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Experimenting with sustainable business models in fast moving consumer goods

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ABSTRACT

The transition to more sustainable business requires comprehensive transformations of business models, and such innovation can benefit from business experimentation for sustainability (BES). In this paper, we investigate BES in fast-moving consumer goods (FMCG). The aim of our study is to investigate how a reiterative BES process can inform the design of more sustainable business models. Specifically, we experiment with greener value propositions, to reveal relevant barriers and strategic interventions to overcome them. In three interrelated studies conducted in collaboration with Norway's largest FMCG company Orkla, we investigate a BES process on refill-based business models for cleaning products, which are aimed at plastic reduction. We investigate consumer acceptance of such sustainable solutions in a focus group (study 1), drivers and barriers associated with the adoption of these solutions in a large-scale survey (study 2), and interventions aimed at overcoming relevant barriers for adoption in an online survey experiment (study 3). Our findings shed light on how BES can reveal actionable insights for business model innovation, related to (1) systematic barriers that need to be overcome to stimulate the adoption of more sustainable solutions, and (2) to behavioural interventions that can facilitate green consumption. Our empirical investigation thus contributes to the understanding of how reiterative BES can drive the transition to more sustainable business models.

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1. Introduction

Consumer goods have considerable societal and environmental footprints (Bocken and Allwood, 2012), and there is increased pressure on fast-moving consumer goods (FMCG) companies to design more sustainable business models (Ashford and Hall, 2011; De Medeiros, Ribeiro and Cortimiglia, 2014). Such innovation can take the form of greener products and packaging, new modes of consumption through service-based models, changes in sourcing and logistics, and so on (e.g. Bocken et al., 2014; Boons and Lüdeke-Freund, 2013). Since consumer decisions in FMCG are largely habitual and difficult to change (Verplanken and Wood, 2006), a key challenge is to design business models that facilitate consumer adoption of new sustainable solutions (Lehner et al., 2016).

In order to enable such sustainability transitions, companies will increasingly need to develop capabilities for *business experimentation for sustainability (BES)* (Bocken et al., 2019). BES can help companies investigate which business model designs may be successful in real-life business contexts (Bocken et al., 2018). BES practices include smaller-scale experiments on novel value offerings, greener production, and efforts to facilitate green behaviour (e.g. Weissbrod and Bocken, 2017). This can include "softer" forms of data, such as qualitative interviews and small-scale pilots, as well as "harder" forms, such as A/B tests and field experiments (cf. Bocken et al., 2019). Such practices can reveal consumer barriers to adopt green value propositions and business model designs that help consumers overcome such barriers. Existing knowledge on BES is still scarce, and as pointed out by Evans et al. (2017, p. 603), there is need for research on "ways in which companies can easily experiment with business models." The present paper aims to address this gap by offering empirical investigation of value proposition experimentation as part of BES processes.

In this paper, we investigate a BES process in collaboration with Norway's largest FMCG company Orkla, which aimed to design business models with lower plastic footprint. The aim of our study is to investigate how a reiterative BES process can inform the design of more sustainable business models. Specifically, we experiment with greener value propositions to reveal relevant barriers and strategic interventions to overcome them. Our BES case revolves

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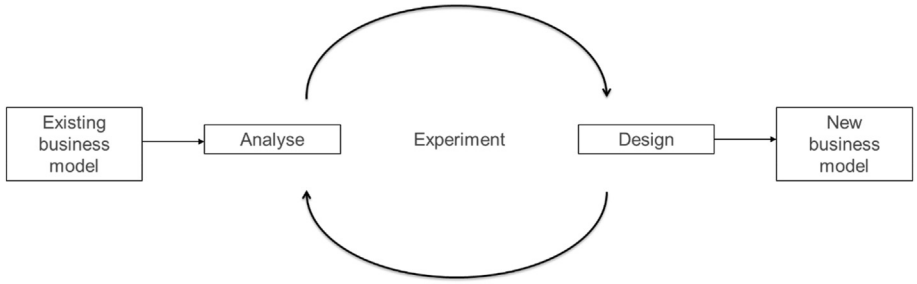


Fig. 1. The business experimentation process (based on Bocken et al., 2019).

around prospective refill-based concepts developed for cleaning products. The baseline against which the prospective solutions are contrasted is a FMCG retail model that involves selling large amounts of consumer goods in single-use plastic containers.

We conduct three studies: a focus group study (n = 20), a nationally representative survey (n = 409), and a randomised survey experiment (n = 259). In each iteration of the BES, our findings were seen in tandem with insights from ongoing innovation processes in the company. Our study contributes to the understanding of how BES can be used to reveal barriers for consumer adoption, and on behavioural interventions to overcome them. Furthermore, the paper provides insight into how BES informs sustainable business model innovation. Finally, our study demonstrates the potential for BES collaboration between companies and researchers.

The remainder of the paper proceeds as follows. First, we discuss experimentation for sustainable business. Second, we outline the background of our BES investigation. Third, we present studies 1–3. Finally, we discuss the findings and outline theoretical and practical implications.

2. Experimentation for sustainable business

We take as point of departure the role of BES in designing business models for sustainability transitions (cf. Schaltegger et al., 2012). A business model is a "representation of the value proposition, value creation and delivery, and value capture elements and the interactions between these elements within an organizational unit" (Geissdoerfer et al., 2016, p. 1218). We focus on value propositions, i.e. the description of the value offered to the consumer in comparison to other offerings in the market (Bocken et al., 2018).

