe and the UK. In the USA, stores were visited in New York/New Jersey, Chicago and San Francisco to get a feel for the difference between the heavily populated East Coast, the Mid-West and the affluent West Coast. In Australia, stores were visited in Brisbane and Sydney and, in New Zealand, stores in Auckland were investigated.

Observations, interview responses and photographs from these visits provided evidence with which to:

- review the short listed concepts for feasibility; and
- construct a decision matrix for each concept.

Anecdotal evidence combined with some limited market research was used to understand why refill packaging in the UK had either failed previously or not taken off. This understanding was used to examine potential barriers and constraints to a wider implementation of refill solutions.

The pros and cons of each concept/product option were assessed using both the decision matrix and the limited marketing responses to current refill packaging. Those options deemed most likely to succeed were evaluated in more depth to determine where and how such systems could be used with success in the UK retail sector.

The pack costs, supply and distribution costs were estimated for the shortlisted concepts in order to determine:

- the commercial feasibility of the refill packs; and
- any potential reduction in household waste going to landfill as a result of the implementation of refill packaging systems.

Using the evidence gained from the store observations and marketing input, a number of solutions are proposed for refill packs that may overcome or mitigate the barriers and constraints that have previously restricted their growth in the UK.

2.2 Target markets

Three key retail market areas were identified where refill systems could be used:

- grocery (food and non-food);
- health & beauty (non-Food); and
- DIY and garden products (non-food).

Grocery is by far the biggest sector by volume and has the widest range of suitable products.

The health & beauty sector has a limited but potentially high volume of products that could be sold in refillable packaging (principally liquid soaps and skincare products). However, significant development of suitable technology may be required before this sector could exploit fully the benefits of refillable packaging.

The DIY and garden products sector already uses some forms of refillable packaging within the UK, but potentially could do a lot more.
2.3 Criteria for concept selection

For any new system to meet the demands of, and be adopted by, the retail sector it must:

- offer added value/profit to retailers; and
- be perceived as value for money by consumers.

This can be achieved by offering:

- a product at a lower cost;
- a premium product at ‘standard product’ price (upgrading); or
- an added value service.

The technology must be safe, simple and ideally transferable to other products/market sectors.

Although the economic and commercial criteria are critical to the retail sector embracing the technology, one of the underlying reasons for implementing the change is to reduce the amount of household food waste and packaging waste going into the waste stream. This favours the selection of high volume products with significant potential weight savings through the adoption of a refillable pack system.

Any initial concepts chosen will need to be easy to install and use, and based on existing technologies in use in other countries.

The criteria for choosing final concepts can be summarised as must:

- reduce the amount of waste entering the waste stream;
- minimise environmental impact via the use of recyclable materials, reduced emissions, lower energy consumption;
- have good sales volume to maximise return on investment;
- offer added value/profit to retailers;
- have consumer benefits;
- have manufacturing benefits; and
- be safe, simple and transferable technology.
3.0 Initial Ideas and Concepts Selected for Evaluation

An initial range of suitable products and potential pack types were discussed for each of the three target markets, i.e. grocery (food and non-food), health & beauty, and DIY. The ideas and rationale behind a number of potential concepts are discussed briefly below.

3.1 Grocery – food and non-food

Cleaning products such as surface cleaners, glass cleaners, bathroom cleansers are typically supplied with a trigger spray mechanism which increases the weight and height of the pack. One option would be to supply initial packs with a robust dispense mechanism and to offer a lower specification bottle or a pouch pack as a refill pack for subsequent purchases (see Figure 2). This would:

- reduce waste (no trigger spray, etc.);
- reduce pack costs;
- make it easier to recycle the pack; and
- lower distribution costs due to the reduced height and weight of the refill pack compared with the primary pack.

Figure 2 Examples of primary and refill packs

The design of the refill pack can be optimised to maximise utilisation of pallet space, giving logistics savings that would act as an incentive for retailers and manufacturers.

Fabric conditioner was thought to be a suitable product, particularly if it could be sold as a concentrate in a refill pack. Such as system has been tried previously in the UK but is no longer used. The reasons for the demise were thought worthy of investigation as they may still be barriers to the introduction of refill packs – not only for fabric conditioner but also for a much wider range of initiatives.

Refill pouches for coffee beans/coffee granules (see Figure 3) or similar product may offer significant savings over glass primary packs, though shelf life issues will have a strong influence of any such pack design.
For breakfast cereals and similar products sold packed in a liner within a carton/box, a modified liner could be used as a refill pack. This would reduce the weight of the box.

Baby formula milk often has a tin primary pack, which can be retained. Mothers could buy refills in pouch or pillow pack form, offering significant weight and cost savings over the primary pack. Issues such as tamper evidence and shelf life will have a major impact on any refill pack design.

Concepts thought suitable for further investigation within grocery were:

- trigger spray pack (non-food);
- baby food - formula milk (food);
- coffee - glass jar/granulated product (food); and
- breakfast cereals (food).

3.2 Health & beauty

A number of personal cleansing products such as liquid soaps, deodorant and moisturisers utilise pump dispensers for consumer convenience. A pouch pack can be introduced as a refill pack for such pump dispensers. Alternatively, the refill could be the same pack but without a pump mechanism (see Figure 4).

A better value option could be to use a larger refill pack capable of 4-5 refills for multiple dispensers in the same household. This is because many households have multiple soap dispensers around the home (kitchen, bathroom, cloakroom, en-suite, etc.) and a bulk refill (1 kg or more in weight) might work. Various individual primary packs can then be refilled when necessary from a single refill pack.

Hair care products such as shampoo and conditioner could be in pump dispense format and refilled as above. Some modern shower fittings include a built-in shower gel/shampoo dispenser that could utilise an appropriate refill pack.

For deodorant sticks, replacement sticks could be sold in a refill pack. However, no such systems are known to exist necessitating some research and development.

For moisturisers, the primary pack can be designed to be a premium product with the aim of persuading the consumer to retain the initial pack. Refills could then be made available either in the form of tubs that can be
dropped directly into the primary container (thus retaining brand identity) or it could be filled up again from a refill pack in pouch or other form.

In hotels across Europe, refill bags are already used to refill wall-mounted liquid soap dispensers. It was suggested that a system could be introduced, through a customer loyalty infrastructure, to help consumers to buy refill packs via a kiosk or over the internet for suitable dispensers installed at home.

Specific issues within the health & beauty sector include:

- hygiene;
- cleanliness;
- spillage;
- complexity; and
- brand loyalty.

Other issues that will need to be addressed include:

- the increase in the number of stock keeping units (SKUs) required;
- shelf space availability in retail outlet; and
- lack of incentives/benefits (especially financial).

Concepts thought suitable for further investigation within health & beauty were:

- moisturisers – double walled tubs with replacement refill pack;
- soap dispenser; and
- stick dispenser for deodorant.

3.3 DIY

Garden care products such as weed killer, insect killer, lawn care and plant feed (see Figure 5) are often sold in the smaller size ranges as trigger sprays. When the container is empty, a new pack, complete with spray mechanism needs to be purchased. This type of product is often seasonal and the consumer may keep the product from one season to the next. To introduce refill packaging in such a market would require a primary pack with a robust dispense mechanism (trigger) that can be reused with a refill pack to ensure longevity of the pack.

There is an argument to have a ‘universal’ spray mechanism that could fit a multiplicity of packs. However, this concept is unlikely to be feasible due to the potential contamination risks between the different products, which may result in hazardous chemical reactions occurring. It may also affect branding and pack design, and thus not be acceptable to the marketing arm of the producer.

Plant feed and lawn care products are sometimes packed in a bag in a cardboard box. These outer boxes are not suitable for storing in sheds as condensation causes them to collapse. Such packs are often thrown out due to pack failure even though the product is still ok. The outer box does not provide any extra benefit other than containment. But if the outer box could be made more durable, features such as measured dosing could be introduced to make dispensing easier. A pillow pack can then be introduced as a refill pack; for example, many lawn treatment products in the USA are sold in a one gallon (3.5 litre) high-density polyethylene (HDPE) container with a fitted dispenser and refills are sold as stand-up pouches that can be easily poured into the original container.
The current pack mechanism for slug pellets is simple and the structure is too weak to retain the pack for reuse. By improving the structure of the pack and introducing measured dosing on the pack, consumers could be persuaded to retain the pack for reuse and a refill pack such as a pillow pack could be introduced.

Consumers often have to buy a 5-litre tin of paint when they only need a litre or half a litre of paint. Pouch packs could be introduced as a refill pack. In the store, paint could be sold out of a bulk container based on consumer need. This would reduce both costs and waste.

Replaceable bristle heads for brushes could be introduced as a refill pack such as those already available for paint rollers. These rollers are available in various different textures. Once a paint brush is used, the bristle head could be thrown out and the handle kept for reuse with a new bristle head slotted on. Examples of brush head refills are already evident for toothbrush heads.

It was felt that DIY stores (particularly out-of-town stores) have more shelf space compared with grocery stores or health & beauty stores. Therefore, an increase in SKUs should not be such an issue within this sector. However, efforts would have to be made to ensure that the refill pack was readily available in store over a suitable period of time to encourage purchase.

Concepts thought suitable for further investigation within DIY were:

- trigger pack (DIY); and
- pouch for paint (DIY).

