**Extended Abstract**
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# Reusable Packaging Systems: Design recommendations for fostering and sustaining consumer adoption.

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## Introduction

Multiple factors influence the success and sustainability of reusable packaging systems, including consumer behaviour (Bradley & Corsini, 2023). Recent findings from UK trials emphasise the need for continued consumer engagement to ensure reusable packaging systems are profitable and provide environmental benefits (Tesco, 2021). Specifically, product categories with high turnover (e.g., household care, personal care and food & beverage) are considered preferable (IDG, 2021; Center for the Circular Economy & US Plastics Pact, 2025), but a change in consumer behaviour is needed to ensure sufficient reuse rates are met (WRAP, 2023; Center for the Circular Economy & US Plastics Pact, 2025).

Whilst consumers are currently familiar with recycling practices, only 55% of plastic packaging is recycled in the UK (WRAP, 2023). Meanwhile, consumer intentions to recycle at-home show a downward trend, reducing by 7% in 2023 (RECOUP, 2023). Alternative strategies to limit plastic waste contribution should be explored. Reusable packaging systems can reduce single-use reliance, but an assessment of consumer barriers is needed to promote successful implementation (Bradley & Corsini, 2023). Specifically, consumer-centric systems can provide additional value to the consumer, reducing the barriers to consumer adoption.

Relatively new to the UK, some retailers have invested in reuse trials. For example, Marks and Spencer's (M&S) supported reuse schemes in 2019 and further investment in reuse systems (for prefilled containers) was made in 2022 through a collaboration with Reposit, City to Sea and Ecover (M&S, 2024a). Overall, consumers (69%) are willing to interact with reusable packaging systems (City to Sea, 2023); however, research highlights that reuse schemes need to be accessible, available and affordable to drive wide-spread adoption (Bradley & Corsini, 2023). M&S restricts the potential uptake of its reuse scheme by limiting availability to just 25 UK stores (M&S, 2024b), and while 10,000 consumers engaged with M&S's prefill initiative in 2023/4, this remains a small fraction of its annual consumer base of 32 million. Thus, systems need to be designed to consider the potential barriers to wider adoption (M&S2024c). Previous schemes, such as Tesco's partnership with Loop, have failed due to poor consumer retention, experience and lack of affordability (Tesco, 2022). Exploring how to motivate adoption and retain consumers is necessary to maintain viability and attain profitability.

Whilst previous research has explored consumer perceptions of current reuse systems (i.e Miao et al., 2023; Greenwood et al., 2021, IGD, 2021), this research aims to identify the influence of consumer demographics on consumer attitudes and behaviours. Results from this research help form insights for varying demographic groups. In doing so, this research supports system designers in developing effective reuse systems from the outset.

This study answers the research question: Do consumer demographics influence attitudes and behaviours towards reusable packaging systems?

## Methodology

To understand current consumer behaviours and attitudes with respect to current reusable packaging systems, this oral presentation presents the findings of an online consumer

survey (n=375). For this abstract, respondents are refined to UK residents (n=283).

Consumers are asked to reflect on current experiences, whilst avoiders identify key barriers to reuse adoption. Survey recruitment was primarily limited to social media (i.e. LinkedIn, Facebook and Instagram), and recruited both users (n=204) and non-users (n=79) of reuse schemes.

Based on consumer-centric factors identified by Bradley & Corsini (2023), 52 statements (refer to Table 1.) were measured for each reuse archetype (refill-on-the-go, refill-at-home, return-on-the-go and return-from-home) on a 5-point Likert scale (Strongly Disagree = 1, Strongly Agree = 5). Factors measured are defined as either "system design" and/or "packaging design" depending on applicability (see Table 1). For this abstract, datasets are combined to form insights of reusable packaging systems. Higher scores on these dimensions suggest areas for greater consideration is required and therefore should form priority factors (see Findings).