When we refer to sustainable business models, we conceive of business models that "incorporate sustainability as an integral part of the company's value proposition and value creation logic" (Abdelkafi and Täuscher, 2016, p. 75; Geissdoerfer et al., 2018). A broad discourse on business model innovation has evolved in recent years (e.g. Chesbrough and Rosenbloom, 2002; Chesbrough, 2007, 2010; Teece, 2010). Previous studies emphasise that business model innovation for sustainability is characterised by uncertainty and ambiguity (Roome and Louche, 2016; Andries et al., 2013). Its success factors are hard to predict (McGrath, 2010), but business model experimentation can be highly important to increase the likelihood of successful implementation (McGrath, 2010). Therefore, authors have called for further research into methods such as experimentation for sustainability (e.g. Evans et al., 2017), and BES can particularly be suitable for testing consumer receptiveness to greener solutions (Thomke and Manzi, 2014).

We conceptualise our investigation in light of the BES framework introduced by Bocken et al. (2019) (see Fig. 1). It illustrates the BES process from the current to the new business model, and how reiterative experimentation, analysis and design drives this transition by generating insights and challenges with new solutions, and how they can be overcome. In our study, the company's innovation processes, and our three empirical studies were intertwined in such a reiterative process of design, experimentation and analysis of the company's new solutions.

Our paper responds to calls for research on BES. Bocken et al. (2018) revealed characteristics of the process of BES but called for research on the integration of sustainability-related and more traditional business-oriented goals. Weissbrod and Bocken (2017) demonstrated that BES approaches commonly used in start-ups can be applicable to large firms, given adequate modifications. However, they emphasised the differences between large firms and start-ups, and the need for more research on experimentation challenges and on company-researcher collaborations. Experimentation is just as relevant for large firms that aim to transit to sustainable business models; however, their process of experimentation can be different, due to differences in financial capability, resources, level of bureaucracy and so on (Wagner and Hansen, 2005). Similarly, in a paper outlining a stepwise approach to BES for circularity, Bocken and Antikainen (2018) called for research on the design, implementation and evaluation of the business model experiments in large firms. Our study addresses these gaps in the literature.

3. Background, setting and method

Our empirical setting is a BES process for new business models that involve plastic reduction in Orkla Home & Personal Care, which is a traditional FMCG company. The setting of Norway is reasonably representative of industrialized economies, but Norway is a high-income country with a well-developed take-back and recycling system for plastic.

When we became involved, Orkla had developed several business model scenarios for plastic reduction. This was based on its sustainability strategy, in which plastic pollution was identified as a highly material sustainability issue.[1] Our role as researchers involved contributing to Orkla's innovation processes and business experimentation. This included providing ideas, engaging in dialogue with the managers, translating their questions into testable hypotheses, and designing business experiments.

The business model scenarios were the starting point for the BES process. They represented prospective solutions with varying value propositions (product vs service solutions) and value delivery designs (distribution channels, and so on). We took part in selecting five solutions from a shortlist of ten, which are the basis for the empirical investigation in this paper. The five models comprise: (1) a big-bag in the household that allows for refilling plastic containers; (2) a refill station in the store that requires that consumers bring back empty containers; (3) a home delivery solution with

[1] Our study is part of a larger research project on experimentation for sustainability, in which Orkla is a partner.

refill at home, bundled with online delivery of groceries; (4) a home delivery solution of refill based on smart-lock solutions that allows for delivery when the consumer is not at home; and (5) a home cleaning service with refill in the home included (see Fig. 2). There are thus solutions where the consumer carries out the effort and those where the service provider carries out the refill.

Since our empirical investigation is part of the company's BES efforts, our paper simultaneously reports on and influenced the experimentation process. Our three studies were designed at the outset but updated reiteratively as the BES process unfolded. The three BES stages in our empirical studies relate to similar stages in Orkla's own innovation process, which included workshops on value proposition design (cf. Fig. 1). Thus, our study reflects the potential for a cross-sector collaboration between companies and business schools on BES design and implementation (e.g. Nambisan, 2009).

4. Study 1

4.1. Aim

The aim of the first study was to explore consumer perceptions of various refill-based solutions, in order to reveal perceptions, drivers and barriers of green consumer behaviour. This study reflects the early-stage BES of Orkla, and consequently had a largely explorative design.

4.2. Conceptual framework

Several factors influence consumers' attitudes and beliefs towards green consumption, which in turn influence intentions and behaviours (Ajzen, 1991). A combination of endogenous, exogenous and structural factors has been found to impact green consumption (Sachdeva et al., 2015). Such behaviour is shaped by consumers' attitudes, values and beliefs about green consumption (endogenous) and by influence from norms, peers and cultural frameworks (exogenous). The latter category includes various forms of norm-based influences (Sachdeva et al., 2015). Moreover, it is shaped by characteristics of the decision environment, such as choice architectures and incentive structures (structural). Understanding consumption practices, and how they may be changed in a greener direction, requires insight into these underlying characteristics.

While such characteristics are relevant across categories, which specific barriers and drivers are relevant in the case of green alternatives to low-involvement FMCG is an empirical question. It is therefore valuable to investigate the endogenous, exogenous and structural factors shaping such consumption behaviour, from the point of view of consumers themselves.

4.3. Method

We used a qualitative approach for understanding consumer perceptions, beliefs and attitudes. By perceptions, we mean consumers' preconceived ideas of product properties (Schifferstein, 2001), whereas the concept of beliefs and attitudes are borrowed from the framework of the theory of planned behaviour (Ajzen, 1991). They are measured qualitatively in study 1 and quantitatively in study 2 and 3 (cf. Tables 1 and 5).