3.4 General UK market-related issues

General observations made during the initial concept development regarding the potential market for refill packs in the UK included:

- refill packs are more common in Europe and Asia Pacific and were introduced into UK as well, but the move did not continue;
- an interesting opportunity is presented by the fact that mothers are more conscious of the environment and are more open to changes in the early years of their child’s life; and
- a dedicated zone such as an ‘EcoZone’ along the same lines as the organic zone found now in many supermarkets might work for refill packs in UK.
In America, Asia Pacific and Europe, there is a greater market share for ‘value’ products (e.g. in shops such as Lidl and Aldi) than in comparison to the UK. This may influence consumer perception of lower cost refill packs. Other factors that may work against the acceptance of refill packs in the UK include:

- lack of consumer incentive;
- retailer shelf space availability;
- complexity in use; and
- social behaviour.

There is currently a demand for premium range product in the UK and retailers estimate there is around a 10% gap (as at 2006) in the premium product market. This gap could be filled using well-designed, premium-looking primary packs that utilise well thought out refills.
4.0 Existing Systems Review – Observations and Findings from Store Visits in the UK, USA, Australia and New Zealand

4.1 Observations from overseas survey

Refill packaging is most common in the non-food fast moving consumer goods (FMCG) category (e.g. detergent, cleaners and baby wipes). Although examples exist within the food category, refills are not very common.

In Australia, reusable packaging (see Figure 6) is encouraged in the Australia Packaging Covenant but is not regulated by law. Australian and New Zealand consumers are also well informed of the environmental benefits of reuse/refill. US consumers purchase mainly on lowest price, so the lower cost refill packs have a good market acceptance – particularly relatively low cost bulk refills (see Figure 7). This is part of the US culture where people usually shop less often than in the UK and thus tend to buy in bulk. In addition most US homes have sufficient storage space for bulk containers, which is not generally the case in the UK. The use of bulk refills can significantly increase the savings compared with the primary pack per unit volume and, because bulk purchase is more standard, the increased price of the ‘bulk’ item is not such an issue in the USA as it is in the UK.

Figure 6 and 7 Trigger spray refills, Australia and Bulk refills, USA

In most markets, refill packs are sold alongside the primary packs. Specific zones or dedicated shops for refill packs were not observed. In some of the health food stores that also sold health & beauty products, there was often a self-dispense area for such products. The available packs for self-dispensing were often sized more for refill than primary packs.

Refill packs generally provided value for money for consumers; this is particularly important in the US market (see Table A1 in Appendix A). Observations during the store visits showed that refill packs can provide up to 67% savings for the consumer, although the average found was 26.2% across all categories. Table 1 shows average consumer price savings by category.

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage saving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td>27</td>
</tr>
<tr>
<td>Household cleaners</td>
<td>25</td>
</tr>
<tr>
<td>Home laundry</td>
<td>21</td>
</tr>
<tr>
<td>Garden and DIY</td>
<td>40*</td>
</tr>
<tr>
<td>Health &amp; beauty</td>
<td>33</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>30</td>
</tr>
</tbody>
</table>

* Only one product detailed
Refill packs were readily available in the larger stores in the USA, Australia and New Zealand (similar in size to a UK out-of-town supermarket) as well as many smaller stores (high street/convenience type stores). In the USA, individual stores typically offered fewer choices for a particular type of product than would be seen in a UK supermarket. They thus had probably less SKUs than a similar sized UK store despite the range of refill options available (e.g. 1-2 branded fabric conditioners and one own label pack compared with 3-4 branded and 1-2 own label, each with 2-3 variants in the UK). Figure 8 shows some of the products found in non-UK stores.

Figure 8 Examples of primary packs and refills from overseas stores

Washing powder and refills (NZ)  Jam jars and refills (Norway)  Fabric conditioner and refills (NZ)

4.2 Current UK situation

A range of retail packs are available in the UK including:

- refills for household cleaners in trigger spray dispensers;
- refills for liquid soaps in pump dispensers;
- baby wipes/wet toilet tissues in flow-wrap;
- some cosmetic items; and
- garden sprays, where the primary pack often includes a complex dispensing system.

Refill packs for soap dispensers and cleaning products (mostly trigger pack) are seen in some UK superstores. The refill packs are generally the same size as the primary pack. This is mainly due to convenience, as the manufacturer only needs to mould one bottle style for both primary and refill pack, giving volume economies. The consumer only has to transfer the dispenser (pump or trigger) from the empty pack to the new pack. This is quick and convenient, and does not involve any messy decanting of liquids from one container to another. Although this is simple and convenient for the consumer, it does not fully realise the potential cost savings arising from optimisation of the refill pack.

Liquid concentrate for fabric conditioner and some cleaners allows for a significant reduction in size between the primary pack and the refill.

Pouch refills, while generally offering good cost savings, are disliked by consumers and stores due to:

- handling issues (pouches are often ‘floppy’ and collapse when decanting, causing spillage and mess);
- stacking issues - pouches cannot be stacked on top of each other or other products;
- they are often oval in cross-section; and
- they can take up more shelf space than say a carton.
There is no indication that pouches are perceived as low quality, probably due to the high quality print often used for them.

The availability of refills is not widespread and appears dependent on store size/available shelf space as well as demand.

In terms of pricing, the refill pack is only marginally cheaper (if at all) in most cases than the primary pack. In most cases there was more difference between individual store chains than between the two styles of pack, implying that the pricing is a deliberate business policy rather than reflection of the cost. This is different to the overseas markets investigated where the refill offered a significant cost saving to the consumer (see Table A1 in Appendix A).

4.3 Analysis of survey findings

A review matrix was constructed for each identified concept using data from the market survey, retailer discussions and design agency discussions. Each concept was reviewed and scored (lower = better) against the following categories for its likelihood of success:

- concept rationale;
- complexity of design/development/ease of use;
- challenges/issues regarding implementation of concept;
- financial case;
- time frame for implementation;
- potential benefits;
- risks; and

Potential annual savings:

- financial; and
- waste impact.

The decision matrix is shown in Appendix A (Table A3).

From the matrix results, two concepts showed high potential and a further three showed good potential and were recommended for further study/trialling.

The criteria for choosing final concepts were that they must:

- offer added value / profit to retailer/manufacturer;
- have good sales volume to maximise prize;
- have consumer benefits;
- have manufacturing benefits;
- be safe, simple and transferable technology;
- reduce the amount of waste entering the waste stream; and
- minimise environmental impact via the use of recyclable materials, reduced emissions, lower energy consumption, etc.
5.0 Challenges Identified from Consumer, Marketing Agencies and Store Manager Interviews

5.1 Challenges regarding the introduction of refill packaging in the UK

5.1.1 Challenges for the retailer

In the majority of retail outlets in the UK, shelf space is at a premium. If a store sells a primary pack and a refill, this may require additional shelf space to prevent above average shelf restocking.

The management of stock and stock rotation are major concerns for most retailers. Having two packs (a primary and a refill pack) for a product will increase the number of SKUs required. This may impact on stock value and warehousing space, as well as store shelf space. An important part of stock management will be getting the right balance between the primary pack and the refill pack both in the display stock on shelf and the warehouse stock. This balance may well change over time or have seasonal variations.

If the refill pack is of sufficiently different construction (e.g. a pouch refill for a glass jar), the supplier will themselves need additional suppliers. There may also be a lack of locally available manufacturing facility for the new pack (primary pack from one supplier, refill from another), which could impact on cost.

Promoting refills on the basis of low cost may not be as effective as promoting an improved primary pack that looks good and offers the consumer some benefit. Retailers need to know that supplies of both the primary pack and the refill will be adequate to avoid running out of stock.

Profitability is possibly the biggest issue for retailers and manufacturers. Unless the adoption of refill packaging can maintain or improve profitability, either directly or indirectly, it is unlikely to be adopted into mainstream retail outlets.

5.1.2 Challenges for the consumer

Many UK consumers are conservative and will need to be induced into change. This can be accomplished by advertising campaigns, special offers or other financial incentives. For refill packaging to be readily accepted by consumers there must be some form of financial incentive combined with simple and easy to use refill packaging.

The lifestyle of many consumers – particularly among younger shoppers who are generally the more willing to change – imposes time constraints; many would claim to be too busy to select appropriate refills and then take the time to refill the primary pack. Like many other nations, the UK is still in the grip of a ‘throw away’ culture, which will need to be challenged for refill packs to succeed.

Most modern UK houses are relatively small compared with their US/Australian/some European counterparts and thus have no room to store bulk refills. The problem is exacerbated by the fact that UK consumers generally shop more frequently (weekly) than those in the USA or Australia (fortnightly/monthly); they buy smaller quantities and are less interested in bulk refills.

Some consumers have a fear of technology and are thus reluctant to buy items they perceive to be difficult to use. For many older people and the infirm, there is also the issue of dexterity in filling and handling packs. This can be partly mitigated by the provision of suitable aids.

With the trend for constant change, consumers who spend money on an expensive primary pack need to be assured that the appropriate refill packs will still be available in the longer term (3, 6, 12 months on).

Social behaviour and attitudes to low cost/value offerings and in the UK compared with other countries (e.g. other parts of Europe, Australia) means that incentives are needed to encourage the adoption of refill packaging.
5.2 Reasons for the failure of previous refill systems in the UK

Table 2 summarises the reasons for the poor consumer response to refill packaging given in conversations with a previous supplier of refill systems (mainly fabric conditioner refills).

