

Scottish reusable coffee cups: A multi-intervention CBSM benchmark analysis

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Structured Abstract

Purpose: With litter from discarded single-use cups increasingly causing pollution we examine three intervention trials which encourage reusable cup usage to assess key success criteria and common barriers to successful implementation.

Design/methodology/approach: Using the Lynes et al. (2014) Community Based Social Marketing benchmark criteria we qualitatively contrast three interventions using messy, citizen science data. Additionally, we provide a critique of the benchmarks themselves developing a new set of benchmarks to assist small organisations doing community based social marketing.

Findings: Several benchmarks were obsolete and were unlikely ever to be met within the scope of these interventions. Important benchmarks needed to be highlighted further and additional benchmarks relating to key elements were added (product, engagement, stakeholders).

Originality: We focus on three interventions in open contexts and examine managerial/design aspects of these to contribute to the literature, while also critiquing and updating the benchmark criteria.

Practical implications: We provide practical suggestions to social marketers wishing to target single cup usage. The research highlights the need to carefully consider all benchmark criteria fully but to also look beyond these as implementation issues are often the cause of limited success in these campaigns.

Keywords: Reusable cups, Coffee cups, Intervention, Scotland, CBSM, Benchmark criteria

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Introduction and Background

Litter is a pervasive problem (Kaur and Singh, 2023; Keep Britain Tidy, 2023a) with single-use plastics and food packaging the most frequent littered items (Almroth *et al.*, 2023). Within this, plastic pollution is highly problematic, polluting every ecosystem (Almroth *et al.*, 2023) fuelled by increasing eating 'on the go' (Dorn & Stöckli, 2018) and the embedding of coffee culture (Ferreira *et al.*, 2021). Sustainability researchers have been slow to investigate plastic litter and have called for more work on 'real life' interventions (Davies *et al.*, 2020) while consumers/marketers have been slow to transition to more sustainable solutions (Phelan *et al.*, 2022).

Responding to this lack of research this paper analyses three Scottish reusable cup interventions designed to reduce single use cup usage. Theoretically we contribute using the Community Based Social Marketing framework and benchmark criteria proposed by Lynes *et al.*, (2014). Practically we provide practitioners with key take home messages about what to embrace/avoid in developing interventions. Finally, we contribute through a case methodology drawing on multiple sources of messy data for a process evaluation.

Literature Review

Product design and reusability

Due to the use of a poly-coated plastic lining in single use cups most cannot be recycled (Almroth *et al.*, 2023). 90% of their environmental impact is from their manufacture and single use, even when recycled most result in lower grade products (Hope Solutions, 2023) and when recycled incorrectly often cause contamination of recycling (de Bortoli *et al.*, 2022). Even 'compostable' single use cups can rarely be composted at home and instead need industrial composting, with facilities lacking in many areas (de Bortoli, *et al.*, 2022). While recognising the requirement for greater life cycle analysis to facilitate evidence (Paspaldzhiev *et al.*, 2018), science and policy increasingly favours reusable over disposable cups (Poortinga *et al.*, 2019). In some places, e.g. Victoria in Australia, Killarney in Ireland (Victoria Government, 2022; Carroll, 2023) single use cups have been banned. In other areas use of reusable rather than single use cups have been encouraged (e.g. Ditching Disposables (Portobello, Scotland)).

Some coffee chains do offer discounts for use of reusable cups; Costa UK offers 25p, Pret offers 50p off drinks when customers bring a reusable cup, and both chains offer collection points for any paper takeaway cup, while Starbucks offers a 25p discount adding a 5p additional charge per single use cup. Meanwhile universities such as Brighton, York, and Birmingham (MyCup, 2023; University of York, 2022; Duncan, 2021) have introduced campus reusable cup initiatives.

Reusable cup interventions and studies

Studies examining the uptake of reusable cups examine either hot (coffee, tea) or cold drink (beer, soft drinks – e.g. Šuškevičė and Kruopienė, 2021) reusables. The differences in

materials and practicalities of the two mean that the suggested and actual interventions differ and therefore the studies of hot drinks are relevant here. Within studies on hot drink reusables three streams arise. Firstly, studies focus on cup design but also on correct non-reusable cup recycling through the design of bins which collect liquids and solid waste for recycling separately (e.g. Lilley and Lofthouse, 2023). A second stream of research examines barriers and motivations to reusable use through interviews/surveys and focuses on behavioural intention rather than actual behaviour change (e.g. Keller et al, 2021; Wang et al, 2022; Bertossi et al, 2024; Herweyers, et al., 2024). The remaining studies test interventions examining actual behaviour change. For example, Shappard et al. (2025) implemented a probabilistic reward (5% chance to win a \$5 gift card) for using reusable cups on a university campus, Sandhu et al. (2021) piloted an intervention across local cafes and Poortinga and Whitaker (2018) tested the influence of environmental messaging across 12 university and business sites.

One key issue within the literature is that most studies focus on the consumer, their potential barriers and motivators, often forgetting to consider the design of interventions, or the potential problems that might arise. One exception is Sandhu et al. (2021) who, while concentrating on consumer behaviour, do note institutional changes that may be needed to support behaviour change. A second differentiating factor is the relative openness of the intervention context with those in more closed contexts such as Novoradovskaya et al., (2020) being more successful suggesting a need to examine interventions in more open contexts. Most studies take a largely atheoretical approach focusing on practical implications although stages of change, the theory of planned behaviour and prospect theory have had influences.

While the few recent studies provide helpful preliminary observations, the results may not be transferable to other, more open, contexts (where there may be significant environmental differences (Allison et al, 2021)), and we know little about the intervention design and implementation challenges that exist. UNEP (2021, p.2) concluded: *“that policy solutions will need to be context specific and locally relevant and take into consideration the role of human behaviour.”*

Therefore, to understand how to effectively implement reusable cup behaviour change we examine interventions in open contexts and focus on the management role of design and implementation in the success of these.

Social marketing and benchmarks

Interventions in this area can be broadly categorised as social marketing as they use marketing techniques to change behaviour. Principally Community Based Social Marketing (CBSM) is a pragmatic social marketing approach that avoids information-intense media advertising (McKenzie-Mohr, 2000) and fits well with these types of practitioner interventions having previously been used successfully in sustainable behaviour interventions (e.g. Fries et al., 2020, Haldeman and Turner, 2009). CBSM encompasses 5 steps: (1) Selecting behaviours (which behaviours will bring about the desired change); (2) Identifying barriers (which inhibit change); (3) Program design (to overcome barriers) (4) Piloting and (5) Evaluation (McKenzie-Mohr, 2000).

Measurement of social marketing campaign success often relies on outcome measurement, i.e. how much behaviour has changed, and this is no different for reusable cup interventions, but some work has also sought to examine the process of cup intervention development (Carrigan et al., 2023). Benchmarks are a popular method assessing how systematically an intervention was designed, prepared, implemented and overall effective, not just relying on outcomes and is a popular social marketing approach (Gracia et al., 2011; Wettstein and Suggs, 2016). Lynes et al. (2014) developed a set of 21 benchmarks based on the CBSM which we use here to analyse three interventions and more deeply understand the process of intervention design.