We conducted four focus groups in the spring of 2018. Focus

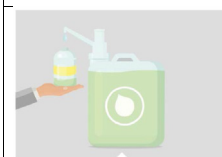
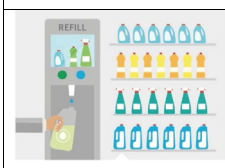
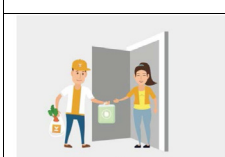
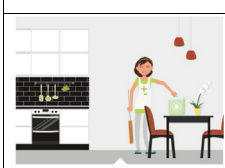
Illustration	Solution	Description
	Big-bag refill at home	The consumer refills products at home from a bigger-sized container bought in the store.
	Refill station in the store	The consumer refills products in a vending machine in the store.
	Home delivery of refill – smart lock service	Orkla provides home delivery of refills in the customers' home, by accessing it through a smart lock (e.g. Amazon Key or comparable solution).
	Home delivery of refill – grocery at the doorstep	Orkla provides home delivery of refills by "piggybacking" on home delivery providers of groceries.
	Home delivery of refill bundled with cleaning service	Orkla provides refill cleaning services bundled with cleaning services offered by a third-party supplier.

Fig. 2. Descriptions of the five business model scenarios on which the BES process was built.

Table 1
Items in the survey instrument in study 2.

Construct	Variable	Description	References
Behavioural Intention	Attitude	To what extent do you think this solution is a good idea	Taylor & Todd (1995)
	Intention to purchase	To what extent are you likely to consume this solution if/ when it becomes available	
Perceived Advantages	Expensiveness	How expensive do you think this solution is compared to the other solutions?	(Claudy et al., 2015; Jansson, 2011)
	Environmental friendliness	How environmentally friendly do you think this solution is compared to the other solutions?	
	Overall perceived advantage	To what extent do you perceive this solution as advantageous to use compared to existing products.	
Perceived Risks	Convenience	To what extent would buying this solution require extra effort from you	(Claudy et al., 2015; Featherman and Pavlou, 2003; Meuter et al., 2005; Moore and Benbasat, 1991)
	Privacy risk	To what extent does this solution pose a privacy risk to you or your household	
	Functionality risk	To what extent do you perceive this solution to be easy to use	
	Product safety risk	To what extent do you perceive this solution as safe and secure for your household?	
Personal Norm	Willingness to change	To what extent are you willing to change your consumption habits to protect the environment?	(Paul et al., 2016; White et al., 2009)
	Environmental consciousness	To what extent do you have a guilty conscience for using disposable plastic?	
Normative Influence		To what extent have your closest acquaintances changed their consumption habits to protect the environment?	(Paul et al., 2016; White et al., 2009)

groups allow for data collection through group interaction on a predetermined topic and for identifying perspectives that can be explored in more depth (Stewart and Shamdasani, 2014). They were conducted by two research team members.[2]

The study was composed of four groups, each including five people from the same segment, relatively balanced on age, gender and education. Four segments were included: young female adults (aged 22–23), young male adults (aged 25–27), adults with children living at home (aged 30–45) and middle-aged and elderly female adults (aged 57–75). The selection criterion was that the person was mainly in charge of shopping in the household, which explains the all-female group in the group of elderly consumers. The slight age discrepancy between genders among young adults was due to the women being bachelor students and the men master students.

The participants were presented with four of the five prospective solutions of Orkla's cleaning product outlined above (see Fig. 2). The solution based on home services with refill was omitted for the purposes of simplification, as the company did not consider it a potential solution at the time.

4.4. Findings

Participants viewed cleaning products as low involvement products, and none of the solutions were favourably perceived. In different ways, the solutions were viewed as burdensome, without significant upside. All the respondents were price-sensitive, except the adults with children, who stated a willingness to select slightly more expensive solutions if they were more sustainable. The big-bag solution was viewed as requiring greater time and effort. Refill stations in the store were viewed as inconvenient and requiring excessive effort. Functionality was also highlighted by the participants. The concerns depended on the solution: for instance, participants believed that refill in the store would be particularly inconvenient due to the considerable change in habits. Participants were sceptical to letting someone access their home to conduct refills, especially elderly participants.

Overall, study 1 revealed that price, convenience and functionality were important characteristics (cf. Rishi, 2013). Considering the factors described by Sachdeva et al. (2015), consumers showed awareness of the plastic problem but believed that disposable plastic is sufficiently handled in Norway (endogenous factors). There were also structural barriers regarding beliefs about convenience, safety and privacy. Exogenous factors such as social norms for living sustainably were also prevalent, and study 2 and 3 will shed more light on this. The focus groups, however, revealed that participants felt an increasing pressure in their surroundings for improving their footprint. Thus, study 1 provided insight into drivers and barriers for changes in consumer practices.

We assessed the results in light of the company's parallel innovation process. In order to further investigate the barriers and drivers identified in study 1, we conducted a second study, in which the home service with refill solution was added to the list of scenarios, because the company now considered it as a more promising solution. Study 2 was designed to investigate these factors on a larger, more representative sample.

5. Study 2

5.1. Aim

The aim of the second study was to investigate drivers and barriers of the adoption of refill-based solutions with lower plastic footprint, when factors related to convenience, functionality and social influence were considered.

5.2. Conceptual framework

We built our investigation on the theory of planned behaviour

[2] We note that other aspects of the data from the focus groups reported in study 1 is also reported on in a different paper by the authors (citation omitted to preserve the integrity of the blind review process).