Table 2 Reasons why refill systems failed previously in the UK

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Comments/ issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>(In)convenience</td>
<td>■ Apathy</td>
</tr>
<tr>
<td></td>
<td>■ ‘Can’t be bothered’</td>
</tr>
<tr>
<td></td>
<td>■ Not worth the hassle</td>
</tr>
<tr>
<td></td>
<td>■ Difficult to open</td>
</tr>
<tr>
<td>Impracticality</td>
<td>■ Poorly designed refill packs (pouch for fabric conditioner)</td>
</tr>
<tr>
<td></td>
<td>■ Consumer spilt the product while attempting to refill primary container.</td>
</tr>
<tr>
<td>Re-closeability</td>
<td>■ Product spilling and leaking after initial opening of refill (applied mainly to bulk refills)</td>
</tr>
<tr>
<td></td>
<td>■ For products with a limited shelf life in a refill pack (e.g. food products - coffee, jams), consumers were concerned that the product would go off or be out of date by the time it was used.</td>
</tr>
<tr>
<td></td>
<td>■ There is currently no easy mechanism of transferring the ‘use by’ date of the refill to the primary pack.</td>
</tr>
<tr>
<td></td>
<td>■ For packs designed for multiple refilling, consumers were concerned about the risk of contamination to their contents.</td>
</tr>
<tr>
<td>Transport, stackability, storage</td>
<td>■ Pouches in particular are difficult to stack and store. They may also require increased transit protection.</td>
</tr>
<tr>
<td></td>
<td>■ Additional space needed in outlet and in home to store bulk refills.</td>
</tr>
<tr>
<td>Cost</td>
<td>■ Consumers’ expectation is for significant cost differential but, in some cases, suppliers were unable to provide real cost savings.</td>
</tr>
<tr>
<td></td>
<td>■ No incentive beyond altruism/environmental awareness.</td>
</tr>
<tr>
<td>Environmental</td>
<td>■ Because many refill options were laminates, they were non-recyclable and non-biodegradable. This was an issue with some consumers.</td>
</tr>
</tbody>
</table>
6.0 Opportunities for Refill Packaging in the UK

Many food and non-food products in the UK could utilise a refill system if suitable pack technologies were available.

The use of elegant or highly desirable primary packs that offer functionality with style coupled with a simple refill pack (that could not be used as a stand-alone item) would allow the primary pack to command a premium price, thus increasing the perception of value for money of the refill.

Within the food sector there could be opportunities for a well designed, ‘kitchen counter friendly’ primary pack, thus providing perceived added value. Within the health & beauty sector, ‘bathroom friendly’ packs could be used.

By optimising the shape of the refill pack, opportunities exist for increasing pallet utilisation, thus reducing distribution and warehouse costs. For the options proposed in this report, the average distribution savings were around 40-50% (~£2,000 per one million packs) (see Table A2 in Appendix A).

Bulk refill packs offer consumers the potential for significant cost savings (though an increased outlay for an individual pack) while offering the retailer a clearly visible difference in product offering/pricing. Bulk refills offer more product per unit weight of packaging and can be easier to drain, giving less product wastage.

The use of product concentrates as refills (transferred to the primary pack then diluted with water by the consumer) provides an opportunity to reduce the size of the refill pack significantly. This could be critical due to the limited size of kitchens and storage space in most modern UK homes.

The use of technology to provide refills that limit, or eliminate, spillage during product transfer will offer added value to the consumer. Use of ergonomic design principles would minimise consumer problems relating to unscrewing dispensers/caps and refitting, thus helping to overcome any potential dexterity issues.
7.0 Concepts with High Potential

7.1 Glass jar and mock-up refill packs

Figure 9 Example of coffee jar with mock-up refill packs

Products such as instant coffee, herbs and spices, jams and other preserves, mayonnaise, pickles and some flavourings are generally sold in glass jars and used over an extended period. When empty, the glass jar is usually discarded. In many cases (particularly coffee and herbs and spices), the jars are much heavier than is really needed due to branding and consumer quality perception.

If the primary pack was designed to be aesthetically pleasing, suitably airtight and easy to clean while maintaining all the branding features, this could become a storage container for subsequent purchases of refill packs such as those shown in Figure 9. In the case of coffee jars, little if any change to the jar is envisaged, though the cap may need to be more heavy duty. For jam/sauce/mayonnaise jars, these may need reshaping to facilitate easy cleaning.

The refill packs will need to be designed such that decanting/pouring of the product into the primary pack is easy and mess free, with little to no residue remaining in the refill. For a bulk refill, the pack must be re-closable and maintain the freshness of the product. Product freshness will be a significant challenge for oxygen-sensitive products such as coffee and, in such cases, a re-sealable refill pack is unlikely to be viable.

The refill could be a simple flow-wrap or pouch design in flexible materials designed to allow easy pouring/emptying into the primary pack. There are precedents for such a system:

- ground coffee is sold regularly in flow-wrap packs in the UK;
- such systems are widely used in Australia, New Zealand and other parts of Europe; and
- limited examples already exist in UK, particularly in herbs and spices (see Figure 10).
Branding should not be an issue for the refill packs given modern print quality and design capability. Indeed, during the overseas visits it was observed that it was mainly well-known brands that used refills rather than own label products. The packaging technology is widespread and readily available.

7.1.1 Retailer benefits

The higher shelf loading density of the flow-wrap packs will allow more packs per unit area on display. Pack costs will fall by ~80%. Distribution and storage costs will reduce significantly due to ~67% increase in pallet utilisation and there would be Packaging Recovery Note (PRN) savings of around £3,000 per one million refill packs. Table 3 summarises the cost benefits to the retailer.

The weight of an individual pack could decrease by 95% and less glass on the store shelf would reduce the risk of injury from damaged packs.

<table>
<thead>
<tr>
<th>Item</th>
<th>Potential savings per one million packs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material costs</td>
<td>£54,000</td>
</tr>
<tr>
<td>Distribution and warehouse costs</td>
<td>£1,800</td>
</tr>
<tr>
<td>Reduction in PRN cost</td>
<td>£3,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>£58,800</strong></td>
</tr>
</tbody>
</table>
7.1.2 Consumer benefits

The refills will weigh less and typically provide a 27% saving in pack cost. Refills could be easier to store (smaller, lighter) than primary packs.

Any information printed on the primary pack (e.g. nutritional, recipes, best before date, etc.) could easily be printed on the refill pack – perhaps along with an environmental message promoting the use of refills.

The best before date on the refill could be on a peelable self-adhesive label, which could be transferred to the primary pack once the contents were decanted into the primary pack.

7.1.3 Manufacturer benefits

The refills proposed:
- use simple, well understood filling and packaging technology;
- offer lower storage and distribution costs; and;
- have less packaging components and lower material costs than the primary pack.

In most cases, the filling rate (packs per hour) will be faster for the refills than the primary pack giving efficiency savings.

7.1.4 Impact on packaging waste

A typical 100 g coffee jar weighs ~250 g and has a foil seal (~5 g) and a foam-lined plastic cap (~15 g), giving a total pack weight of 270 g. A similar sized flow-wrap or foil pouch would weigh ~20–25 g, giving a saving of 245–250 g per pack.

However, the shipper for the refill may need to have higher stack strength due to:
- higher packing density of product; and
- inability of pack to take some of stack load.

This may increase the shipper weight by 20–30 g per pack.

The flexible pack will need to be a barrier laminate, which is currently not recyclable. It would thus end up in the waste stream (equivalent to cap + foil seal weight). The glass jar is recyclable, though the cap and foil seal are not. Thus if the jar is recycled, there is no net benefit or detriment to the waste stream.

Therefore, there would be a saving of ~220 tonnes per one million packs in packaging waste. Assuming an annual volume of 350 million packs, this would reduce the waste stream by 77,000 tonnes per year.

7.1.5 Risks and development challenges

The risks and development challenges associated with glass jars and refills are summarised in Table 4.
Table 4 Risks and development challenges: glass jars and refills

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Store</td>
<td>■ SKU proliferation/impact*</td>
</tr>
<tr>
<td></td>
<td>■ Shelf space availability at retail store - offset slightly by higher shelf loading density*</td>
</tr>
<tr>
<td></td>
<td>■ Potentially reduced shelf life – depends on refill format and product properties</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>■ Manufacturing facility has to be adapted or new machines installed to pack refills</td>
</tr>
<tr>
<td>Consumer</td>
<td>■ Availability – many consumers commented that refills were not available when they went to buy them*</td>
</tr>
<tr>
<td></td>
<td>■ Social behaviour – consumers time pressured, not motivated to use refills*</td>
</tr>
<tr>
<td></td>
<td>■ Consumer dexterity – consumers unable to handle/open refill without spillage*</td>
</tr>
<tr>
<td></td>
<td>■ Consumer perception of lower quality of refill pack, thus low take-up of refills</td>
</tr>
<tr>
<td>Environmental</td>
<td>■ Increased product waste due to possible leakage from punctured packs</td>
</tr>
</tbody>
</table>

* Ways of overcoming or mitigating these challenges are discussed in Section 10.

7.2 Soap pump – bottle refill concept

Figure 12 Example soap pump – bottle refill concept
7.2.1 Rationale

With the modern trend towards added value and convenience, a large market is developing for liquid soaps sold in bottles with attached pumps for dispensing (see Figure 12). The dispensing pump typically weighs 12–16 g and costs 10–12p and, although it could be reused, it is thrown away each time. The way the pump operates means there is always soap residue in the bottle, which is also thrown away with the pack.

An opportunity exists to utilise refill packs for soap dispensers (see Figure 13). The simplest option is to supply the same bottle but with a screw cap, requiring the consumer to simply remove the original pump and fit it to the new (refill) pack. Although this saves the cost and weight of the pump, it does not address the issue of product waste. An alternative solution is to provide a bulk refill capable of refilling the original bottle at least twice or, more likely, using it to refill several different bottles around the home (bathroom, kitchen, cloakroom, en-suite, etc.).