However, the use of benchmark criteria is criticised for its assumption of a one size fits all approach, that it does not differentiate between criterion levels of importance, can be a narrow micro-managerial lens and a reductionist approach (Fry et al., 2017). While some benchmark approaches are considered to need engagement with a wider range of ecosystem actors, CBSM already defines this as a clear purpose, again supporting its use here and balancing one criticism of benchmark use.

Overall, the CBSM framework and related benchmarks give us a clear structure to analyse intervention design and implementation as well as critiquing the relevance of each benchmark in these types of interventions. Lynes et al. (2014) also note the need for their benchmarks to be assessed in other CBSM programmes which we do here.

Methodology

Our research employed a citizen science approach, collecting 'messy' data—fragmented sources from multiple stakeholders to illustrate complex processes (Dobson et al., 2020; Rambonnet et al., 2019). Data was often gathered on personal mobile devices, allowing for "creative and socially innovative formats" (Tauginienė et al., 2020, p.4) and positioning citizens as researchers.

While common in conservation, this 'messy' data approach is less frequent in the social sciences, despite calls for a "trans-disciplinary embrace of messiness to accelerate..... [research] progress" (Salk, 2020, p 413). This method is valued for its potential to deliver positive community outcomes, democratize science, and advance societal responsibility (Gratton et al, 2020; Tauginienė et al., 2020). Collaborating with practitioners, we focused on the meaningfulness of research for wider society and improving the benchmark criteria through this partnership (Di Bendetto, Lindgreen, Storgaard and Clarke, 2019).

Messy data is sometimes the only data available, offering low cost, easy access, high volume, and real-world relevance. It allowed us to capture multiple perspectives, including community voice and stakeholder involvement, unlike traditional structured methods (Follett and Strezov, 2015). A known drawback is the challenging nature of mitigating inherent biases (Follett and Strezov, 2015). To address this, we triangulated data and verified each point with a member of the involved organizations.

Within the data collection multiple sources of data were collated and examined across three qualitative case studies/interventions (see Table 1). This data included field notes (including

photos) of meetings and visits, presentations at community events, campaign materials (both on and offline), e-mails between stakeholders and to/from researchers, final external facing reports, video reports, social media posts, beach litter surveys, data collection by practitioners (mostly questionnaires) etc (See Table 1). To supplement this data, as each intervention was led by a single organisation, they committed at least one participant to contribute an interview. For the Oban & Helensburgh Cup Trials two Project Officers were interviewed (one from each location), for the Highland Cup Movement the Campaigns and Interventions Officer was interviewed, and for the Ditching Disposables scheme the partner responsible for Circular Economy was interviewed. They provided detail about their perspectives on the interventions and were able to share relevant data sources which were added to those already collated. The interviews were semi-structured (via Teams or in person for the Oban Project Officer), allowing flexibility and elaboration, around the interviewee's role and the intervention process and outcomes. All interviews lasted approximately 60 minutes and covered the initial impetus for the intervention, how it was planned and rolled out and reflections on the intervention once completed. University ethical approval committee approval was granted prior to interviews taking place.

Note that cases did not necessarily refer to themselves as social marketing/CBSM but were clearly behavioural interventions which included specific communities and therefore met the criteria for a social marketing assessment.

Initially the research team worked with the GRAB Trust only, collecting data throughout the Oban project and following the intervention from beginning to end. The team then continued this work on the Helensburgh intervention also following the intervention from beginning to end. It was only in the later stages of the Helensburgh Cup Trial that the team became aware of the two other case studies and initiated following those interventions. The team were able to follow these interventions to their end. Formal interviews were completed towards the end of each intervention, so practitioners were able to reflect fully on the process and outcomes of the interventions. In total the data collection across all three cases took place over approximately 2.5 years.

Table 1 contains information about each case/intervention, and a summary of our data for each case. The trials represented three different geographical locations, one city region, two rural towns (one with a fluctuating tourism population) and a tourist route (for cycling, driving) between a range of different conurbations (large and small).

The data from various sources was collated and triangulated and extensively discussed between the two academic authors, referring to the practitioner authors when necessary to clarify points or to gain further explanations and data. An etic side to our analysis came from the 21 benchmark criteria (Fries et al, 2020) but we were also open to emic responses and any other patterns or issues that arose (Reinecke et al. 2016). As each of the interventions was a time limited trial they are treated as pilot studies so it is appropriate to analyse them using Step 4, but as there was no broadscale implementation the Step 5 analysis will only focus on evaluation.

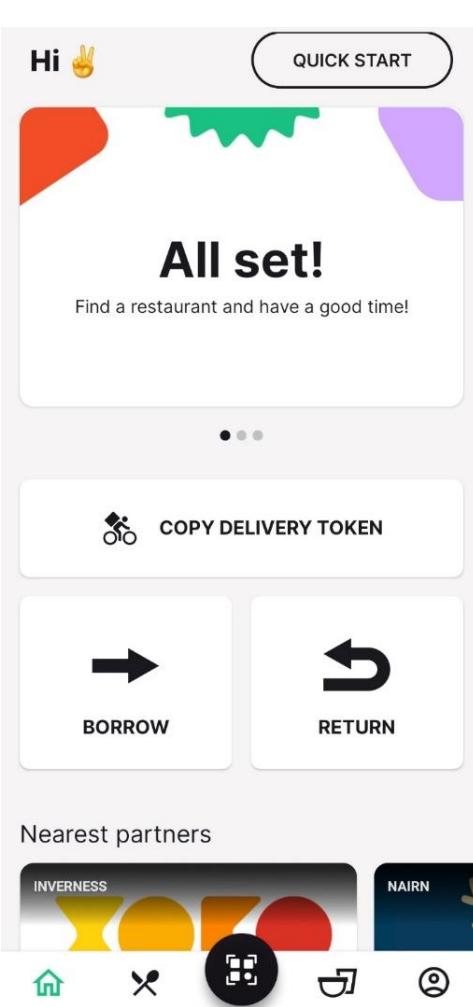
Table 1: Case Study and Intervention Details