(TPB) (Ajzen, 1991), which has been used in studies on green consumption (e.g. Bamberg and Möser, 2007; Klöckner, 2013; Ertz et al., 2017). Although the TPB has been criticised for having unreasonable assumptions and for poorly predicting behaviours (Sniehotta et al., 2014), it is shown to be among the attitude-behaviour frameworks that best capture the intention-behaviour relationship (Webb and Sheeran, 2006), with relatively strong reliability and validity (e.g. Ertz et al., 2017). We developed a survey adapted to the context, derived from existing TPB literature (cf. Table 1).

As shown in Fig. 3, the TPB suggests that purchase behaviour is a function of a behavioural intention to purchase, which in turn is shaped by three main variables: attitudes, subjective norm and behavioural control. The former and the latter relate to the functionality and convenience factors revealed in study 1, whereas the normative influence reflects the social pressure dimension revealed in study 1.

Previous literature has demonstrated an attitude-behaviour gap, i.e. a relatively weak relationship between consumers' positive attitudes toward green products and services, and their actual buying behaviour (Vermeir and Verbeke, 2006; White et al., 2019). As pointed out by Podsakoff et al. (2003), measuring intentions to predict behaviour is an imperfect approach due to problems including social desirability and respondent overconfidence. For pro-environmental behaviour, Gatersleben et al. (2002) demonstrated a weak relationship between households' intent and actual behaviours. However, existing research has revealed factors that can contribute to close this gap (Joshi and Rahman, 2015; Guagnano et al., 1995). Finally, several studies have shed light on factors such as normative influences, message framing, and information feedbacks that influence green purchasing behaviour (e.g., Allcott, 2011; Døskeland and Pedersen, 2015).

We investigated attitudes and behavioural intentions related to each of the solutions. Three characteristics that relate to attitudes are relative advantages, complexity and compatibility (Taylor and Todd, 1995). We conceptualise the former as perceived advantages from the respondents' point of view, while we similarly conceptualise complexity and compatibility as perceived risks. Also, we include normative influence on behaviour in our model, informed by the findings from study 1.

5.3. Method

We conducted a nationally representative survey in Norstat to gather data on consumers' beliefs, attitudes and behavioural intentions related to the prospective scenarios. Participants were presented with the five solutions in Fig. 1. We collected data from 409 respondents, who were largely representative of the Norwegian adult population. The survey measured consumers' beliefs, attitudes and intentions to purchase each of the new solutions. We used Likert scales ranging from 0 to 10. Table 1 gives an overview of items in the survey.

5.4. Findings

The sample consisted of 48.4% female participants, with an average age of 46 years and mean income slightly above $50,000. Regarding perceived advantages, the *refill in store* solution was perceived to be least expensive and the *smart lock service* most expensive (Table 2, Panel A). The participants found the *big-bag* solution to be more advantageous overall (Table 2, Panel B). The *big-bag refill at home* solution was perceived as most environmentally friendly, whereas the *smart lock service* was perceived as the least environmentally friendly solution (Table 2, Panel C).

Regarding perceived risks, participants perceived the *home cleaning service* as most convenient, whereas the *refill in store* solution was seen as least convenient. However, when ease of functionality and product safety was taken into account, the *big-bag* was perceived as the least risky. Similarly, the *big-bag* solution was perceived to pose least privacy risk, and in line with the focus group findings, the *smart lock service* was considered to pose most privacy risk. Table 3 summarises these results.

Studies 1 and 2 both indicate that adoption of the solutions requires adapting consumption practices. Therefore, we investigated how normative influences might affect consumers' stated willingness to change their buying behaviour. A regression analysis on the influence of social norms on the willingness to change buying behaviour (see Table 4) revealed a significantly positive relationship between respondents' perceived social norms (SN) for sustainability and their willingness to adopt greener consumption habits (w) ($p < 0.05$). Finally, the regression analysis revealed that consumers who feel more guilty about their plastic footprint have greater willingness to change consumption habits ($p < 0.05$). This should perhaps be expected, as the objective of this innovation is to reduce plastic footprints. These findings, however, shed light on the potential power of peer influence on the adoption of green solutions.

The findings from study 1 and study 2 revealed similar barriers,

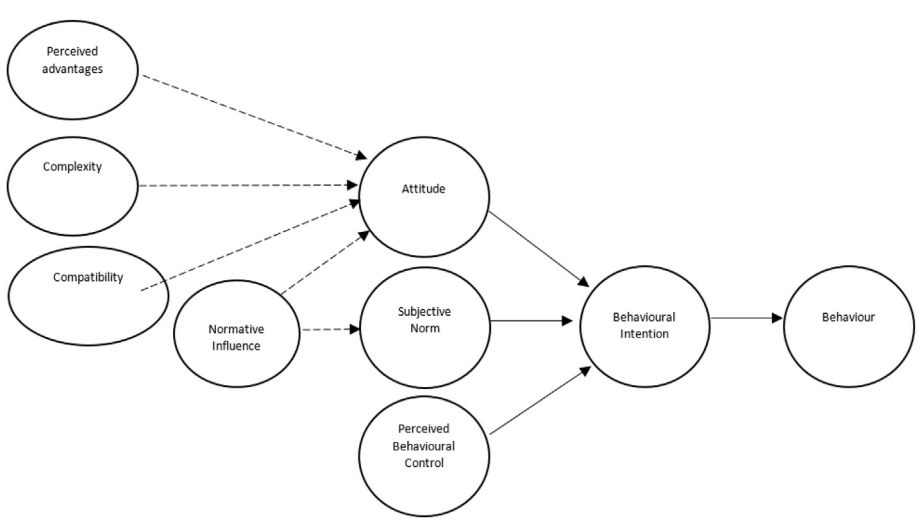


Fig. 3. Expanded model of the theory of planned behaviour (Ajzen, 1991).