Precedents for such a system exist and are widely used in Australia, New Zealand and other parts of Europe. Limited examples already exist in UK, though these tend to be own label products. The overseas survey found it was mainly well-known brands that used refills rather than own label. It also gives scope for an improved design for the primary pack – particularly if the bulk refill option is adopted – to create a different or highly desirable style soap dispenser.

Figure 13 Examples of refill packs with dispensers

7.2.2 Retailer benefits

The pack costs will fall by ~47%. The distribution and storage cost will decrease due to ~29% increase in pallet utilisation. Use of a bulk refill bottle will increase the unit price, thus potentially increasing profitability. Table 5 summarises the cost benefits to the retailer.

A cap or foil seal on the refill bottle significantly reduces the risk of consumers ‘trying’ the product (using the pump) causing wastage/spillage. This technology could also be applied to shampoos, conditioner, moisturisers, etc. to create a uniform health & beauty range.

Table 5 Potential savings: soap pump – bottle refill

<table>
<thead>
<tr>
<th>Item</th>
<th>Potential savings per one million packs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material costs</td>
<td>£100,000</td>
</tr>
<tr>
<td>Distribution and warehouse costs</td>
<td>£1,050</td>
</tr>
<tr>
<td>Reduction in PRN cost</td>
<td>£57</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>£101,107</strong></td>
</tr>
</tbody>
</table>

7.2.3 Consumer benefits

The bulk refill option allows one refill pack to service multiple dispensers, reducing the storage requirement for multiple spare dispensers in the home. There is also the potential for cost savings from the reduced pack costs.
7.2.4 Manufacturer benefits

For the same size or similar size bottle, it will be possible to use existing filling and packaging lines. Removing the pump will reduce the pack height, giving lower storage and distribution costs. The pack will also have fewer packaging components and lower material costs.

With good design it may well be possible to fill a bulk refill on the same filling line. If so, the filling rate (litres per hour) is likely to be higher for the bulk pack, giving efficiency savings.

7.2.5 Impact on packaging waste

A typical pump dispenser weighs ~10–15g; replacing this with a lightweight cap will save 9–10 g per pack.

If a bulk refill is used, the ratio of packaging weight to product is significantly reduced. For the same volume of product, there is thus a net pack weight saving. The bulk refill may also reduce the product waste arising from product residue compared with a discarded primary pack.

The shipper for the refill could be of lower specification as there is no longer a need to prevent crushing of the pump.

For one million primary packs, the amount of packaging waste saved will be ~9-10 tonnes for the same size refill or ~25–40 tonnes for bulk refill. Assuming an annual volume of 100 million packs, this could reduce the waste stream between 4,000 to 7,000 tonnes per annum depending on design options. In addition, the refill and the closure would both be recyclable whereas the pump unit is not.

7.2.6 Risks and development challenges

The risks and development challenges associated with soap pumps – bottle refills are summarised in Table 6.

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Store</td>
<td>■ SKU proliferation/impact*</td>
</tr>
<tr>
<td></td>
<td>■ Shelf space availability at retail store*</td>
</tr>
<tr>
<td></td>
<td>■ For bulk refills, pricing may be an issue – although potentially cheaper per unit volume, the larger pack will typically be more expensive than the smaller primary pack.</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>■ Manufacturing facility has to be adapted or new machines installed to pack and cap the refills.</td>
</tr>
<tr>
<td>Consumer</td>
<td>■ Social behaviour – consumers time pressured, not motivated to use refills*</td>
</tr>
<tr>
<td></td>
<td>■ Availability – many consumers commented that refills were not available when they went to buy them.*</td>
</tr>
<tr>
<td></td>
<td>■ Consumer dexterity – consumers unable to unscrew pump and either refill bottle or transfer pump to refill without spillage.*</td>
</tr>
<tr>
<td>Environmental</td>
<td>■ Increased use of glass in primary container to give reusable value, requiring higher energy consumption and higher waste at end of life.</td>
</tr>
<tr>
<td></td>
<td>■ Increased product waste due to leakage from punctured packs.</td>
</tr>
</tbody>
</table>

* Ways of overcoming or mitigating these challenges are discussed in Section 10.
8.0 Concepts with Good Potential

8.1 Trigger dispenser - bottle mock-up refill

Figure 14 Example of trigger dispenser - bottle mock-up refill

8.1.1 Rationale

With the modern trend towards added value and convenience, a large market is developing for household cleaners sold in bottles with attached trigger dispensers (see Figure 14). The dispensing trigger typically weighs 22-26 g and costs 12-16p and, although it could be reused, it is thrown away each time. Because of the way the trigger operates, there is always liquid residue in the bottle. This is also thrown away with the pack.

An opportunity exists to utilise refill packs for trigger dispensers. The simplest option is to supply the same bottle but with a screw cap, requiring the consumer to simply remove the original trigger and fit it to the new (refill) pack. Although this saves the cost and weight of the trigger, it does not address the issue of product waste. An alternative solution is to provide a bulk refill, capable of refilling the original bottle at least twice.

Precedents for such a system exist. Such systems are widely used in Australia, New Zealand and other parts of Europe, and limited examples already exist in UK. The use of a bulk refill gives product differentiation on the shelf and allows for greater cost saving (per unit volume). It also gives scope for an improved design for the primary pack and, if the bulk refill option is adopted, to create a different or highly desirable style trigger dispenser.

8.1.2 Retailer benefits

The pack costs will fall by ~43% and the distribution and storage cost will decrease due to ~25% increase in pallet utilisation. Use of a bulk refill bottle will increase the unit price, thus potentially increasing profitability. In addition, the technology could be used across a range of household cleaning products to create a uniform product range. Table 7 summarises the cost benefits to the retailer.

Table 7 Potential savings: trigger dispenser- bottle refill

<table>
<thead>
<tr>
<th>Item</th>
<th>Potential savings per one million packs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material costs</td>
<td>£130,000</td>
</tr>
<tr>
<td>Distribution and warehouse costs</td>
<td>£2,050</td>
</tr>
<tr>
<td>Reduction in PRN cost</td>
<td>£132</td>
</tr>
<tr>
<td>Total</td>
<td>£132,182</td>
</tr>
</tbody>
</table>
8.1.3 Consumer benefits

There could be cost savings from the reduced pack costs – typically 25% in overseas markets.

8.1.4 Manufacturer benefits

It may be possible to use existing filling/packaging lines. There will be lower storage and distribution costs, less packaging components and lower material costs.

8.1.5 Impact on packaging waste

A typical trigger dispenser weighs ~22–26 g, so replacing it with a lightweight cap will save ~20 g per pack. If a bulk refill is used, the ratio of packaging weight to product will fall significantly, giving a net pack weight saving for the same volume of product. The bulk refill may also lead to a reduction in the product waste arising from product residue compared with a discarded primary pack.

The shipper for the refill could be of lower specification as there is no need to prevent crushing of the trigger unit.

For one million primary packs, the amount of packaging waste saved will be ~20 tonnes for same size refill and ~30–40 tonnes for bulk refill. Assuming an annual volume of 200 million, this could reduce the waste stream by at least 7,500 tonnes per year. The refill and the closure would both be recyclable, whereas the trigger unit is not.

8.1.6 Risks and development challenges

The risks and development challenges associated with trigger dispensers with bottle refills are summarised in Table 8.

Table 8 Risks and development challenges: trigger dispenser – bottle refill

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Store</td>
<td>SKU proliferation/impact*</td>
</tr>
<tr>
<td></td>
<td>Shelf space availability at retail store*</td>
</tr>
<tr>
<td></td>
<td>For bulk refills, pricing may be an issue – although potentially cheaper per unit volume, the larger pack will typically be more expensive than the smaller primary pack</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>Manufacturing facility may have to be adapted or new machines installed to pack and cap the refills</td>
</tr>
<tr>
<td>Consumer</td>
<td>Social behaviour – consumers time pressured, not motivated to use refills*</td>
</tr>
<tr>
<td></td>
<td>Availability – many consumers commented that refills were not available when they went to buy them*</td>
</tr>
<tr>
<td></td>
<td>Consumer dexterity – consumers unable to unscrew trigger unit and either refill bottle or transfer trigger to refill without spillage*</td>
</tr>
</tbody>
</table>

* Ways of overcoming or mitigating these challenges are discussed in Section 10.
8.2 Soap dispenser – pouch mock-up refill

**Figure 15** Example of soap dispenser with pouch mock-up refill

### 8.2.1 Rationale

With the modern trend towards added value and convenience, a large market is developing for liquid soaps sold in bottles with attached pumps for dispensing. The dispensing pump typically weighs 12–16 g and costs 10–12p and, although it could be reused, it is thrown away each time. Because of the way the pump operates, there is always soap residue in the bottle. This is also thrown away with the pack.

An opportunity exists to utilise refill packs for soap dispensers. The simplest option is to supply the same bottle but with a screw cap, requiring the consumer to simply remove the original pump and fit it to the new (refill) pack. Although this saves the cost and weight of the pump, it does not address the issue of product waste. An alternative solution is to provide a flexible pouch bulk refill (see Figure 15), capable of refilling the original bottle at least twice or, more likely, refilling several different bottles around the home (bathroom, kitchen, cloakroom, en-suite, etc.).

Precedents for such a system exist and are widely used in Australia, New Zealand and other parts of Europe. Limited examples already exist in UK. Branding should not be an issue for the refill packs given modern print quality and design capability. Indeed, the overseas survey found that it was mainly well-known brands that used refills rather than own label.