	The GRAB Trust: Oban & Helensburgh Cup Trials	Keep Scotland Beautiful (KSB): Highland Cup Movement®	Zero Waste Scotland: Ditching Disposables (café scheme)
Design, Management and Implementation	<p>The design stage started with a call on Facebook for litter information to determine which litter would be targeted in the intervention. The target of coffee cups was decided by the GRAB team (4 people) who decided to recruit local takeaway food businesses, to help promote the intervention. The intervention then focused on posters, and in store materials (tagline "Have you got your cup?") alongside a scavenger hunt to encourage consumers to use reusable cups (and buy discounted reusables from participating takeaways). The intervention was first run in Oban, followed by Helensburgh where the same posters/in store materials were adapted and reused. The implementation and day to day operation was managed by the Beaches and Marine Litter Project (BMLP) Education Officers in Oban and in Helensburgh. The BMLP officers kept in touch with the businesses and visited them regularly during the trial.</p>	<p>The campaign was motivated by the Scottish Litter Survey and built on the Glasgow Cup Movement. An app-based cup-loan model was chosen (with Vytal) where consumers downloaded the Vytal app and a QR code on the lid was scanned to borrow the cup with no upfront cup cost. After the target behaviour (cup reuse) was decided upon, businesses were engaged through social media and direct approaches from the team. Businesses were visited at least twice during the trial. Posters and point of loan materials were used in each participating business to encourage consumers to download the app and borrow a cup. The trial was promoted on KSB and NC500 social media and website, through an influencer partnership, digital audio advertising and promotional signage at highland train stations and on social media.</p> <p>Implementation was managed by KSB and day to day operation was managed by participating businesses. Further information can be found at: keepscotlandbeautiful.org/cup-movement/choose-to-reuse/highland-cup-movement/</p>	<p>The Ditching Disposables café scheme built on a Ditching Disposables project in Portobello, Edinburgh which had focused on reusable cups and was motivated by the Scottish Environmental Protection (Single-Use Plastic products) act in 2022. It was also motivated by a rise in on-the-go consumption.</p> <p>The intervention was promoted in participating cafés through posters, window stickers and strut cards, with all being encouraged to share via their social media channels. Customer instructions were also included, with the locations of participating cafes published on the Transition Stirling website.</p> <p>The implementation and day to day operation was managed by Transition Stirling, this included the collection and redistribution of the cups via an e-cargo bike which was hired for the duration of the trial.</p>
Desired behaviour and cup	<p>Bring your own cup or buy a discounted (£4.00 per cup to consumers (discounted from RRP. £11.95)) Ecoffee® reusable cup (no logo) and reuse this each time you visit:</p>	<p>Borrow and Return 'Vytal' logo Reusable Cup (Partners with reusable cup supplier Vytal). Using App and QR code. Alternatively bring own reusable cup. Free but £4 if cup is not returned within 14 days.</p> 	<p>Deposit (refundable £1) and Return of 'Use me again and again' & 'Please don't ditch me' logo Reusable Cups (made from polypropylene - designed to withstand repeated use and cleaning in industrial dishwashers)</p>

			
Number of participating businesses	Oban: 5 Helensburgh: 8	22	18 cafes and 2 shops
Deposit return options	N/A	Any of 22 participating businesses on the NC500 route (25 initially agreed to take part). Could borrow from one location and return at another (majority were checked out/returned to the same business).	Any participating members of the scheme. Later, a bin was located at Stirling Castle for cup collection.
Visuals and Campaign Materials	<p>Call for litter observations:</p>  <p>Call for takeaway food businesses to take part:</p>	<p>Vytal App interface:</p>	<p>Café poster:</p>



Poster and instore materials example:



Have you got your cup?

Oban Reusable Cup Trial

An exciting scientific research project.

Participating businesses:

- Hinba Coffee Roasters
- Oban Chocolate Company
- Taste of Argyll Kitchen
- Go Naked Veg
- Dougie Dan's

With
scavenger
hunt!



Save money
Save the planet



The GRAB Trust
GROUP FOR RECYCLING IN ARGYLL & BUTE

www.grab.org.uk



www.oban.org.uk

Poster/point of loan advertising examples:



Café window sticker:



Scavenger hunt information:



Flyer Example:

Posters/other advertisements:



Café poster:



Have you got your cup?

Oban Reusable Cup Trial

An exciting scientific research trial is running in Oban from July to September 2022. The aim is to stop single-use coffee cup waste and investigate the barriers to switching to fully reusable cups.

Please bring and use your reusable cup in Oban. You can buy an Ecoffee reusable cup from participating businesses:

- Oban Chocolate Company
- Hinba Coffee Roasters
- Taste of Argyll Kitchen
- Go Naked Veg
- Dougie Dan's

With scavenger hunt!  



Get ready!

Join the mission to reduce single-use takeaway cups.

Use your own reusable cup or download the Vytal app to borrow, enjoy, return and repeat.

Download the Vytal app before you go 



Making it easier to choose a returnable reusable cup for your takeaway drink. www.keeplandbeautiful.org/highland-cup-movement

 **Keep Scotland Beautiful**
Your charity for Scotland's environment

Customer instructions:

How does it work?



- Our new reusable cups create no waste
- Just leave a deposit
- Enjoy your drink
- And return the cup to get your deposit back

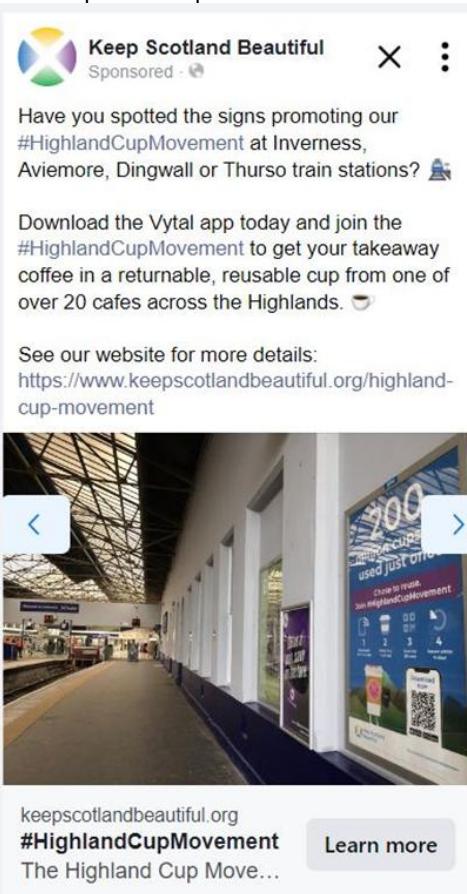
Café strut card:



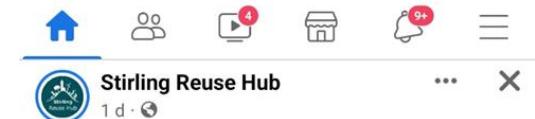
Social media post example:



Social media post example:



Social media example:



Exciting update! 🌟

Drop off containers for reusable cups have been set up at Stirling Castle to make it more convenient for tourists to participate in the scheme. Whilst deposits cannot be refunded at the drop off points, the deposits will be reinvested in the Ditching Disposables scheme to support its long-term sustainability

#ditchingdisposables #ReuseRevolution
#RevolveReuse #VisitStirling #VisitScotland
#SecondhandFirst #StirlingScotland
#SustainableLiving #SustainableShopping
#SecondHandScotland



Cup display in café:



Railway station advertising example:



	<p>Poster and cups display in café:</p> 		
Outcomes	<p>Oban: 196 reusable cups sold; reusable cups increased to 2% of all cups sold.</p> <p>Helensburgh: reusable cups averaged 5.3% of sales during trial.</p>	<p>1051 Vytal cups checked out, 269 app users, 148 repeat app users, 92% cup return rate and 27% increase in customers using their own reusable cup. 60% of businesses reported selling more takeaway drinks in reusable cups.</p>	<p>3,987 cups and lids saved in the café scheme. 1761 cups taken, 888 cups returned, 1186 cups refilled.</p>
Funding/In-kind Support	<p>Highlands and Islands Climate Change Community Grant funded by UKRI; delivered by the British Science Association (BSA) and Science Ceilidh</p> <p>2500 donated Ecoffee© cups</p>	<p>Part of £1.4 million <i>Bring it Back Fund</i>, funded by Hubbub and Starbucks.</p>	<p>Delivered by Transition Stirling, managed by Green Gain; funded by Zero Waste Scotland.</p> <p>Cups supplied by ZWS</p>
Participant retailers willing to wash customer cups	Yes	Yes: businesses were required to have a dishwasher available.	Yes; Once used, the cups and lids are cleaned by the café in an industrial dishwasher to 50°C
Geographical coverage	Argyll & Bute: Oban (coastal town) with a population of 8,500 (can increase to 24,000 during tourist season); Helensburgh (coastal town) population 15,340.	The NC500 (North Coast 500) route which is 516 miles and runs through Inverness-shire, Ross and Cromarty, Sutherland and Caithness.	Stirling council area (#93,000). Stirling City (41,000).

Length of Trial	June-September 2022 (Oban), April-June 2023 (Helensburgh)	April-October 2023	April-October 2023
Data Sources used to develop case study	Interviews: Project Officer (Oban); Project Officer (Helensburgh) Field Notes Rubbish Summit Presentation Campaign materials (Flyers/Posters)	Interview: Campaigns and Interventions Officer (Cup Movement) Final Impact Report – January 2024 Various E-mails about the campaign Rubbish Summit Slides Online Resources	Interview: Partner (Circular Economy) Discussion with Communications Consultant Rubbish Summit Presentation Video report Pilot trial report (Ogden, 2023)

As the analysis took place and results were written up for publication each stage was shared with the practitioners who made corrections, clarified any misunderstandings and added further information. This continued through the publications revise and resubmit process to ensure that practitioner insight was reflected through the process (including being co-authors on the outputs). Management and marketing research has often been criticised for producing “naïve, unrealistic, completely speculative” (p,1555) implications and hence through practitioner collaboration we sought to increase the relevance of our research and speak to issues that stakeholders care about (Houston, 2024).

Results

Table 2 provides detail about intervention adherence to the benchmark criteria (numbered in brackets below) with shading variants to show full integration of the benchmark (darkest), through partial integration to not considered (lightest).

Step 1: Selecting Behaviours

All three interventions acknowledged target audiences (1.1) but did not identify them specifically, or segment them as much as they could meaning for all three interventions this benchmark was only partially integrated (as they did this indistinctly rather than ‘clearly’). Similarly in selecting behaviours (1.2), behaviours, at different levels of specificity were identified, but again these were sometimes inexact, and none considered whether they were non-divisible or end state, meaning this was partially integrated. Seemingly unconsciously, or simply because time/energy did not allow, all three interventions integrated limited numbers of behaviours meeting the benchmark (1.4). None of the interventions evaluated between behaviours specifically, although two did evaluate cup models (although external influences affected their ability to choose). However, deeper integration through examining potential impact penetration and probability was not achieved.

Step 2: Identifying Barriers and Benefits

Only one intervention fully integrated benchmark 2.1 (the Highland Cup Movement) doing extensive formative research. The benchmark was partially integrated for the other interventions where less specific research took place. Importantly the integration of this benchmark was advantageous for the Highland Cup Movement allowing them to understand potential issues regarding the app, business capability and cup design/hygiene which they could work into the design of the intervention (Step 3). In comparison due to only partial integration for Ditching Disposables, issues came to light and had to be dealt with later that potentially could have been identified through earlier formative research. Only GRAB partially integrated benchmark 2.2 and none of the interventions explicitly used internal/external analysis.

Step 3: Developing Strategies

All three interventions, to different extents, designed strategies that had elements based on their formative research but as the levels/types of formative research were different, especially in meeting the benchmark of studying barriers and benefits, this had a knock on to the integration of the first benchmark (3.1). Only one of the three fully integrated this benchmark. Essentially if 2.1 had not been fully integrated 3.1 could not be suggesting interdependency

between the benchmarks. In terms of commitment tools (3.2) two interventions partially integrated these by technical or engagement approaches. All three interventions used prompts (3.3) in the form of point of purchase communications and social media integrating this benchmark but the success of these were disrupted by unengaged stakeholders with one interviewee stating "*They[staff] just either...chuck them or they just lost them... it's like one more thing for them to wipe the table round and that's just no, don't have time, don't have any interest in that anyway.*" Only one intervention, the Highland Cup Movement engaged with a well-known person (3.4) (a travel influencer) and norms (3.5), the next benchmark were not explicitly used across any of the interventions. As with prompts, communication tools (3.6) were developed more widely, although the finer details of this benchmark (tailored, credible, framing etc) were not explicitly noted meaning only partial integration of this benchmark. For benchmark 3.7 all trials utilised only financial incentives (discounted cup, discounted drinks) and disincentives (deposits, charge for non-return) and therefore as non-financial incentives were not used this could be considered only partially integrated. In terms of convenience (3.8) all three interventions tackled key barriers of locating cafes (through app, map or online), washing and return albeit in different ways and at different stages (for example, Ditching Disposables added an extra collection point during the intervention) integrating this benchmark.

Step 4: Conducting a pilot

The baseline benchmark (4.1) was only partially integrated by one intervention but was related to respondents who had heard about the schemes rather than actual behaviour change. None of the interventions integrated, even partially, the benchmarks relating to control groups (4.2, 4.3). All three interventions tried to evaluate strategy effectiveness (4.4) but only one did this through unobtrusive measurement (via the app) and fully integrated this benchmark. Others relied on manual self-reported data collection by staff, who, as noted, were not fully engaged and hence this was only partially integrated. One interviewee stated for the manual data collections that "*I feel like I don't think it can be accurate. I don't think it is*" highlighting the importance of not relying on self-reported data. The final benchmark in this step (4.5) was not integrated as none of the interventions were focused on broad scale interventions.

Step 5: Evaluation and Broad-Scale Implementation

In terms of measurement (5.1) all three measured activities at several points in time, integrating the benchmark, although as noted, some had limited pre-trial data collection and each collected data in different ways meaning that some self-report data may have been unreliable. Finally, all three trials responded to mid-intervention feedback to refine strategies (restocking, moving cups, additional collection points) and all three provided feedback to the community via reports or workshops integrating this benchmark (5.2).