To assess whether there was a significant difference between sample demographics a series of statistical analysis (e.g., MANOVA and t-Test) were performed for each priority factor identified. This oral presentation explores how consumer demographics (age, sex, education and salary) influences consumer ratings for three of the top priority factors.

Furthermore, qualitative questions gather insights on how systems can be improved for consumer retention and adoption. Insights are thematically coded, identifying key areas of improvement, forming consumer-orientated recommendations.

**Table 1. Statements measured according to factors (Bradley & Corsini, 2023).**

| | P | S |
|---|---|---|
| **Material Selection & Production** | **X** | **-** |
| *Recycled Content* | X | - |
| *Material Type* | X | - |
| *Packaging Weight* | X | - |
| *Consumable Weight* | X | - |
| **Use** | **X** | **-** |
| *Usage volume* | X | - |
| **Transportation** | | **X** |
| *Distance* | | X |
| **Shrinkage** | **X** | **X** |
| *Return Rate* | X | x |
| *Deterioration Rate* | X | - |
| *Loss Rate* | X | - |
| **End-of-Life** | **X** | **X** |
| *Disposal Scenario* | X | X |
| **Convenience** | **X** | **X** |
| *Convenience* | X | X |
| *Cleaning and maintenance* | X | X |
| *Service location, access and availability* | - | X |
| **Usability** | **X** | **X** |
| *Service usability* | - | X |
| *Product usability* | X | - |
| **Awareness** | **X** | **X** |
| *Labelling* | X | **-** |
| *Marketing* | - | X |
| **Consumer Perception** | **X** | **X** |
| *Functional design* | X | X |
| *Aesthetic design* | X | X |
| *Service experience* | - | X |
| *Value for money* | X | X |
| *Product quality* | X | - |
| *Hygiene* | X | X |
| *Sustainability* | X | X |
| **Consumer Behaviour** | **-** | **X** |
| *Consumer knowledge and education* | - | X |
| *Familiarity of product/ service* | - | X |
| *Availability of low waste alternatives* | - | X |
| *Peer pressure* | X | - |
| *Market trends* | X | - |
| *Type of reuse model* | - | X |
| *Product category* | - | X |
| **Policies and Legislation** | **-** | **X** |
| *Strategies to increase consumer behaviour change* | - | X |
| **Customer Retention** | **-** | **X** |
| *Customer retention* | - | X |
| *Brand loyalty* | - | X |
| *Financial incentives* | - | X |
| *Deposit return schemes* | - | X |
| *Loyalty schemes/ subscription services* | - | X |
| **Product Features** | **X** | **-** |
| *Standardisation (of the packaging)* | X | - |
| *Product protection* | X | - |

**P*=Packaging Design, S = System Design
** X = Statement provided to participant

## Findings

Findings presented in this abstract focus on UK participants. Refer to Table 2-5.

| Gender | N | % |
|---|---|---|
| Male | 68 | 24 |
| Female | 210 | 74.2 |
| Other | 5 | 1.8 |

**Table 2. Consumer Demographics (Gender)**

| Age | N | % |
|---|---|---|
| 18-29 | 46 | 16.3 |
| 30-39 | 42 | 14.8 |
| 40-49 | 63 | 22.3 |
| 50-59 | 69 | 24.4 |
| 60-69 | 43 | 15.2 |
| 70+ | 20 | 7.1 |

**Table 3. Consumer Demographics (Age)**

| Edu. Lvl | N | % |
|---|---|---|
| Lvl. 1-4 (below higher edu.) | 73 | 25.7 |
| Lvl. 5 (e.g DipHE, HND) | 17 | 6.0 |
| Lvl. 6 (e.g Bachelors) | 93 | 32.9 |
| Lvl. 7 (e.g Masters, PGCE) | 78 | 27.6 |
| Lvl. 8 (e.g PhD) | 20 | 7.1 |