There is scope for an improved design for the primary pack and, if the bulk refill option is adopted, a different or highly desirable style soap dispenser could be created. With good design, the opportunity exists to create a technical ‘lock in’, possibly increasing sales volume – the refill pack will only fit the specific primary pack, preventing refills from other, lower cost, suppliers being used.

### 8.2.2 Retailer benefits

The pack costs will fall by ~60%. The distribution and storage cost will decrease due to ~43% increase in pallet utilisation. Use of a bulk refill pouch will increase the unit price, thus potentially increasing profitability. Table 9 summarises the cost benefits to the retailer.
There will also be significantly less risk from consumers ‘trying’ the product (using the pump), causing wastage/spillage. The same technology could be applied to shampoos, conditioners, moisturisers, etc. to create a uniform health & beauty range.

**Table 9** Potential savings: soap dispenser–pouch refill

<table>
<thead>
<tr>
<th>Item</th>
<th>Potential savings per one million packs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material costs</td>
<td>£130,000</td>
</tr>
<tr>
<td>Distribution and warehouse costs</td>
<td>£1,400</td>
</tr>
<tr>
<td>Reduction in PRN cost</td>
<td>£270</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>£131,670</strong></td>
</tr>
</tbody>
</table>

8.2.3 Consumer benefits

The bulk refill option allows for one refill pack to service multiple dispensers, reducing the storage requirement for multiple spare dispensers in the home. There is also the potential for cost savings from the reduced pack costs.

8.2.4 Manufacturer benefits

An opportunity exists to create both brand loyalty and technical ‘lock in’ if the consumer has paid a premium for the primary pack and the refill is a dedicated fitment. There will be lower storage and distribution costs as well as lower material costs.

8.2.5 Impact on packaging waste

A typical bottle (250 ml) and pump dispenser weighs ~40-45 g. Pouches will save 30-35 g per pack. If a bulk refill is used, the ratio of packaging weight to product will fall significantly, giving a net pack weight saving for the same volume of product. The bulk refill may also reduce the product waste arising from product residue compared with a discarded primary pack.

The shipper for the refill may need to be of higher specification to prevent damage to the pouches.

For one million primary packs, the amount of packaging waste saved would be ~30-35 tonnes for same size refill and ~35-50 tonnes for bulk refill. Assuming an annual volume of 100 million, this could reduce the waste stream by up to 5,000 tonnes per year.

The flexible pack will need to be a barrier laminate and, as such, would not currently be recyclable. It would thus end up in the waste stream (equivalent to approximately half the weight of a pump). However, the waste pouch will take up less volume than either a bottle or a pump.
8.2.6 Risks and development challenges

The risks and development challenges associated with pouch refills for soap dispensers are summarised in Table 10.

Table 10 Risks and development challenges: soap dispenser – pouch refill

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Store</td>
<td>■ SKU proliferation/impact*</td>
</tr>
<tr>
<td></td>
<td>■ Shelf space availability at retail store, though this may be offset slightly by higher product shelf loading density*</td>
</tr>
<tr>
<td></td>
<td>■ For bulk refills, pricing may be an issue – although potentially cheaper per unit volume, the larger pack will typically be more expensive than the smaller primary pack</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>■ Manufacturing facility has to be adapted or new machines installed to pack and cap the refills</td>
</tr>
<tr>
<td>Consumer</td>
<td>■ Social behaviour – consumers time pressured, not motivated to use refills*</td>
</tr>
<tr>
<td></td>
<td>■ Availability – many consumers commented that refills were not available when they went to buy them*</td>
</tr>
<tr>
<td></td>
<td>■ Consumer dexterity – consumers unable to unscrew pump and refill bottle*</td>
</tr>
<tr>
<td></td>
<td>■ Consumer perception of lower quality of refill pack, thus low take-up of refills*</td>
</tr>
<tr>
<td></td>
<td>■ Handling of a flexible pouch may be an issue for some consumers</td>
</tr>
<tr>
<td></td>
<td>■ Fear of technology if docking mechanism is too complex</td>
</tr>
<tr>
<td>Environmental</td>
<td>■ The refill pouch may not be recyclable, thus will end up in the waste stream</td>
</tr>
<tr>
<td></td>
<td>■ However, the pouch and cap will weigh no more than the pump dispenser, thus saving the whole weight of the primary bottle</td>
</tr>
<tr>
<td></td>
<td>■ Increased product waste due to leakage from punctured packs</td>
</tr>
</tbody>
</table>

* Ways of overcoming or mitigating these challenges are discussed in Section 10.

8.3 Deodorant stick

8.3.1 Rationale

With an increasing awareness of personal hygiene, particularly among the younger generation, personal grooming products are a growing market. A trend away from spray deodorants is resulting in a faster rate of growth in the roll-on and deodorant stick market than the overall market sector. Designer/fashionable products in this sector are also growing in popularity.

An opportunity exists to create a refill stick for a deodorant applicator (see Figure 16). The simplest option is to supply a shrink-wrapped refill that can be easily inserted into the applicator. This provides an opportunity to create a high quality/desirable applicator that can be reused many times. Such an item would create a strong differential against non-refill deodorants and the refill will have the potential to be a higher price/high margin item.

Precedents for such a system were not found in any market that was investigated and such an application would therefore need to be developed. However, the technology to produce the pack components is well-established.
and widespread, and the deodorant part of the refill would be the same as for the primary pack. Given modern
design capability, branding should not be an issue for either the primary pack or refill packs. There would be an
opportunity to provide a refill ‘multi-pack’ (say three refills - may be with different scents) to create bulk
purchase value.

A replacement cartridge for roll-on (liquid) deodorants would also fit into this category. Again, no precedents
were found for such a system, though the technology is well-established and all the comments applied to the
refill stick could be applied to a replacement cartridge. But the structural requirements of the refill mean that the
net weight saving going for disposal would be less than for a refill stick.

**Figure 16** Mock-up deodorant stick with replacement

**Replacement deodorant stick - shrink wrapped or flow wrapped**

8.3.2 **Retailer benefits**

The refill pack cost could fall by ~50% compared with current pack designs. The distribution and storage cost will
reduce due to ~15% increase in pallet utilisation. There is an opportunity to create a higher value primary pack,
thus increasing profitability. With creative design, there is also an opportunity to create/enhance brand loyalty.
Table 11 summarises the cost benefits to the retailer.

**Table 11** Potential savings: deodorant stick

<table>
<thead>
<tr>
<th>Item</th>
<th>Potential savings per one million packs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material costs</td>
<td>£40,000</td>
</tr>
<tr>
<td>Distribution and warehouse costs</td>
<td>£320</td>
</tr>
<tr>
<td>Reduction in PRN cost</td>
<td>£350</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>£40,670</strong></td>
</tr>
</tbody>
</table>

8.3.3 **Consumer benefits**

A well designed primary pack would offer ‘designer’ appeal, yet be affordable. There is also the potential for cost
savings from the reduced pack costs.
8.3.4 Manufacturer benefits

The potential for brand loyalty arising from having a good primary pack with a dedicated refill would create sales stability. There will be lower storage and distribution costs, and lower material costs for the refill. There is also the opportunity for a higher margin primary pack.

8.3.5 Impact on packaging waste

A typical, low cost stick deodorant has ~80 g of packaging; creating a simple refill will save ~50–55 g per pack. The refill could be manufactured from recyclable materials, but the shipper for the refill may need to be of higher specification to prevent damage to the refills.

For one million primary packs, the amount of packaging waste saved would be ~50–55 tonnes for the same size refill. For a market size of 200 million units, the potential annual saving could be 10,000 to 11,000 tonnes.

8.3.6 Risks and development challenges

The risks and development challenges associated with deodorant stick refills are summarised in Table 12.

Table 12 Risks and development challenges: deodorant sticks

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Store</td>
<td>■ SKU proliferation/impact*</td>
</tr>
<tr>
<td></td>
<td>■ Shelf space availability at retail store, though this may be offset slightly by higher product shelf loading density*</td>
</tr>
<tr>
<td></td>
<td>■ The use of a store loyalty card kiosk or on-line ordering and fulfilment are options to avoid on-shelf SKU proliferation (see Section 10.2)*</td>
</tr>
<tr>
<td></td>
<td>■ For primary pack, pricing may be an issue - higher than existing packs, although refills should offer a cost saving</td>
</tr>
<tr>
<td></td>
<td>■ For bulk refills, pricing may also be an issue - although potentially cheaper per unit volume, the larger pack will typically be more expensive than the smaller primary pack</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>■ An entirely new pack design will need to be created and marketed</td>
</tr>
<tr>
<td></td>
<td>■ Manufacturing facility has to be adapted or new machines installed to pack and cap the refills</td>
</tr>
<tr>
<td>Consumer</td>
<td>■ Social behaviour - consumers time pressured, not motivated to use refills*</td>
</tr>
<tr>
<td></td>
<td>■ Availability - many consumers commented that refills were not available when they went to buy them*</td>
</tr>
<tr>
<td></td>
<td>■ Consumer dexterity - consumers may have difficulty in unloading spent cartridge and inserting new refill*</td>
</tr>
<tr>
<td></td>
<td>■ The refill may be soft and sticky in hot weather, thus making it more difficult/messy to handle</td>
</tr>
<tr>
<td></td>
<td>■ Consumer perception of lower quality of refill pack, thus low take-up of refills</td>
</tr>
<tr>
<td></td>
<td>■ Fear of technology if docking mechanism is too complex</td>
</tr>
</tbody>
</table>

* Ways of overcoming or mitigating these challenges are discussed in Section 10.
9.0 Other Concepts - with Potentially Higher Risks Associated with Success

9.1 Double walled tubs

Introducing a replaceable insert for double walled tubs (see Figure 17) will save:

- approximately 120 g in packaging weight per pack; and
- approximately 8p in packaging cost per pack.