The Highland Cup Movement integrated more of the 21 benchmarks (10 fully/8 partially) compared to GRAB (5 fully/10 partially) and Ditching Disposables (5 fully/7 partially). However, this can't be used to determine whether one of the trials was more successful or not as they recorded outcomes in different ways (sold, percentage of use, returned, company reports – see Table 1) making it impossible to compare success. The only measure of success might be that four of the Highland Cup Movement businesses continued offering the reusable cup service. However, this does suggest what specific improvements in process could be encouraged and highlights questions of the relevance of the benchmark criteria in these types of interventions as we will discuss below.

Table 2: Summary of benchmark criteria attainment for each trial

CBSM Step	Benchmark Criteria	GRAB	Highland Cup Movement	Ditching Disposables
Step 1: Selecting behaviours	1.1 Clearly identifies target audience	People living in remote/rural locations in and around Oban and Helensburgh. Tourists and locals. Do not appear to be clearly delineated.	Those using/living along the NC500 route (residents and visitors). Do not appear to be clearly delineated.	Workplaces and cafés in and around Stirling. But open to any type of business (café, university, theatre). Locals and tourists. Do not appear to be clearly delineated.
	1.2 Selects behaviours that are both non-divisible and end state	Encourage take-away businesses to ditch single-use plastics. Encourage tourists/locals to use reusables.	“Make reusable cups a mainstream choice.” “promote the use of reusable cups and reduce the number of takeaway drinks sold in single-use cups.”	Ditch disposable cups Encourage refills.
	1.3 Evaluates list of selected behaviour for potential impact, penetration, and probability	Reusable cup models evaluated.	Does not provide a list which have been evaluated. But does evaluate different cup models.	
	1.4 Limits number of behaviours to target in any given CSBM campaign (not more than 5/6)	Swap single-use for reusable cups. ‘Carry your cup’	Use a loan cup and refill, rather than using single use.	Swap single-use for reusable cups
Step 2: Identifying barriers and benefits	2.1 Conducts research on barriers and benefits for each of the potential segments in the target group.	Evidence collected pre-trial on Facebook; discussions with community, businesses and waste management about scale of litter problem. Reducing single-use cups identified as main benefit. Barriers/challenges identified (business capacity/cup design, easy cup return hygiene). Hygiene and customer concerns, convenience seen as key disincentive.	“We engaged with businesses and customers to understand the potential challenges and barriers of a reuse scheme.” Businesses who expressed an interest were provided with a readiness assessment. Acknowledged that there are practical challenges with data collection, robustness and consistency. A research phase (incorporating a webinar, surveys and workshops) identified key needs, challenges and opportunities. Barriers/challenges identified (business capacity/space, internet connectivity, cup design, easy cup return, hygiene). Hygiene worry was seen as a key disincentive to reuse. Internet connectivity needed to download the Vytal App but not to check cups in/out. Three surveys conducted prior to the trial to assess barriers and incentives (December	Whatsapp group between businesses to assess needs, challenges, barriers and capacity. Stock of cups managed using e-bike. Tourists and Students going away from city centre and not being able to return cups there- not identified until during the intervention had started. Cup design and type considered carefully including materials, number of times it would need to be used to be carbon neutral), recyclability etc.

			<p>2022, January/February 2023 and September 2023)- pre and post intervention. Consistent findings across surveys.</p> <p>ScotPulse survey (784 Highland residents) – 27% said remembering to bring their cup would be their main barrier.</p> <p>Main incentive/Benefits for consumers is a discount on reusable cups.</p> <p>Similar barriers and incentives between visitors and residents.</p> <p>Businesses agreed that the incentive of discount would be useful.</p> <p>Campaigns officer: <i>“pretty much all of them when they were put a question, what do you think is the biggest barrier for customers? It was downloading an app.”</i></p>	
	2.2 Identifies and distinguishes between barriers and benefits that are internal versus those which are external to the target segments.	Barriers identified (for both businesses and consumers). Identifies cost savings (business and consumers); up-front costs of cup mitigated; environment benefits identified internally and externally.	Barriers/benefits identified (for both businesses and consumers) but separate internal/external not identified.	
Step Developing strategy	3: a	3.1 Creates strategies that are appropriate for the barriers of the behaviour(s) being promoted and reduce the benefits of the behaviour(s) being discouraged.	<p>No cost if use own cup; discounted cup for sale.</p> <p>Businesses provided with service script to explain reusable benefits.</p>	<p>After soft launch additional videos and leaflets (FAQs) were developed.</p> <p>Chose cup return scheme based on identified barriers/challenges. Campaigns officer: “if he’s forgotten his cup, that’s fine. He can get a new one, and as long as he takes them all back within two weeks, it’s fine.”</p> <p>No upfront cost/deposit for consumers.</p> <p>Use of the Vytal cup – QR code on lid allowed consumers to check out while coffee being made in generic cup (speeded up service/less onerous for staff).</p> <p>Did not need to remember/or have cup- could pick up at the point of purchase (overcoming ScotPulse survey identified barriers).</p> <p>The need to download an app was a reported barrier - but the intervention was still chosen which required this, based on the balance of the data collected through the app.</p>

			Received feedback that once downloaded, the app was easy and convenient to use. Main disincentive was hygiene- businesses were required to have a dishwasher (but was this communicated to consumers?). Some businesses added a surcharge on single use cups or a discount for reusable cups. May promotion – first drink free on activation of the app.	Put a bin at Stirling Castle to allow collection of cups from tourists (but did not work well due to timing and other rubbish contaminating it).
3.2 Develops commitment tools, that: Emphasize written over verbal; seek commitments in groups; actively involve the individual; avoid coercion; help people to view themselves as environmentally concerned; are public and durable.	Scavenger hunt activity/competition taking participants around all the participating businesses in town. Completed by very few consumers.	#BrewWithAView - problems with seeing social media posts using the hashtag due to privacy settings.		
3.3 Developed prompts that are; noticeable; self-explanatory; presented in slow proximity to where the action is taken; and encourage positive behaviours rather than discouraging negative behaviours.	Signage and leaflets. Flyers for tables- but not available equally across outlets.	Social media, signage, stickers and leaflets.	Social media; posters; strut cards for tables; leaflets; posters at bins;– but still found problems with understanding.	
3.4 Engages well-known and well-respected people to be part of the campaign.		Partnership with Travel Influencer Chris Lawlor (319,754 views) – posted in July. Approached Highland MPs to be involved.		
3.5 Encourages the use of norms that are visible and reinforced through personal contact.				
3.6 Develops communication tools that are: captivating;	Promotion on social media (Facebook); local newspaper articles.	Promotion on social media (various channels), digital advertising, train station advertising, leaflets.	Posters; Social media; launch event (press invited but did not come)	