Table 2
Panels A–C: Perceived price, environmental friendliness and overall advantageousness of the solutions (Likert scale – 1–10).

Summary Statistics								
Panel A			Panel B			Panel C		
Product Solution	**Mean Rank**	**SD**	**Product Solution**	**Mean Score**	**SD**	**Product Solution**	**Mean Rank**	**SD**
Big-bag refill at home	3.96	1.90	Big-bag refill at home	8.20	2.90	Big-bag refill at home	1.93	1.18
Refill in store	4.08	1.73	Refill in store	6.96	3.34	Refill in store	1.97	1.20
Home delivery through smart lock	3.04	1.82	Home delivery through smart lock	4.23	2.95	Home delivery through smart lock	4.60	1.18
Home delivery with groceries	3.09	1.18	Home delivery with groceries	5.48	3.17	Home delivery with groceries	3.85	1.10
Home cleaning service	3.11	1.71	Home cleaning service	5.27	3.11	Home cleaning service	4.05	1.25
* Rank 1 = most expensive solution			*Higher score indicates higher perceived advantages			* Rank 1 = most environmentally friendly		

which may be overcome by means of behavioural interventions. In parallel, Orkla ran value proposition workshops on the scenarios. Informed by the findings from study 2, the company kept faith in the home cleaning service with refill solution, believing that consumers' expectations for convenient solutions would grow. Thus, the company aimed to investigate further the conditions under which a service-based model could succeed. We therefore conducted study 3 on a behavioural intervention aimed at overcoming the barriers associated with adopting the *home cleaning service with refill* solution.

6. Study 3

6.1. Aim

The aim of the third study was to investigate whether a behavioural intervention aimed at reducing the barriers associated with the *home cleaning service with refill* model could reduce consumers' concerns and perceptions of risk associated with such solutions.

6.2. Conceptual framework

Study 2 revealed an interesting contrast between the solutions. On the one hand, some of the solutions are traditional product-based solutions, such as the big bag, which seem to be preferred on the basis of functionality, product safety and lower privacy risk. That is, such solutions more closely resemble the current business model. The other category comprises service-based solutions through which cleaning products are turned into "products-as-services", e.g. home service with refill (see e.g. Bocken, de Pauw, Bakker and van der Grinten, 2016; Tukker, 2004). While seen as more convenient, these solutions require larger behavioural changes. Study 2 revealed opposite types of barriers associated with each solution.

BES is useful in habit-based consumption, for which behavioural interventions can be effective (Verplanken and Wood, 2006; White et al., 2019). We therefore conducted a randomised survey experiment in study 3. The experiment was based on a message framing logic (e.g. Maheswaran and Meyers-Levy, 1990) in which we made features of the prospective solution salient. Specifically, we intended to investigate whether emphasising the relative environmental friendliness and the safety of the solution could overcome consumers' concerns.

6.3. Method

We designed a randomised online survey experiment on Norstat. We collected responses from 259 participants, who did not already use home cleaning services. They were randomised into four experimental groups (see Fig. 4).

Group 1 acted as a control group and was presented the standard version of the home cleaning service with refill solution. Group 2 received a version with message framing that highlighted its environmental benefits. Group 3 received a version with message framing that highlighted its safety aspects, while group 4 received a combination of the two treatments; both environmental appeal and safety assurance (see Fig. 5).

In order to keep perceptions of price out of the evaluation, respondents were told to envision that they had been given a budget to spend on home cleaning and refilling soap that would allow for selecting this option, if they so desired. Table 5 summarises the variables in the survey. All responses were recorded on a Likert scale from 1 to 7.

6.4. Findings

Of the 259 participants, 51% were women. All participants were aged 25 or older, with an average annual household income of $80-90k. The data was well-balanced on socio-demographic measures. Table 6 provides an overview on respondents' average attitudinal measures (beliefs and evaluations of beliefs) for the home cleaning service with refill solution, compared to the three experimentally treated versions.

While there were no significant effects for versions 2 and 3, we found a significantly positive effect of the "environmentally friendly

Table 3
Convenience, functionality and product safety scores for the different solutions.

Summary Statistics										
Solution | Perceived Risks	Big-bag refill at home		Refill in store		Home delivery through smart lock		Home delivery with groceries		Home cleaning service	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Convenience	5.47	2.36	7.10	2.14	5.62	2.73	5.46	2.57	5.17	2.88
Functionality	4.00	3.24	5.64	3.48	7.40	3.06	6.65	3.24	6.53	3.23
Product Safety	5.00	3.38	6.79	3.29	8.17	2.81	8.06	2.82	8.03	3.01
* lower score indicates lower risk										
Privacy	9.43	2.39	8.85	2.75	4.61	2.96	6.44	3.04	5.60	3.05

* lower score indicates higher risk.
§ Green and red colours indicate the best and worst performing scenarios, respectively, for each risk.

Table 4
Regression analysis on stated willingness to change consumption practices.

Summary Statistics		
	Willingness to change	Confidence Interval
Social norms	0.427***	[0.344,0.510]
Environmental conscientiousness	0.300***	[0.235,0.366]
Age	−0.00931	[-0.0191,0.000524]
Education	0.00487	[-0.00545,0.0152]
_cons	3.363***	[2.623,4.102]
N	409	

95% confidence intervals in brackets.
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

and safe" solution (version 4) compared to the baseline. The behavioural intention of participants to adopt the home service with refill solution increased by 0.64 units when they received this treatment ($p < 0.05$). Thus, the "environmental and safe" message framing led to greater consumer inclination to adopt (see Fig. 6).

