

Implementing reusable packaging systems: lessons from industry

Charles G. Bradley^(a), Lucia Corsini^(b), Fabrizio Ceschin^(a)

a) Design for Sustainability Research Group, Brunel Design school, Brunel University of London, London, UK

b) Circular Economy and Sustainability Lab, Department of Engineering Science, University of Oxford, Oxford, UK

Keywords: Design, Reusable Packaging; User Experience; Circular Economy; Sustainability; Digital.

Introduction

Despite corporate pledges, reliance on single-use plastics continues to grow (Greenpeace, 2018). In 2023, plastic production reached 413.8mT (Plastics Europe, 2024), with a predicted 152.5mT attributed to plastic packaging (OECD, 2022). An estimated 50% of plastic packaging enters landfill each year, with a projected 1-2mT leaking into the environment (Ritchie et al., 2023). Ill-disposed plastics create a lasting impact on the environment and eco-systems. Despite this, plastic packaging production is expected to triple by 2060 (OECD, 2022). Whilst at-home and in-store initiatives are trailed to stimulate consumer recycling rates, stagnation leaves much to be desired. In the UK, 55% of plastic packaging is recycled per year (WRAP, 2023), and intention to engage in kerbside recycling has decreased by 7% (RECOUP, 2023). Exploring alternative avenues for waste management is necessary to curb plastic pollution and natural resource depletion further.

Reusable packaging systems are increasingly seen as potential strategies to relieve single-use reliance. Reuse is defined as “packaging which has been conceived, designed and marketed to carry out multiple trips in its lifetime by being refilled or reused for the same purpose in which it was conceived” (EU Directive 94/62). Within reuse, four archetypes are defined: (i) Refill-at-home, (ii) Refill-on-the-go, (iii) Return-from-home, (iv) Return-on-the-go (Ellen McArthur Foundation, 2019). Reuse systems are dependent on meeting pre-defined cycle rates to outweigh the benefits of single-use plastics (Greenwood et al., 2021). The continued usage of materials, with assets confined to a closed loop, ensures minimal energy consumption and carbon contribution along the reusable's life cycle.

Some businesses are already implementing (successful) reusable packaging systems, however there is limited understanding about their current challenges and best practices. This study aims to address this gap by presenting key learnings from industry partners, highlighting current barriers faced when implementing reuse systems, to streamline the design and implementation of future systems. Three research objectives are defined: (i) to understand the barriers and benefits of establishing reusable packaging systems, (ii) to understand the role and limitation of implementing technologies within reusable packaging systems, (iii) to consider the future of reuse.

This oral presentation presents the findings of 40 industry interviews. Design considerations for future reuse systems are outlined, with key barriers for establishing reusable packaging systems highlighted.

Methodology

To do this, 40 reuse providers and consultants were interviewed (semi-structured), with sessions ranging from 30 to 90 minutes. Each attendee provided primary insights into reusable products within FMCG (Fast-Moving-Consumer-Goods): 5 technology providers, 5 consultants/ facilitators, 5 refill-on-the-go, 3 refill-at-home, 19 return-on-the-go, and 3 return-from-home. Interviews are transcribed. Thematic coding (using the Bradley & Corsini's analytical framework) identifies common themes discussed. Participants range from founders, CEOs to technical specialists (see Table 2.)

Table 1. Respondents according to primary service provided.

Primary service	Number
Return-on-the-go	19
Return-from-home	3
Refill-at-home	3
Refill-on-the-go	5
Reuse Consultant	5
Technology Provider	5

Table 2. Participants role.

Role	Number
Founder / CEO	23
Senior Management*	7
Consultant / Specialists	5
Project Manager	3
Marketing & Sales	2

*Senior Management incl. Chief Technology Officers, Directors and Head of Departments.

Findings

Implementing reusable packaging systems requires a systemic shift from linear to circular practices. Industry interviews help to identify popular areas of interest/ concern amongst designers and providers. Table 3 quantifies the popular factors referenced. More mentions infer higher importance. Key factors include: (a) Convenience, (b) Consumer Behaviour, (c) Consumer Perception, (d) Material, Infrastructure and Operational Costs, (e) Customer Retention, and (f) Shrinkage. The emphasis on consumer related factors highlights the importance of designing consumer-centric reusable packaging systems. Some interesting insights include, but are not limited to:

- Funding opportunities are seemingly linked to perceived risk (i.e shrinkage, lack of consumer engagement and consumer retention).
- To reduce asset shrinkage (risk), and improve viability, providers introduce digital technologies within back-end processes. Some companies are expanding to consider how technology can streamline processes (convenience), engage the consumer and motivate repeat adoption.
- Investors (and single-use providers) await legislative reforms which favour circular practices prior to investing in circular systems. Without clear messaging from government, industries stick to the status quo.