	<p>tailored to the target audience; uses credible sources; appropriately frames the message; and makes messages easy to remember.</p>	<p>Businesses approached directly, received sales script; cups; posters; leaflets in businesses and tourist accommodation.</p> <p>Launch event (press invited but event ended early due to adverse weather).</p>	<p>Businesses approached directly. Businesses received training, cups and marketing collateral (signage and stickers) – response to surveys which suggest good signage is needed.</p> <p>Featured in BBC news.</p> <p>#Brewwithaview hashtag social media campaign.</p> <p>NC500 newsletter.</p>	
	<p>3.7 Establishes incentives/disincentives that: reward positive behaviour; are closely paired with behaviour; and are visible.</p>	<p>Discounted cup price (£4 instead of £11.95).</p> <p>Businesses could keep profits from reusable sales.</p> <p>Some businesses offered % off, others a fixed discount off the price of drinks served in reusables.</p> <p>One business offered reward scheme for refills (free drink after 4 uses of reusable cup)</p>	<p>Disincentive- if did not return (£4 charge if not returned to a participating business in 14 days).</p> <p>Discount/surcharge employed by some businesses.</p>	£1 deposit refunded on cup return.
	<p>3.8 Initiates convenience strategies that attempt to address external barriers.</p>	<p>Provision of cup washing.</p> <p>Map with location of cafés included.</p>	<p>App allowed people to easily locate participating businesses (if they had internet connectivity); cup return to any participating business.</p>	Provision of cup washing; cup return to any participating business.
Step 4: Conducting a pilot	<p>4.1 Develops a pilot that can be compared with baseline measurements.</p>		<p>“From a baseline of zero more than 30% of respondents had heard of, or seen promotion, for the scheme.”</p>	
	<p>4.2 Utilizes a control group.</p>			
	<p>4.3 Whenever possible, participants are randomly selected and then randomly assigned to strategy or control groups.</p>			
	<p>4.4 Whenever possible evaluates strategy effectiveness through unobtrusive measurement of behaviour change rather than through self-report.</p>	<p>Data collected via tally charts; pre-and post-trial questionnaires.</p>	<p>Data collected via app.</p> <p>Promotional reach – influencers, NC500 socials and website, DAX radio advertising promotional signage in train stations. Keep Scotland Beautiful socials and website, leaflet distribution.</p> <p>Campaigns officer: “I think that access to data was the key and why we went with the</p>	Manual data collection at point of sale (tally sheets etc).

			app scheme it provided that data. We weren't relying on the businesses giving them something else to do to, to keep track of the numbers and having to get the information from them."	
	4.5 Focuses only on strategies that can be implemented at a broad scale.			
Step Evaluation	5: 5.1 Measures activity prior to implementation and at several points afterwards.	No pre-trial measurement: monthly collection of sales figures through tally charts but acknowledges practical challenges with data collection, robustness and consistency.	Soft launch allowed testing of technology and infrastructure. Acknowledges that there are practical challenges with data collection, robustness and consistency. App-based model allowed for automatic collection of cup usage and return data (businesses therefore not required to do this and freed up project management time). Developed a FAQ leaflet to aid consumers and businesses after initial feedback (related to app downloading etc) -suggestion to download in advance.	Data collection limited; acknowledges that there are practical challenges with data collection, robustness and consistency. Some cup losses.
	5.2 Utilizes evaluation data to use to retool strategy and/provide feedback to community.	Data evaluated and presented to local community at workshop (The Rubbish Summit). Acknowledges that there are practical challenges with data collection, robustness and consistency.	Acknowledges that there are practical challenges with data collection, robustness and consistency. Did consider changing the text on the cup (as some people reported it as off putting) but were unable to do this in the timescale.	Learning on route such as tourist and student specific behaviours were acted on where possible (e.g. addition of bin at Stirling Castle) but not always successful. National workshop held to share learning. Acknowledges that there are practical challenges with data collection, robustness and consistency. Transition Stirling unlikely to continue as not commercially viable.

Discussion

Our study sought, using the CBSM framework and related benchmarks, to assess integration across three reusable coffee cup interventions, with the aim to test the usefulness of the benchmarks in identifying and analysing cases and to provide practical suggestions to practitioners to improve practice. A main contribution of our work was to assess integration not just as integrated or not, but also to acknowledge where and why integration and implementation of benchmarks fail. Additionally, we contribute by providing an updated set of benchmark criteria (see below), focused on real world application and discussing the different levels of integration and providing a path for practitioners to integrate benchmarks fully while being aware of constraints and barriers to this. We especially focused on three cases that were open in scope (not in closed conditions) and focused on the managerial and design aspects to contribute to the literature on reusable cup interventions. Additionally, we sought to examine the potential for messy citizen science data in a benchmark study adding a methodological contribution to benchmark focused work in social marketing.

As noted, based on these comments and reflections we expand on below (and other more minor issues dealt with in the table) we propose an updated adapted set of benchmark criteria which we feel is more appropriate for smaller practitioner led interventions and in cutting down the number of criteria provides a more realistic and useable set of criteria for practitioners (see Table 3). Research shows that social marketers often have low levels of skill and training in social marketing techniques (Robinson et al, 2019) which may be even more the case for small organisations or those that do not even consider themselves social marketers. Hence providing simple, streamlined guidance is likely to be taken on board more easily and be more likely to make a difference. In doing so we additionally highlight which of the criteria are most important, while also providing guidance regarding what integration/partial integration looks like.

Benchmark criteria have been criticised for trying to be 'one size fits all' (Fry et al., 2017) and this was certainly the case here with several benchmarks not even meeting the basic level of integration. Several benchmarks were arguably too specific for these types of small local organizations to integrate, with limited time, expertise and resources (e.g. control groups, norms and engaging well-respected people) and therefore whether these are useful to retain, in a practitioner led environment, is questionable, and have been removed in our updated benchmarks. While CBSM is thought to overcome one of the criticisms of benchmarks by engaging with ecosystems, this did not come through enough in the benchmarks. Data shows that stakeholder engagement, or lack of successful integration, had significant effects on the roll out and success of pilots (front line staff uncommitted, lack of use of provided 'script', staff turnover etc). To overcome this, we have added two benchmarks, mapping of stakeholders (1.3) and engaging people in the slightly retitled Step 3: Developing a Strategy (3.6) to acknowledge their key importance.