**Table 4. Consumer Demographics (Education)**

| Income. | N | % |
|---|---|---|
| <12 570 | 33 | 11.7 |
| £12 571 to £20 185 | 32 | 11.3 |
| £20 186 to £27 295 | 46 | 16.3 |
| £27 296 to £50 270 | 120 | 42.4 |
| £50 271 to £100 000 | 40 | 14.1 |
| £100 000+ | 12 | 4.2 |

**Table 5. Consumer Demographics (Salary)**

### *Consumer attitudes towards Reusable Packaging Systems*

Whilst key factors to consider are dependent on the specific reuse model, results show Material Selection & Production (M=3.55, S.D=0.63), Consumer Retention (M=3.09, S.D=0.51), Usage Volume (M=2.98, S.D=0.96) and Product Features (M=2.97, S.D=0.54) require greater consideration during the design phase (see Figure 1). These overarching categories highlight the need to utilise recycled materials (M=3.59, S.D=0.90), and consider the packaging weight (M=3.13, S.D=0.96) and consumable weight (M=3.73, S.D=0.87). Consumers are also likely to consider container functionality, incorporating features (i.e pump dispensers) to limit usage may influence adoption (M=2.98, S.D=0.96). Interestingly, consumers were less likely to adopt containers for their individuality (M=2.06, S.D=0.85) highlighting the potential for standardize packaging design. However containers supplied should provide adequate product protection (M=3.95, S.D=0.71).

Designers should consider methods to engage a consumer. Currently, discounts fail to engage consumers (M=2.22, S.D=0.96) – however, including deposits where possible, may lead to increased consumer retention (M=3.58, S.D=1.08).

To explore how the overarching factors impacting the sustainability of reusable packaging systems can be influenced by consumer demographics (sex, age, education, salary), a series of statistical analysis is conducted.

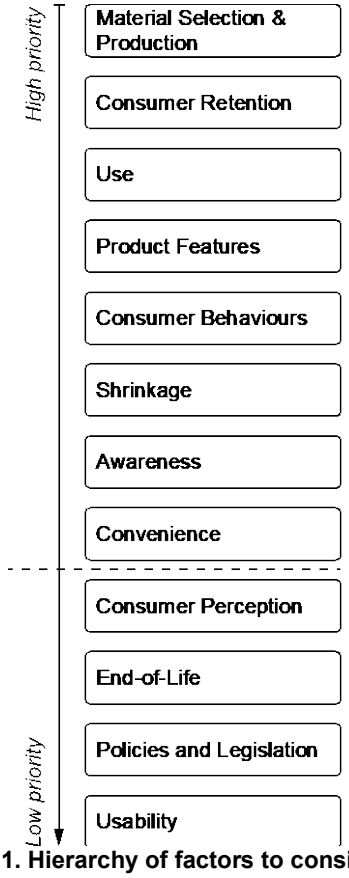


**Figure 1. Hierarchy of factors to consider when re-designing reusable packaging systems.**

## Conclusion

This abstract presents initial findings from a descriptive analysis. Within the oral presentation, relationships between consumer demographics (age, gender, education and salary) and consumer attitudes and behaviours are explored for UK participants. Findings show reusable packaging systems are influenced by consumer demographics, particularly for the factors: Shrinkage, End-of-Life, Awareness, and Product Features. Throughout this presentation, recommendations for designing reusable packaging systems for sustained consumer engagement are presented.

Whilst results from a G*Power analysis suggests an appropriate sample size was recruited for this work (n>270), limitations of this study should be acknowledged. Participants were recruited primarily from social media (i.e LinkedIn, Facebook, Instagram). Whilst selection bias may be present, this should be limited by targeting relevant groups. Targeting sustainability-focused groups increased the diversity of participants and the likelihood of lived-experience with reuse systems. This dataset presents insights for all age, salary, gender and education categories, however notable skew between males (n=68) and females (n=210) is present.

Notably, self-reported data can be influenced by recall bias and social desirability bias, potentially affecting the accuracy of responses. Further research should be conducted to determine the influence of consumer demographics on individual reuse archetypes.

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