Furthermore, we found that consumers who perceived the solution as inexpensive, high quality and more convenient were more inclined to use the solution. Older participants were less willing to use the service, which suggests that younger adults place higher value on convenience (cf. Swoboda and Morschett, 2001). All the above-mentioned variables, except age, were also statistically significant for the second dimension of behavioural intention, namely the willingness of the participants to recommend the solution. We found no significant difference of the impact of the treatments for people who expressed higher environmental concern. Therefore, we ruled out any moderation effects for environmental concern Table 7.

7. General discussion

In this paper, we have investigated a BES process for greener value propositions in FMCG. Through qualitative and quantitative empirical inquiries that fed into the BES process, we revealed barriers and drivers for the adoption of these solutions, and interventions to overcome barriers. Such insights can in turn inform BES processes in FMCG and beyond. Our empirical investigation thus relates to two levels: at a micro-level, to consumers' responsiveness to green

Table 5
Survey instrument.

Variables for Survey Experiment in Study 3			
Construct	Variable	Description	Cronbach's alpha
Behavioural Intention	BI 1	I would use home cleaning service with refill	0.9328
	BI 2	I would recommend home cleaning service with refill to friends and family	
	BI 3	I think that home cleaning service with refill is a good idea.	
Environmental Friendliness	Belief	I think that home cleaning service with refill is an environmentally friendly solution.	0.6837
	Evaluation of Belief	When evaluating home cleaning service with refill, it is important to me that the service is environmentally friendly	
Safety and Security	Belief	I think that home cleaning service with refill is a safe and secure solution.	0.6329
	Evaluation of Belief	When evaluating home cleaning service with refill, it is important to me that the service is safe and secure	
Personal Norm	Environmental Consciousness (PN 1)	I take the environment into account when shopping for products and services in everyday life (e.g. food, transportation, etc.)	0.6158
	Environmental Consciousness (PN 2)	I believe that man-made climate change is a major problem in society today	
Social Norm	Normative Influence (SN)	I think it is important what my friends and family think of home cleaning service with refill.	
Controls	Price	I think that home cleaning service with refill appears as an inexpensive service.	0.8114
	Quality	I think that home cleaning service with refill appears as a high-quality service.	
	Convenience	I think that home cleaning service with refill appears as a simple and convenient service	
Socio-Demographics	Age		
	Gender		
	Income		
	Education		

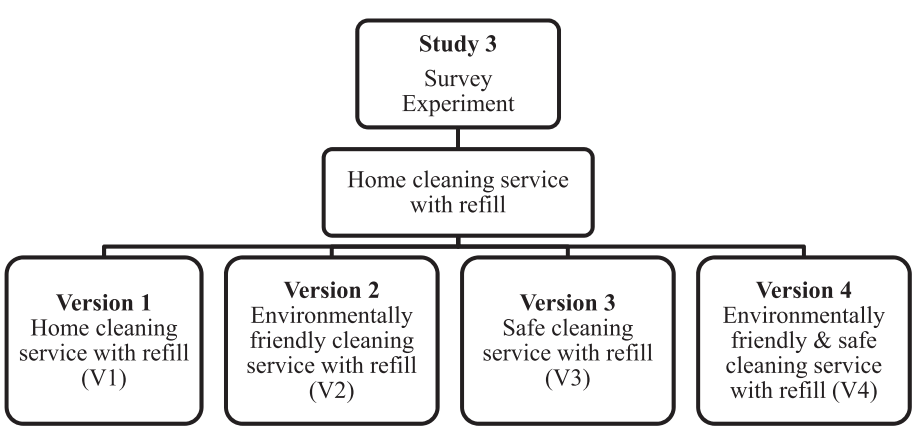


Fig. 4. Survey-experimental design.

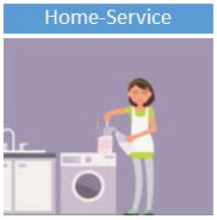
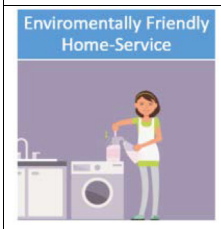
Intervention image	Intervention message	Group
	**Heading:** Now we offer home cleaning services with refill **Body text:** Our cleaners clean your house and refill the containers of your cleaning products. Always a clean house with full cleaning product containers.	Control group 1
	**Heading:** Now we offer environmentally friendly home cleaning services with refill **Body text:** Our cleaners clean your house and refill the containers of your cleaning products. They use exactly the right amount of soap, and refilling your cleaning products saves the environment from plastic waste.	Treatment group 2
	Heading: Now we offer safe home cleaning services with refill **Body text:** Our professional cleaners clean your house and refill the containers of your cleaning products. The cleaners have been carefully selected and trained by us, and you can trust them.	Treatment group 3
	Heading: Now we offer environmentally friendly and safe home cleaning services with refill **Body text:** Our professional cleaners clean your house and refill the containers of your cleaning products. The cleaners have been carefully selected and trained by us. They use exactly the right amount of soap, and refilling your cleaning products saves the environment from plastic waste.	Treatment group 4

Fig. 5. Treatments and treatment groups in the survey experiment.

innovations, and at a broader level, the process of BES in companies' efforts to enable such consumer behaviour.

In study 1, we shed light on the challenge of changing consumer habits. The participants viewed the refill solutions effortful quite like reusable shopping bags, which are also perceived as inconvenient by the shoppers who are unaccustomed with them (Wilson et al., 2011). Interestingly, participants did not perceive the service-based models as improvements regarding the plastic problem. This suggested that the environmental dimensions of such models needed to be communicated well to consumers (Bocken et al., 2014). The participants were also concerned with privacy and safety, especially older participants. As domestic cleaning services are becoming more widespread, this can be suggestive of the younger population prioritizing convenience (Lutz, 2002).