Table 3: Updated benchmark criteria

CBSM Step	Benchmark Criteria	Fully Integrated	Partially Integrated	Notes/Justification
Step 1: Selecting behaviours	1.1 Identifies and describes target audience(s)	Full identifies and describes (using demographics, geodemographics, psychographics etc) all target audience(s). Differentiates between target audiences.	Target audience(s) are acknowledged/noted but detail is not considered. Little differentiation between target audiences.	Original benchmark criteria assumed one target audience- this acknowledges there may be more than one. Goes beyond identification to description. Acknowledges that a better understood target should lead to better outcomes.
	1.2 Specific behaviours (no more than 5/6) are selected (for each target audience).	Identified specific behaviours for each target audience and examine these in terms of their potential impact and measurability. Evaluates alternative behaviours.	Identifies specific behaviours for each target audience but does not examine them more deeply. Does not evaluate alternative behaviours.	Brings together benchmarks 1.2 and 1.4 for simplicity. Makes language more practitioner friendly. Also integrates 1.3 acknowledging that for most practitioners the behaviour may have been set by funding criteria and there may not be scope to determine alternatives. Instead detailed as how integrated the criteria is.
	1.3 Stakeholders are mapped and their roles and influences understood.	Stakeholders are carefully and mapped in detail including their influences and roles.	Stakeholders are partially/poorly mapped including their influences and roles.	Stakeholder engagement is a key issue in intervention success and an understanding of them should be integrated early in the process.
Step 2: Formative Research	2.1 Conducts formative research on each target audience and stakeholder (links to 1.1 and 1.3)	Formal formative research on all target audiences(s) and stakeholders and barriers and benefits is completed.	Limited formal, or informal research on some or all target audiences and stakeholders.	Acknowledges that formative research needs to go beyond just barriers and benefits. Integrates 2.2 so language is simpler for practitioners. Links to understanding the target audience (1.1 made).
	2.2 Collects baseline data on the target behaviour(s)	Collects specific baseline information on the target behaviour using unobtrusive/non-self-report.	Collects specific baseline information on the target behaviour using any method.	Acknowledge that 4.1 is only every likely to be fully integrated if a baseline measure is taken and that evaluation is aided by the action being benchmarked.
Step 3: Developing a strategy	3.1 Creates a strategy that is grounded in the formative research (Step 2) and work with stakeholders (1.3).	The intervention strategy is clearly grounded in the formative research on audience(s) and acknowledges carefully the behavioural barriers/benefit. The strategy is co-designed with stakeholders.	The intervention strategy is partially or poorly grounded in the formative research on audience(s) and acknowledges carefully the behavioural barriers/benefit. The strategy is only partially co-designed with stakeholders.	Acknowledges the broader aspects of formative research and the important link between this and step 2. Not that it is impossible for this to be fully integrated if 2.1 is not integrated.
	3.2 The core product (benefits from performing the behaviour), the Actual product (goods and services) and Augmented product (product	Core, actual and augmented products are clearly developed and grounded in the formative research.	Core, actual and augmented products are partially or poorly developed and grounded in the formative research.	Acknowledges the importance of the product (in this case the cup) in the intervention. Overlooked as a key element in the original benchmarks. Aligns the benchmarks with the 4Ps (see also 3.3-3.5)

	elements to assist in performing the behaviour) are determined.			
	3.3 Determines appropriate promotion methods for the interventions based on formative research (2.1) which considers messaging (taglines etc), vehicles (augmented products, social media, posters etc) and messengers (spokespeople, influencers etc).	Appropriate and relevant promotional methods are chosen and grounded within the formative research.	Promotional methods are chosen but may not be carefully and fully grounded within the formative research.	Acknowledges that elements of promotion were dispersed across benchmarks and brings them all together in one (previously 3.2-3.6). Recognizes that specific tools may not be relevant and should be determined by formative research, not enforced by inclusion in benchmarks (e.g. commitment tools, prompts, norms etc).
	3.4 Determines appropriate strategies related to convenience and the place aspects of the intervention based on formative research (2.1) (e.g. where the behaviour is performed) grounded in the formative research (2.1)	Appropriate and relevant convenience and place strategies are chosen and grounded within the formative research.	Convenience and place strategies are chosen but may not be carefully and fully and grounded within the formative research.	Replaces and extends 3.8 going beyond convenience to all place-based strategies.
	3.5 Determines both financial/ non-financial incentives/disincentives	Appropriate and relevant financial/non-financial incentive/disincentive strategies are chosen and grounded within the formative research.	Financial/non-financial incentive/disincentive strategies are chosen but may not be carefully and fully and grounded within the formative research.	Replaces and extends 3.8 widening to explicitly note the use of non-financial incentives (for example greater options, special products, fast lane)
	3.6 The role of people (internal and external stakeholders) is acknowledged and planned for (links to 1.3 and 2.1).	All internal and external stakeholders who may affect the implementation success of the intervention are clearly noted, and engagement of these is integrated into the intervention.	All internal and external stakeholders who may affect the implementation success of the intervention are only partially or poorly noted, and engagement of these is integrated into the intervention.	The case studies show that people are an important consideration in implementation and therefore these are included within the benchmark. These may be internal employees (who for example liaise with businesses through the intervention) or external stakeholders (like front line staff).
Step 4: Conducting a pilot	4.1 Develops a pilot that can be compared against baseline (2.2) and where effectiveness can be evaluated.	Collects specific data which can be compared with the baseline information on the target behaviour using unobtrusive/non-self-report.	Collects specific data which can be compared with the baseline information on the target behaviour using any method.	This benchmark brings together 4.1 and 4.4 and links them to 2.2. Benchmarks 4.2 (control group), 2.3 (random assignment) and 4.5 (board scale) were not retained as these were simply not a consideration for small organisations running these types of interventions who had financial, time and expertise constraints. This is not to suggest that these would not be worthwhile

				endeavours but are simply not practical for practitioners.
Step 5: Evaluation	5.1 Building on baseline measurement measures activity (2.2) measure activity/behaviours change at several points during and after the pilot.	Collects data at regular intervals to map changes in behaviour against baseline (using unobtrusive/non-self-report methods).	Collects data at irregular intervals to map changes in behaviour against baseline using any method.	This replaces the previous 5.1 linking it directly to 2.2 and replaces 4.4.
	5.2 Utilizes data to retool strategy and provide feedback.	Always uses data to update strategy where necessary and provides feedback to stakeholders at regular intervals within and after the pilot.	Sometimes uses data to update strategy where necessary and provides feedback to stakeholders at irregular intervals.	Updated from the original benchmark with timelines.

Additionally, the original benchmarks assumed a single target audience, while all three interventions had multiple targets. Delineating between these more carefully would have more effectively targeted these audiences and hence this is added specifically in the Step 1 benchmarks. Specifically, we found that segmentation of target audiences (businesses, locals, tourists) was not done strategically and did not feed through to other aspects of the campaign development. Tourist and locals were noted as having very different behaviours, and shared learning across the interventions demonstrated these two segments needed personalised strategies. Segmentation is a crucial element of social marketing, although it is often not employed effectively or deeply (Kubacki et al, 2017) so this case is not unique and this may have limited the impact from the interventions (Dietrich et al, 2017). Not studying the target audience in detail is also a key factor in social marketing failure (Akbar et al, 2021). Had segmentation taken place this could have added further refinement to the implementation and targeted investment in key elements (French, 2017). While the Oban and Helensburgh Cup Trials and the Ditching Disposables schemes never planned to target tourists specifically the Highland Cup Movement did and perhaps was designed more effectively for this specific group, again highlighting the importance of understanding the segments prior to the intervention development.