In addition:

- the number of packs per pallet will increase by 135%, reducing pallet, distribution and warehouse costs; and
- both the primary pack and the refill insert could be recyclable.

The estimated savings from replacing one million primary packs with refill packs are:

- 120 tonnes in weight; and
- cost savings of £85,000.

Figure 17 Mock up of double walled tub with refill pack

A thin plastic tub is placed inside the original pack. The foil lid peels off. This idea could be applied to moisturisers, night cream, eye cream and possibly hair care products.
9.2 Drum and refill

Drum and refills for babies formula milk. This could also be extended to coffee and hot chocolate. The tin has a resealable plastic lid, the refills could be plastic flow wraps or pouches.

Replacing a primary drum and lid with a pouch (see Figure 18) will save:

- approximately 182 g in packaging weight per pack;
- approximately 9p in packaging cost per pack.

In addition, the number of packs per pallet will increase by 37% - reducing pallet, distribution and warehouse costs.

The estimated savings from replacing one million primary packs with refill packs are:

- 182 tonnes in weight; and
- cost savings of £98,000.
9.3  Paint top-ups

Replacing a 2.5-litre paint can and lid with a 1-litre pouch (see Figure 19) will save:

- approximately 100 g in packaging weight per pack; and
- approximately 6p in packaging cost per pack once the cost of a shipper is included.

The estimated savings from replacing one million primary packs with refill packs are:

- 100 tonnes in weight; and
- cost savings of £89,000.

Figure 19  Mock up of paint can and lower volume pouch

9.4  Trigger pack – 5-litre refill

Replacing a 750 ml trigger spray with a 5-litre can (see Figure 20) will save:

- approximately 48 g in packaging weight per 750 ml; and
- approximately 24p in packaging cost per 750 ml.

The estimated savings from replacing one million primary packs with refill packs are:

- 48 tonnes in weight; and
- cost savings of £240,000.
9.5 Trigger pack – pouch refill

Replacing a 750 ml trigger spray with a 750 ml pouch (see Figure 21) will save:

- approximately 61g in packaging weight per 750 ml; and
- approximately 16p in packaging cost per 750 ml.

The estimated savings from replacing one million primary packs with refill packs are:

- 60 tonnes in weight; and
- cost savings of £165,000.
9.6 Box and bag

Simply replacing the existing carton with a pouch (see Figure 22) will save:

- approximately 55 g in packaging weight per pack; and
- approximately 2p in packaging cost per pack.

In addition:

- there will be no effective change in pallet loading or distribution costs; and
- the carton will be recyclable but the pouch will not

The estimated savings from replacing one million primary packs with refill packs are:

- 55 tonnes in weight; and
- cost savings of £20,000.

Figure 22 Mock-up of pouch replacing carton

The new master pack would need to more substantial than the existing box. The Refill bags would need to be strengthened.
10.0 Analysis of findings and discussion of ways forward

10.1 Motivation for consumers

Table 13 lists some ideas for motivating consumers to buy and use products with refill packs. These ideas are based on altruism, cost and innovation/technology/convenience.

10.1.1 Altruism

Use a dedicated zone in the store (e.g. an EcoZone) to attract aware/motivated consumers who will take more time, make more effort and/or potentially spend more to obtain a good ‘green’ solution.

One option is to use a store loyalty card to order refills either via through the internet or in-store terminals. The purchase of refills would then accrue discounts, bonus points, etc.

10.1.2 Cost

What is important is the perceived good value of the refill versus the cost of a standard (primary) pack. This is the main driver in the USA and is also important in Australia and New Zealand. A refill pack on average provides a 26% cost saving for the consumer in these markets.

10.1.3 Innovation/technology/convenience

Use creative systems to decant/pour/dispense, etc. and/or design the product to look/feel ‘different’ or stylish.

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Comments</th>
</tr>
</thead>
</table>
| Zoning                         | ■ Targets susceptible customers (cost conscious, eco-friendly, trend-setters, etc.)  
                                  | ■ Becomes lifestyle choice                                                
                                  | ■ Easy transfer of acceptability across categories                        |
| Cost                           | ■ Must offer a tangible/significant cost benefit to consumer to attract buy-in on basis of value to meet consumer expectations |
| Environmental                  | ■ Refill pack should give perceived if not real environmental benefit     
                                  | ■ Light/disposable/biodegradable                                          |
| Convenience                    | ■ Easy to store                                                           
                                  | ■ Easy to use                                                             
                                  | ■ Re-sealable (if appropriate)                                            
                                  | ■ Less packaging/more product                                             |
| Improve desirability           | ■ Improve and increase ‘image’ of refill packs                            
                                  | ■ Carry brand values of primary pack                                      |
10.2 Potential solutions

Price differentiation between the primary pack and the refill is a key driver in overseas markets and will be critical to consumer acceptance in the UK. The refills will need to demonstrate a lower cost to the consumer than the primary pack.

Bulk refills offer significant cost saving to consumer as well as different price proposition/SKU to the retailer. For some products (e.g. soap), they may offer additional consumer benefits as the consumer needs only one refill for multiple dispensers.

For some liquids such as fabric conditioner, the use of concentrates for refill packs can be used to create smaller refill pack sizes which offer weight and cost savings to the consumer. The same technology could be applied to other products such as hair care and liquid soaps, and even some food products such as flavourings/dressings. However, care will need to be taken to ensure that, if the consumer uses the product undiluted, there will be no risk of injury/damage.

While many UK consumers want good value products, there is a large unfulfilled market for premium goods at realistic prices. This creates an opportunity to provide a primary pack/refill pack combination that offers value but also has desirability.

The increase in environmental awareness in the UK may create an opportunity to promote the environmental advantages of refillable packaging by creating a ‘feel good’ factor. However, this will need to be part of an overall publicity campaign. This could be achieved by using a point of sale promotion explaining the environmental as well as the financial benefits. Another option could be to use a separate zone such as an EcoZone within the store (like the organic zone in large grocery stores) to sell refills/fair trade/more environmentally friendly packs.

A different approach could be to create a new or easier way of shopping for refills such as the ability to re-order refills over the internet using a code or web address printed on the primary pack. The refills could be delivered to the home or local store.

Another variation could be to use a store loyalty card to order refills at in-store touch screens; the refills can either be delivered to the home or brought to the checkout for collection by the shopper.

Whichever sales process or marketing campaign is chosen, the most critical factor in achieving consumer acceptance will be to ensure that the process of refilling the primary pack or replacing the dispenser is simple and mess free, and can be carried out by the young and old alike.

10.3 Overcoming the potential challenges

10.3.1 Social behaviour

To ensure consumers make the time to choose and use refills, the refill pack needs to offer them some form of added value. This could be in the form of a cost saving, a desirable primary pack or a convenient way of ordering. The technology needs to be:

- simple to use;
- ergonomic; and
- designed to minimise or eliminate spillage/mess.
10.3.2 Availability

It is essential that refills are stocked in all suitable stores and remain available over a long period of time. This will require buy-in from the brand owners and store managers.

Initially the display could be 50% primary: 50% refill pack but over several weeks/months, depending on the product, the ratio should change with more refills than primary packs being displayed.

One option could be to separate out an own label range with refills on one shelf and the primary pack on the shelf above or below. Ideally this would be in the same aisle as the branded products to give a good price comparison.

10.3.3 Consumer dexterity

Simple to use designs for caps and dispensers are key to easy operation. For the less able consumers, the use of a (third party?) device to unscrew caps, etc. could be in the form of a simple spanner type device that locates on the cap/dispenser or a sliding clamp similar to the lid opening aids that are currently available. The bottom of the refill could have a hollow moulded in its base that would fit over the dispenser and be used as ‘screwdriver’ to assist in the removal of the dispenser and or cap.

A sensible, innovative approach to design that addresses use, distribution, handling and disposal issues could provide genuine costs savings as well as value added features for the consumer, This would increase the appeal and hopefully the market share.

10.3.4 Consumer perception of lower quality of refill pack

While consumers require good value, the majority do not want cheap looking packs. A good value added design will thus increase the perception of quality.

In the case of pouches or similar refill packs, good quality printing is easy to achieve and will help to convey a high quality image for the product.

Communication and education will be vital in the early stages of promoting refill packs. This could be achieved by:

- in-store promotions/signage;
- on pack communication; and
- TV advertising campaigns (possibly more for complete product ranges or branded products).
11.0 Conclusions

The survey found a well-established use of refills in USA, Australia, New Zealand and parts of Europe – mainly in non-food categories though some food refills exist in these markets. But only those stores with a large floor area or increased shelf space to take the increased SKUs displayed refill packs (e.g. Wal-Mart and Home Depot). Refill packs were not evident in any of the stores found in the large shopping malls. The refill packs found during the international survey were mainly for health & beauty products (soaps, shampoo, conditioner, etc.) and household cleaning products, though a limited number of garden/insect treatments were available in the larger DIY stores.

Refills in the USA were predominately used for primary packs that had a dispensing mechanism of some kind – typically a trigger spray. The refill pack was generally 2-3 times the volume of the primary and sold at a cheaper price per unit volume. Refills were always sold as economy packs, offering good value for money.

The simple solutions such as removing the dispenser from the empty primary pack and fixing it to the refill pack are the most popular with the consumers and thus are more widely used.

Refills are well-established in the UK for stationery products such as pens, ink cartridges, toners, etc. Some household cleaners and laundry products are also available in refills.