Study 2 expanded on these findings and revealed that social norms and peer influence were drivers of green consumption. This aligns with prior studies on social influence on green consumer behaviour, e.g. for solar energy equipment and organic food (Welsch and Kühling, 2009), reduction of meat consumption (Sparkman and Walton, 2017) and other domains of consumption (White et al., 2019; Peattie, 2010). Study 2 also suggested that consumers' willingness to change habits could be more likely in younger generation, although previous research is unclear on direction and strength of such age-effects (Wiernik et al., 2013).

The company believed that consumer convenience would be important for consumers, and therefore decided to further explore the home service with refill solution. Prior research also shows that convenience is important for consumer adoption of green innovations (Ottman et al., 2006; Seyfang, 2005), and our subsequent empirical investigation took this as point of departure. Consequently, study 3 investigated the possibility to overcome barriers for the adoption of the home service with refill. Explicitly informing consumers on the environmental friendliness and safety of the solution made it more attractive and consumers were more likely to adopt it. This aligns with previous research showing that message-framing techniques promote consumer adoption of pro-

Table 6
Mean scores for control and intervention groups.

Summary Statistics					
Measure | Version		Control	Environmentally friendly	Safe	Safe and environmentally friendly
Environmental Friendliness	Belief	4.12 (1.74)	4.38 (1.70)	3.71 (1.74)	4.86 (1.80)
	Evaluation of Belief	4.50 (1.89)	4.53 (1.65)	4.12 (1.87)	5.48 (1.57)
	Attitude (Belief x Evaluation)	20.49 (14.30)	21.5 (11.87)	16.35 (11.90)	28 (14.41)
Safety and security	Belief	4.33 (1.69)	4.37 (1.44)	4.03 (1.88)	4.65 (1.86)
	Evaluation of Belief	5.71 (1.31)	5.53 (1.48)	5.59 (1.58)	6.17 (1.32)
	Attitude (Belief x Evaluation)	25.76 (12.80)	25.37 (11.26)	24.23 (14.69)	29.52 (14.28)

Table 7
Regression analysis on behavioural intentions in Study 3.

Summary Statistics				
	(1)		(2)	
	BI1	Confidence Interval	BI1	Confidence Interval
Version 2	0.109	[-0.646,0.865]	0.200	[-0.446,0.847]
Version 3	−0.309	[-1.064,0.447]	0.414	[-0.275,1.103]
Version 4	0.687*	[0.0131,1.361]	0.648*	[0.0590,1.238]
Price			0.241**	[0.0607,0.421]
Quality			0.519***	[0.310,0.728]
Convenience			0.304***	[0.126,0.482]
PN1			−0.0905	[-0.247,0.0664]
PN2			−0.000883	[-0.143,0.141]
Age			−0.0189*	[-0.0341,-0.00382]
female			−0.102	[-0.550,0.347]
Income			−0.0172	[-0.0826,0.0481]
Edu			0.0376	[-0.163,0.239]
SN				
_cons	3.509***	[2.979,4.038]	0.465	[-1.009,1.939]
N	259		207	

95% confidence intervals in brackets.
*p < 0.05, **p < 0.01, ***p < 0.001.

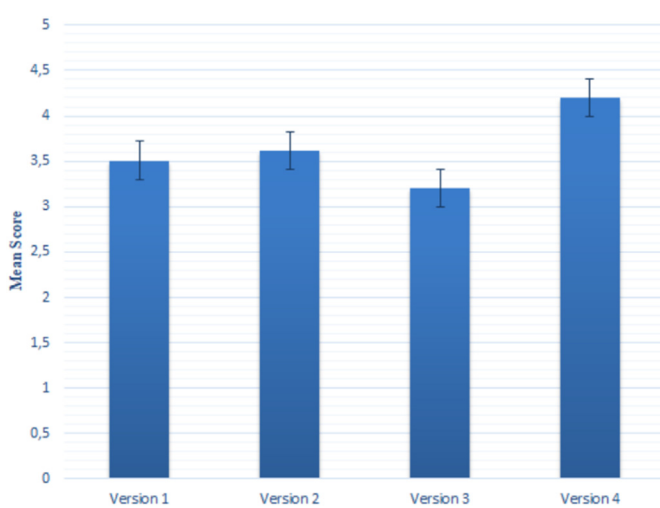


Fig. 6. Consumers' intention to use different versions of the home cleaning service.

environmental behaviours (e.g., Morton et al., 2011; Hanss and Böhm, 2013).

The home cleaning service solution is akin to a Sustainable Product-Service System (S.PSS), and it has been argued in previous studies that consumers often undervalue the benefits of a S.PSS offering and overvalue its costs and risks (Vezzoli et al., 2015). Our findings in study 2 indeed showed that consumers viewed this solution less favourably. However, by means of message framing, we induced a lower risk perception among consumers. Thus, our findings contribute to the understanding of S.PSS adoption. According to Vezzoli et al. (2015), adoption of S.PSS solutions requires transition-oriented designs to encourage consumer acceptance. BES is one approach through which companies can design and encourage the adoption of such solutions.

On a broader level, our paper engages in a meta-narrative of a BES process in FMCG. Our studies contribute to the understanding of the different stages and actions companies can undertake in order to arrive at actionable insights. Previous research (e.g. Bocken et al., 2019) argues that BES is an iterative process of trial and error requiring companies to engage stakeholders, conduct focus groups or A/B testing, develop prototypes before arriving at the final product that offer better value proposition for the customers. This paper has investigated such processes in a large incumbent company and how consumer insights can be generated by means of BES.