For these three interventions the product, core (benefits from performing the behaviour), actual (goods and services) and augmented (product elements to assist in performing the behaviour) were central to success, especially related to the cup design and branding, app use etc. For example, the design used for the Highland Cup Movement (“use me baby one more time”) put off some people and the team received feedback that “it’s just really inappropriate. I’m not using the system because of it”. Cup materials (origin, recyclability, carbon neutrality etc.) and cup design (style, lid etc.) were key considerations with cup design (effective use, leakage etc.) critical in targeting the barrier of people not wanting to carry cups around, but the success of this was difficult to include in the original benchmark criteria which did not reflect this, and a specific benchmark has been added for this (3.2). This is also complemented by changes to the other Step 3 benchmarks. None of the interventions did any formative research related to the product element, which has shown to be an issue in failure of social marketing campaigns (Akbar et al, 2021), and should be a point of more detailed formative exploration to determine the best strategy in terms of quality/design of cups and value to the target audience (Cook et al, 2021). Many of the original benchmarks related to promotions (messages, vehicles) but in many cases these were too specific and shown to not be relevant in the data collection. We have therefore adjusted the benchmarks to be more flexible considering data collection leading the strategy, while also suggesting that the formative research should be focused on both baseline data, for comparison, and go beyond just barriers and benefits.

As noted in the results above, linkages between the benchmarks were evidenced, with it being impossible to integrate some benchmarks if others have not been met. In our updated version we explicitly acknowledge these linkages.

Our updated benchmarks reflect both the realities of work for small practitioners with limited time, expertise, skills and resources, focus on (through explanation or deletion) key areas of importance and make the language more user-friendly to allow both practitioners to engage with these if they wish and to make the application of them clearer for academics.

Practical Implications

As well as providing scope for us to critique and provide updates to the benchmark the study also saw several practitioner recommendations emerge (common successes considerations and challenges are detailed in Table 4).

Table 4: Common Successes, Considerations and Challenges Across Case Studies

Successes	Considerations	Challenges
<p>Increased awareness and acceptance</p> <p>Some increased use of reusables</p> <p>Business owner commitment</p> <p>Well received by community</p>	<p>Will an app work given the context of the intervention?</p> <p>Additional drop off sites needed for deposit schemes?</p> <p>Would collaboration add valuable experience to the intervention (e.g. specialist cup deposit schemes)?</p> <p>Would engaging with/understanding benchmarks enhance the process of intervention development for practitioners?</p>	<p>Results not as strong as expected (only a small percentage of drinks sales in renewables)</p> <p>Limited resources</p> <p>Staff shortages and turnover</p> <p>Staff engagement and time pressures</p> <p>Insufficient business participation (focus on financial bottom line)</p> <p>Data collection gaps/unreliable data</p> <p>Evaluation and measurement</p> <p>Transient tourist population</p> <p>Remote areas</p> <p>Unengaged audiences</p> <p>Understanding remained low</p> <p>Infrastructure</p>

In terms of successes the schemes were well received by the communities and increased awareness and acceptance of reusables. All interventions considered using an app, but only one did so. The app allowed more accurate/detailed data collection and was the least disruptive to businesses (avoiding manual recording) but had issues around accessibility and willingness to download. Use of digital technologies is not unusual in social marketing and can provide unique opportunities to interact with target audiences but other technologies such as a video or website have more of a history of being integrated into social marketing approaches (Flaherty et al, 2021). However, Flaherty et al (2021) in reviewing digital technologies in social marketing do not highlight any problematic elements and take a positive view of the integration of these. Bowerman and DeLorme (2014) building on the general literature around app adoption do highlight barriers in their social marketing campaign aimed at boaters. The barriers they highlight range from technological accessibility and audience technophobia which were also reflected here, to confusion about the apps purpose, challenges of outdoor use, quality limitations and a perceived clash between technology and nature. However, these studies do not mention that the social marketers' perceptions of the apps can

also be a barrier. The Highland Cup Movement itself highlights their ambivalence about the app: “I’m torn because I think it worked. It did work really well, and it gave us really good information, but I think it did put some people off”. Bowerman and DeLorme (2014) suggest that barriers to app adoption will be dependent on the unique features of the campaign and here security and app ‘fatigue’ also played a part. Future studies should consider whether an app designed specifically for the intervention versus one already in existence or a simple website interface would overcome some of these barriers.

Additionally, any scheme that has a cup deposit would need to ensure drop-off sites are in locations relevant to consumers (which may be some distance from the source cafes). While the teams could sometimes work around some challenges (e.g. by adding extra drop off bins and enhancing convenience), these added efforts still could not overcome issues, such as staff reluctance. In terms of challenges, staff made the implementation difficult as they did not provide the point of purchase nudge. Research highlights the important role of service employees as a critical touchpoint in supporting individual behaviour change (Russell-Bennett et al, 2013). This research suggests that the employees may not see their role as a social marketer and do not want to engage in marketing/persuasion like activities which was the case here. Russell-Bennet et al (2013) suggest staff training, regular encouragement and support (e.g. weekly check-ins) are important and might be a way to overcome this in future trials. Essentially there is a need for behaviour to nudge reusable cup use to be an organisational norm even when these are small enterprises with small numbers of staff (Truong et al, 2024).

The practitioners themselves may wish to consider upskilling, to develop an understanding of the benchmarks, given the low levels of skill and knowledge of social marketers noted (Robinson et al, 2019). They themselves may be better placed to critique their usefulness for those on the front line. Certainly, our updated criteria have aimed to simplify some aspects and make them potentially more understandable/attractive to practitioners.

Methodological implications

Methodologically we embraced the use of messy citizen science data. The campaign materials, often because the practitioners had met the benchmark of engagement with the community, were detailed and readily available and alongside practitioner interviews and e-mail conversations to flesh these out and fill any gaps this worked well, and we would consider the method a suitable approach for assessing intervention process and benchmarks. However, if the engagement criteria had not been met and the practitioners were unwilling to take part this could have rendered this approach unworkable.

Further Research & Limitations

From a theoretical approach, testing of our new benchmark criteria would be important both within further reusable cup interventions (in wider contexts, varying regulatory landscapes) and other CBSM interventions. Alongside this further testing of the messy citizen science data approach could be examined. As noted above, engagement with practitioners, through them spending time engaging with the benchmarks themselves may allow further refinement of these.

One key practical implication that requires further research is to determine how staff can be motivated to be involved in trials. Unpicking what undermined staff engagement – e.g. time pressures, discomfort, disinterest – would assist future planning. Additionally involving unengaged businesses and consumers is vital for successful interventions in this area as apathy played a part in poor take up, undermining the impact scale (Russell-Bennett et al, 2013). While the updated benchmarks bring the importance of this forward, future research is still needed to determine exactly how this might be done.

Finally, while pilot trials were useful in highlighting issues, trials need to build momentum. Businesses were more willing to join once they saw other businesses being involved and longer trials would help build momentum across all target audiences. One interviewee noted that it's "*all about building that momentum and building that real recognition of the scheme, isn't it? it's just being almost second nature. It's just what you do. You just go and get a cup of tea and then you take it back to whatever*". Supporting and examining longer term interventions is key for any future research for sustained and long-term behaviour change.

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