There is a significant opportunity to expand the refill product range in the UK provided social attitudes can be changed with good point of sale literature/advertising.

Findings from this international study will help to identify which of the proposed concepts could be adopted in the UK. Use of examples of refill packs from the international marketplace will help to communicate the benefits of using refills to both retailers and consumers.

11.1 Recommendations

1. Review consumer insights against the proposals contained in this report.

2. Involve potential packaging suppliers in discussions on key concepts to obtain their help on pack designs and costs suitable for mass manufacture, and in manufacturing prototypes. Follow this up with trials with key retailers, involving the brand owners to get ‘buy-in’ from the decision-makers for the brand.

3. Hold discussions with brand managers at both suppliers (particularly those that market refills in other markets) and supermarkets (own label) to get senior decision-making buy-in for the refill concept and thus make refills a key part of brand packaging strategy.

4. Introduce examples of products with refills to the UK that are marketed globally – particularly in coffee and health & beauty. (Many of the examples seen during the visits to the USA, Australia and New Zealand were native brands and thus not available in the UK.) This could be achieved by either a third party or the retailer contacting global brand owners and requesting samples/details of global refill packs and trialling them in the UK. If the retailers introduced refill packs, global brand owners are very likely to introduce their own refills to prevent potential loss of market share.

5. Consider holding retailer workshops to discuss the possible designs and rationale behind the use of refill packaging – where possible, including consumer insights. These could involve leading high street supermarkets, major health & beauty retailers, and DIY chains.

The key element in driving refills forward is communication. It is essential to communicate:

- benefits to senior retail directors;
- concept to brand managers;
- initial ideas to potential suppliers to obtain take up; and
- the ethos and benefits to the consumer.
Appendix

This appendix contains three tables:

- Table A1 Refill pack cost table
- Table A2 Detailed savings estimates for concepts
- Table A3 Decision matrix summary score sheet

Table A1 Refill pack cost table

<table>
<thead>
<tr>
<th>Product</th>
<th>Application</th>
<th>Primary pack</th>
<th>Volume</th>
<th>Price</th>
<th>Refill pack</th>
<th>Volume</th>
<th>Price</th>
<th>Cost saving</th>
<th>Average saving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coffee</td>
<td>Food</td>
<td>Glass jar</td>
<td>100 g</td>
<td>$10.30</td>
<td>Flow-wrap</td>
<td>100 g</td>
<td>$8.13</td>
<td>21%</td>
<td>27%</td>
</tr>
<tr>
<td>Jam</td>
<td>Food</td>
<td>Glass jar</td>
<td>1 kg</td>
<td>NKr24.88</td>
<td>Flow-wrap</td>
<td>1 kg</td>
<td>NKr 13.90</td>
<td>44.1%</td>
<td></td>
</tr>
<tr>
<td>Oregano herbs</td>
<td>Food</td>
<td>Glass jar</td>
<td>12 g</td>
<td>£0.39</td>
<td>Sachet</td>
<td>12 g</td>
<td>£0.33</td>
<td>15.4%</td>
<td></td>
</tr>
<tr>
<td>Shake &amp; feed lawn feeder</td>
<td>Garden/DIY</td>
<td>HDPE moulding</td>
<td>4 lb</td>
<td>$9.98</td>
<td>Pouch</td>
<td>8 lb</td>
<td>$11.98</td>
<td>40%</td>
<td>40%</td>
</tr>
<tr>
<td>Soft soap</td>
<td>Health &amp; beauty</td>
<td>Pump dispenser</td>
<td>221 ml</td>
<td>$2.49</td>
<td>Bottle</td>
<td>589 ml</td>
<td>$3.29</td>
<td>51%</td>
<td></td>
</tr>
<tr>
<td>Soap</td>
<td>Health &amp; beauty</td>
<td>Pump dispenser</td>
<td>250 ml</td>
<td>$1.99</td>
<td>Plastic bottle</td>
<td>500 ml</td>
<td>$3.52</td>
<td>11.50%</td>
<td></td>
</tr>
<tr>
<td>Carex aloe vera soap</td>
<td>Health &amp; beauty</td>
<td>Pump dispenser</td>
<td>250 ml</td>
<td>£0.97</td>
<td>Bottle without pump</td>
<td>250 ml</td>
<td>£0.97</td>
<td>0.0%</td>
<td>33%</td>
</tr>
<tr>
<td>Carex soap</td>
<td>Health &amp; beauty</td>
<td>Pump dispenser</td>
<td>500 ml</td>
<td>£2.88</td>
<td>Bottle without pump</td>
<td>750 ml</td>
<td>£2.28</td>
<td>47.2%</td>
<td></td>
</tr>
<tr>
<td>Huggies wipes</td>
<td>Health &amp; beauty</td>
<td>Wipe with storing box</td>
<td>108 wipes</td>
<td>£3.29</td>
<td>Refill wipes in a flow-wrap</td>
<td>240 wipes</td>
<td>£3.53</td>
<td>52.0%</td>
<td></td>
</tr>
<tr>
<td>Kandoo toilet wipes</td>
<td>Health &amp; beauty</td>
<td>Dispenser box</td>
<td>60 wipes</td>
<td>£2.21</td>
<td>Flow-wrap</td>
<td>60 wipes</td>
<td>£1.35</td>
<td>39.0%</td>
<td></td>
</tr>
<tr>
<td>Downy fabric conditioner</td>
<td>Home laundry</td>
<td>HDPE bottle</td>
<td>40 fl oz</td>
<td>$5.79</td>
<td>Carton</td>
<td>40 fl oz</td>
<td>$4.89</td>
<td>16%</td>
<td>21%</td>
</tr>
<tr>
<td>Product</td>
<td>Application</td>
<td>Primary pack</td>
<td>Volume</td>
<td>Price</td>
<td>Refill pack</td>
<td>Volume</td>
<td>Price</td>
<td>Cost saving</td>
<td>Average saving</td>
</tr>
<tr>
<td>-----------------------</td>
<td>------------------------</td>
<td>-----------------------</td>
<td>---------</td>
<td>-------</td>
<td>---------------------------</td>
<td>---------</td>
<td>--------</td>
<td>-------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Fabreze</td>
<td>Home laundry</td>
<td>Trigger pack</td>
<td>500 ml</td>
<td>$2.69</td>
<td>Bulk bottle</td>
<td>2,000 ml</td>
<td>$7.97</td>
<td>26%</td>
<td></td>
</tr>
<tr>
<td>Fabreze</td>
<td>Home laundry</td>
<td>Trigger pack</td>
<td>800 ml</td>
<td>$4.48</td>
<td>Bulk bottle</td>
<td>2,000 ml</td>
<td>$7.97</td>
<td>29%</td>
<td></td>
</tr>
<tr>
<td>Fabric softener</td>
<td>Home laundry</td>
<td>Bottle with handle</td>
<td>2 litres</td>
<td>$3.39</td>
<td>Concentrate pillow pack</td>
<td>250 ml for 2 litres</td>
<td>$1.77</td>
<td>48%</td>
<td></td>
</tr>
<tr>
<td>Radiant liquid</td>
<td>Home laundry</td>
<td>Bottle with handle</td>
<td>1.5 litres</td>
<td>$6.01</td>
<td>BM bottle with heat seal neck</td>
<td>1 litre</td>
<td>$4.08</td>
<td>-2%</td>
<td></td>
</tr>
<tr>
<td>Washing detergent</td>
<td>Home laundry</td>
<td>Bottle</td>
<td>750 ml</td>
<td>$2.99</td>
<td>Stand-up pouch</td>
<td>900 ml</td>
<td>$3.31</td>
<td>8%</td>
<td></td>
</tr>
<tr>
<td>Shout - household cleaner</td>
<td>Household cleaners</td>
<td>Trigger pack</td>
<td>22 fl oz</td>
<td>$3.29</td>
<td>Bulk bottle</td>
<td>60 fl oz</td>
<td>$4.89</td>
<td>46%</td>
<td>25%</td>
</tr>
<tr>
<td>Windex - window cleaner</td>
<td>Household cleaners</td>
<td>Trigger pack</td>
<td>26 oz</td>
<td>$3.99</td>
<td>Bulk bottle</td>
<td>32 oz</td>
<td>$3.99</td>
<td>19%</td>
<td></td>
</tr>
<tr>
<td>Window cleaner - Pure Power</td>
<td>Household cleaners</td>
<td>Trigger pack</td>
<td>33 fl oz</td>
<td>$2.49</td>
<td>Bulk bottle</td>
<td>67.7 fl oz</td>
<td>$2.99</td>
<td>42%</td>
<td></td>
</tr>
<tr>
<td>Zep glass cleaner</td>
<td>Household cleaners</td>
<td>Trigger pack</td>
<td>32 fl oz</td>
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<td>Bulk bottle</td>
<td>128 fl oz</td>
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<td>Ajax baking Soda</td>
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<td>$4.65</td>
<td>Refill bottle</td>
<td>500 ml</td>
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<td>14.2%</td>
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<td>Ajax bathroom cleaner</td>
<td>Household cleaners</td>
<td>Trigger pack</td>
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<td>$4.65</td>
<td>Refill bottle</td>
<td>500 ml</td>
<td>$3.99</td>
<td>14.2%</td>
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<td>$4.65</td>
<td>Refill bottle</td>
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<td>$3.99</td>
<td>14.2%</td>
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<td>Ajax multi-purpose cleaner</td>
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<td>500 ml</td>
<td>$4.05</td>
<td>Bottle without trigger</td>
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<td>$4.65</td>
<td>Refill bottle</td>
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<td>14.2%</td>
<td></td>
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<td>Refill bottle</td>
<td>500 ml</td>
<td>$3.99</td>
<td>14.2%</td>
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<td>Product</td>
<td>Application</td>
<td>Primary pack</td>
<td>Volume</td>
<td>Price</td>
<td>Refill pack</td>
<td>Volume</td>
<td>Price</td>
<td>Cost saving</td>
<td>Average saving</td>
</tr>
<tr>
<td>-------------------------</td>
<td>------------------------</td>
<td>-------------------</td>
<td>--------</td>
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<td>----------------------------</td>
<td>---------</td>
<td>--------</td>
<td>-------------</td>
<td>----------------</td>
</tr>
<tr>
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<td>litre</td>
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<td>Jiff Power Spray</td>
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<td>Refill bottle</td>
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<td>Squeezy</td>
<td>750 ml</td>
<td>$4.13</td>
<td>HDPE bulk container</td>
<td>5 litres</td>
<td>$19.98</td>
<td>27.0%</td>
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<td>Household cleaners</td>
<td>Trigger pack</td>
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<td>$3.99</td>
<td>Refill bottle</td>
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<td>$3.99</td>
<td>Refill bottle</td>
<td>500 ml</td>
<td>$3.19</td>
<td>20.1%</td>
<td></td>
</tr>
<tr>
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<td>Household cleaners</td>
<td>Trigger pack</td>
<td>500 ml</td>
<td>NKr24.95</td>
<td>Refill bottle</td>
<td>500 ml</td>
<td>NKr21.95</td>
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<td>Fairy washing up liquid</td>
<td>Household cleaners</td>
<td>Pump dispenser</td>
<td>375 ml</td>
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<td>Bottle without pump</td>
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<td>Dishwasher liquid</td>
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<td>Pump dispenser</td>
<td>400 ml</td>
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<td>Misc</td>
<td>Bottle + Dispenser</td>
<td>20 ml</td>
<td>£3.44</td>
<td>Refill bottle</td>
<td>20 ml</td>
<td>£1.99</td>
<td>42.2%</td>
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</tr>
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<td>Own brand air freshener</td>
<td>Misc</td>
<td>Bottle + dispenser</td>
<td>15 ml</td>
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<td>15 ml</td>
<td>£1.49</td>
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### Table A2 Detailed savings estimates for concepts