With the dual goals of plastic avoidance and attractive solutions in mind, the company engaged in a comprehensive BES process. Insights from consumers made it possible to assess and understand the strengths and weaknesses of the different prospective business models, as the company tried to align sustainability goals and traditional business goals (cf. Bocken et al., 2018). In particular, the A/B-test approach in study 3 allowed for digging deeper into how small changes in the presentation of the value proposition could lead to different beliefs and behavioural intentions on the part of consumers. This informed the ongoing process of value proposition design in the company – a design choice of substantial importance in the design of more sustainable business models (Schaltegger et al., 2012).

So, how can BES be done in practice? It is important to highlight that BES is a comprehensive process of change. It is an important innovation capability for organizations in uncertain environments (Chesbrough, 2010; Weissbrod and Bocken, 2017), it can benefit from a combination of data sources and data collection approaches, and a combination of evidence-based decisions and intuition-based assessments (cf. Bocken et al., 2019). In the case of Orkla, this implied moving from a highly successful product-based business model towards prospective service-based models with very different value creation, delivery and capture than its current offerings. For large firms with strong positions in the marketplace, such innovation processes can be challenging. However, on the flipside, large companies have the resources to carry out comprehensive BES processes (cf. Weissbrod and Bocken, 2017). BES, which involves reiterative bouts of analysis, experimentation and design (cf. Fig. 1) can be central to innovation and can lead a company from its current business model to a new one. Using structured approaches for reiteratively designing, hypothesising and testing can thus generate knowledge-based and actionable insights that can inform and drive BES in practice.

8. Conclusion and implications

BES can enable companies' transition from an existing business model to a new and more sustainable business model. This requires a reiterative approach to design, experimentation and analysis that can generate actionable insights on barriers for the adoption of such solutions, and interventions to overcome them. In this study, we have shed light on how parallel and intertwined innovation and experimentation processes can inform such a transition. Our three studies revealed drivers and barriers for more sustainable business models in FMCG and unveiled possible approaches for overcoming barriers to adoption. In doing so, the studies also shed light on the reiterative nature of BES in practice.

Our paper has implications for our understanding of consumers' green consumption behaviour in general and for S.PSS models in particular. We show that while consumers may not be readily receptive to green value propositions, barriers can be overcome through behavioural interventions to promote sustainable consumption, including message framing as demonstrated in this paper. The cross-sector collaboration between companies and researchers reflected in the paper shows its potential for applying knowledge-based approaches in BES. Furthermore, the paper contributes to the growing field of sustainable business model innovation. As argued by Baldassarre et al. (2020), there is a design-implementation gap that hinders diffusion of such business models. Our paper empirically shows how companies can engage in the process of business experimentation to address this gap, in a manner that caters to consumer preferences.

From a managerial point of view, cross-sector collaboration between companies and researchers can allow for the application of scientific methods in the pursuit of actionable, evidence-based insights for innovation purposes. The uncertainty involved in a company's pursuit of sustainable innovation can be reduced by applying such approaches to BES. As noted by Kennedy and Bocken (2020), there is a lack of research on the type of experimentation required for companies to transition to sustainable business models and the types of questions companies should explore in such experimentation. Our paper offers a case of value proposition experimentation and provides insights on the types of knowledge companies could aim to extract. Future research should further investigate empirical applications to business model innovation. Moreover, through multiple studies, we shed light on how collecting data in a combination of more and less controlled environments both in the lab and the field can allow for richer data for making decisions. We ran our experiments on product solutions that the company found commercially viable to pursue, which shows that BES can be aligned with the commercial objectives of the company. Finally, the paper offers insights to managers on how behavioural interventions can be used effectively for consumer adoption of innovative product solutions.

8.1. Limitations and future research

BES is an emerging topic and future research can build on this work for further investigation. A limitation of our paper is that we rely on self-reporting from participants. Actual behaviour may differ from stated intentions, as noted in our discussion of the intention-behaviour gap above. For example, it is possible that the respondents may underestimate barriers to adoption, as they might struggle to correctly envision the needed behaviour. Social desirability also comes into play, as people tend to perceive themselves as more pro-environmental than they really are (Podsakoff et al., 2003). However, we aimed to mitigate this challenge by placing questions that explicitly relate to environmental issues at the end of the survey. Future research can also overcome such limitations by conducting natural field experiments on actual behaviour, which allow for controlled testing on real decisions.

Furthermore, we investigated products for which consumers have habitual buying behaviour. It is possible that for other products and services, where consumers are more engaged, simple behavioural interventions might not be sufficient. Future research could explore how BES could feed into the design of sustainable business models for such product categories. It should be noted in relation to this that our company-researcher collaboration to some degree constrained our ability to freely design the study, since the research design in part hinged on parallel choices in Orkla's innovation process. However, we independently designed and conducted our study, and this constraint is also a strength, in the sense that it allowed us to closely collaborate with the firm on the BES process.

A further limitation is that the focus group study might suffer from a groupthink bias. For instance, it could be that not all shared viewpoints were held by all participants. However, this is an inherent characteristic of focus groups, which are intended to generate data from the conversation and interplay between people. The studies were conducted in Norway, which has a population with relatively high income, education and environmental awareness (Orderud and Kelman, 2011). Thus, one can question how far the results generalize. For instance, it has been suggested that the S.PSS systems such as home service are more positively received in communal societies such as Scandinavia, the Netherlands and Switzerland (Wong, 2004). Future studies should investigate these issues in different contexts and cultures. Finally, this paper has focused on experimentation for sustainable business models, but it does not investigate the sustainability impact of the prospective value propositions. Future research can take a more holistic approach and include such investigation.

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