- Industries look for guidance on how to implement effective systems, securing profitability and meeting predicted asset rotations.

Table 3. Mentions vs. Sustainability Factors (Bradley & Corsini, 2023).

	Overarching Factor	Freq.*
Env.	Material Selection & Production	20
	Use	2
	Sorting and Cleaning	3
	Transportation	11
	Shrinkage	34
	End-of-Life	21
Soc.	Convenience	36
	Usability	25
	Awareness	29
	Consumer Perception	35
	Consumer Behaviour	36
	Consumer Characteristics	33
Econ.	Policies and Legislation	32
	Material, Infrastructure and Operational Costs	35
	Labour	22
	Customer Retention	35
Tech.	Logistics	28
	Management	20
	Maintenance and Infrastructure	10
	Technology	10
	Product Features	15
	Standards and Protocols	11

*Number of participants referencing overarching factors.

Providing companies with the tools and information for establishing effective reuse systems prior to implementation can help to reduce financial risk. Ensuring transparency of information between stakeholders and easing the competitive nature within industries to stimulate collective action, will help to expedite reuse adoption within the wider community. Providing accessible, affordable, available and scalable solutions is necessary to stimulate future system growth.

Whilst the future of reusables is pure conjecture, some companies advocate for technologies inclusion, improving asset tracking, container circulation, consumer retention, and engagement. Utilising technologies to prompt or enhance consumer experience is proposed, with added-value necessary for continued adoption (i.e strategies such as gamification). Meanwhile, some see technology as a transitional tool, a temporary aide to evoke consumer behaviour change. Companies implementing technologies within

reuse systems should consider the role of the technology, as well as the benefits and barriers these technologies will present.

Conclusion

This oral presentation provides preliminary insights into industries learnings for establishing reusable packaging systems. This collates insights from founders, designers and facilitators of reusable packaging systems, with the aim to inform future providers of the challenges awaiting reuse systems. Whilst there is a greater emphasis on refill-on-the-go systems within the dataset, insights gathered form collective insights for reusable packaging systems - learnings may be applicable across all archetypes.

Identifying problematic areas prior to implementation ensures future systems are designed effectively, and expenditure can be optimised and risk reduced. To the authors knowledge this is the first paper to present industry learnings within academia. This oral presentation outlines some key design considerations to aid companies designing and implementing future reusable packaging systems. Future research should explore the potential for technologies inclusion in reuse systems, and how embedding technology can improve reuse sustainability.

Acknowledgments

This research has been funded by the EPSRC.

References

- C. G. Bradley & L. Corsini (2023). A literature review and analytical framework of the sustainability of reusable packaging. Retrieved December 03, 2024, from <https://doi.org/10.1016/j.spc.2023.02.009> [Journal article]
- Ellen McArthur Foundation (2019). Reuse-Rethinking Packaging. Retrieved December 03, 2024, from: <https://www.ellenmacarthurfoundation.org/reuse-rethinking-packaging> [Report]
- Greenpeace (Oct 22, 2018). A Crisis of Convenience: The Corporations Behind the Plastics Pollution Pandemic. Retrieved December 03, 2024, from https://issuu.com/greenpeaceinternational/docs/crisis_of_convenience_final [Report]
- H. Ritchie, Veronika Samborska and Max Roser (2023) - "Plastic Pollution" Published online at OurWorldinData.org. Retrieved December 03, 2024, from: <https://ourworldindata.org/plastic-pollution> [Online Resource]
- Plastics Europe. (November 5, 2024). Annual production of plastics worldwide from 1950 to 2023 (in million metric tons) [Graph]. In Statista. Retrieved December 03, 2024, from <https://www.statista.com/statistics/282732/global-production-of-plastics-since-1950/> [Online Resource]
- OECD. (May 5, 2022). Plastics use for packaging worldwide in 2019 with projections to 2060 (in million metric tons) [Graph]. In Statista. Retrieved December 03, 2024, from <https://www.statista.com/statistics/1342657/plastic-packaging-consumption-worldwide-outlook/> [Online Resource]
- S. C. Greenwood, S. Walker, H. M. Baird, R. Parsons, S. Mehl, T. L. Webb, A. T. Slark, A. J. Ryan and R. H. Rothman (2021). Many Happy Returns: Combining insights from the environmental and behavioural sciences to understand what is required to make reusable packaging mainstream. Retrieved December 03, 2024, from <https://doi.org/10.1016/j.spc.2021.03.022> [Journal Article]
- WRAP (2023). The UK Plastics Pact Annual Report 2022-2023. Retrieved December 03, 2024, from <https://www.wrap.ngo/sites/default/files/2023-11/the-uk-plastics-pact-annual-report-2022-2023-0.pdf> [Report]