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<th>Concept</th>
<th>Soap dispenser</th>
<th>Trigger spray</th>
<th>Drum &amp; refill</th>
<th>Box &amp; bag</th>
<th>Deodorant stick</th>
<th>Double walled tub</th>
<th>Glass jar &amp; refill</th>
<th>Paint top-ups</th>
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<tr>
<td><strong>Option</strong></td>
<td>Rigid</td>
<td>Pouch</td>
<td>Rigid</td>
<td>Pouch</td>
<td>-</td>
<td>Current</td>
<td>Proposed</td>
<td>-</td>
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<td><strong>Current pack</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Weight (g)</td>
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<td>53</td>
<td>75</td>
<td>75</td>
<td>200</td>
<td>70</td>
<td>100</td>
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<td>Cost (£)</td>
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<td>0.28</td>
<td>0.12</td>
<td>0.04</td>
<td>0.05</td>
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<td>Pallet loading</td>
<td>2,100</td>
<td>2,100</td>
<td>960</td>
<td>960</td>
<td>420</td>
<td>384</td>
<td>384</td>
<td>3,936</td>
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<td><strong>Proposed pack</strong></td>
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<tr>
<td>Weight (g)</td>
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<td>10</td>
<td>54</td>
<td>14</td>
<td>18</td>
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<td>Cost (£)</td>
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<td>0.10</td>
<td>0.15</td>
<td>0.12</td>
<td>0.03</td>
<td>0.02</td>
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<td>0.03</td>
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<td>3,000</td>
<td>1,200</td>
<td>1,680</td>
<td>576</td>
<td>384</td>
<td>384</td>
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<tr>
<td><strong>Savings per individual pack</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight (g)</td>
<td>9</td>
<td>43</td>
<td>21</td>
<td>61</td>
<td>182</td>
<td>55</td>
<td>85</td>
<td>55</td>
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<tr>
<td>Cost (£)</td>
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<td>0.09</td>
<td>0.02</td>
<td>0.03</td>
<td>0.04</td>
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<tr>
<td>Pallet loading</td>
<td>29%</td>
<td>43%</td>
<td>25%</td>
<td>75%</td>
<td>37%</td>
<td>0%</td>
<td>0%</td>
<td>15%</td>
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<td><strong>Estimated savings per one million packs</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight (tonnes)</td>
<td>9</td>
<td>43</td>
<td>21</td>
<td>61</td>
<td>182</td>
<td>55</td>
<td>85</td>
<td>55</td>
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<tr>
<td>Material costs (£)</td>
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<td>£130,000</td>
<td>£130,000</td>
<td>£160,000</td>
<td>£90,000</td>
<td>£20,000</td>
<td>£30,000</td>
<td>£40,000</td>
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<tr>
<td>No. of pallets</td>
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<td>143</td>
<td>208</td>
<td>446</td>
<td>645</td>
<td>0</td>
<td>0</td>
<td>32</td>
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<td>Distribution costs (£)</td>
<td>£831</td>
<td>£1,121</td>
<td>£1,635</td>
<td>£3,504</td>
<td>£5,062</td>
<td>£0</td>
<td>£0</td>
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<td>Warehouse costs (£)</td>
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<td>£286</td>
<td>£417</td>
<td>£893</td>
<td>£1,290</td>
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<td>PRN</td>
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<td>£270</td>
<td>£132</td>
<td>£384</td>
<td>£1,625</td>
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<td>£346</td>
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<td>Total (£)</td>
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<td>£131,678</td>
<td>£132,184</td>
<td>£164,781</td>
<td>£97,977</td>
<td>£20,330</td>
<td>£30,510</td>
<td>£40,665</td>
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## Table A3 Decision matrix summary score sheet*

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<tr>
<th>Primary pack</th>
<th>Refill option</th>
<th>Rationale score</th>
<th>Complexity score</th>
<th>Challenges score</th>
<th>Cost score</th>
<th>Time frame score</th>
<th>Benefit score</th>
<th>Risk score</th>
<th>Savings Score</th>
<th>Total score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glass jar and refill</td>
<td>Flow-wrap refill - same size - weight or volume</td>
<td>3.6</td>
<td>4.9</td>
<td>5.4</td>
<td>3.0</td>
<td>4.5</td>
<td>2.2</td>
<td>4.3</td>
<td>1.0</td>
<td>11,991</td>
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<tr>
<td>Soap pump</td>
<td>Bottle with a cap</td>
<td>1.8</td>
<td>4.5</td>
<td>5.3</td>
<td>3.8</td>
<td>5.8</td>
<td>2.8</td>
<td>3.0</td>
<td>2.0</td>
<td>15,649</td>
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<td>Trigger pack – 750 ml</td>
<td>Bottle with a cap - 750 ml</td>
<td>1.8</td>
<td>4.6</td>
<td>5.4</td>
<td>3.8</td>
<td>5.5</td>
<td>3.0</td>
<td>3.0</td>
<td>3.5</td>
<td>28,629</td>
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<td>Soap pump</td>
<td>Pouch</td>
<td>2.0</td>
<td>5.0</td>
<td>5.4</td>
<td>4.7</td>
<td>6.7</td>
<td>3.6</td>
<td>2.5</td>
<td>2.0</td>
<td>30,240</td>
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<td>Deodorant</td>
<td>Replaceable deodorant stick</td>
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<td>4.0</td>
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<td>3.0</td>
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<td>3.3</td>
<td>5.0</td>
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<td>32,400</td>
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<tr>
<td>Double walled tub</td>
<td>Replaceable injection moulded insert</td>
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<td>4.8</td>
<td>5.5</td>
<td>4.7</td>
<td>5.5</td>
<td>2.3</td>
<td>4.5</td>
<td>2.5</td>
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<td>Drum and refill</td>
<td>Flow-wrap refill – same size – weight or volume</td>
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<td>4.6</td>
<td>5.5</td>
<td>4.7</td>
<td>5.3</td>
<td>3.0</td>
<td>4.3</td>
<td>2.0</td>
<td>57,850</td>
</tr>
<tr>
<td>Paint top-ups</td>
<td>Pouch for paint top-ups</td>
<td>2.8</td>
<td>5.8</td>
<td>5.9</td>
<td>4.5</td>
<td>6.5</td>
<td>2.1</td>
<td>5.7</td>
<td>2.0</td>
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<tr>
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<td>Bottle with a cap - 5 litres</td>
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<td>5.4</td>
<td>5.3</td>
<td>3.7</td>
<td>5.7</td>
<td>2.8</td>
<td>6.7</td>
<td>3.5</td>
<td>116,014</td>
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<td>Trigger pack – 750 ml</td>
<td>Pouch (750 ml) same size</td>
<td>4.0</td>
<td>5.9</td>
<td>6.0</td>
<td>3.3</td>
<td>6.0</td>
<td>2.8</td>
<td>6.7</td>
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<td>Flow-wrap refill – same size – weight or volume</td>
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<td>5.3</td>
<td>6.2</td>
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<td>5.0</td>
<td>3.0</td>
<td>7.0</td>
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* Each of the eight separate scores for each concept is the average score out of five against a range of criteria for each heading, with low being better than high score. The total score is the product of the multiplication of each of the eight scores (Rationale x Complexity x Challenges x Cost x Time Frame x Benefit x Risk x Savings). The concepts with the lowest scores were those deemed most likely to succeed.