Informing sustainable business models with a consumer preference perspective

Viktorija Viciunaite[*], Frode Alfnes

Norwegian University of Life Sciences, School of Economic and Business, Chr. Magnus Falsens vei 18, 1430, Ås, Norway

A B S T R A C T

Sustainability-oriented firms can incorporate information about the sustainability of their business model elements into their value proposition. For some consumer segments, information about business model elements such as resources, activities, and partners will add value to the products and services offered by the firm. In this article, we study consumer preferences for these types of sustainable business model elements. We use a sample of 394 active Norwegian knitters to elicit ranked importance of sustainable attributes when choosing yarn labels and stores. Our findings indicate heterogeneous preferences for sustainable attributes. The most sustainability-oriented consumers ranked sustainable attributes related to the business model elements key partners, key resources, key activities, and channels higher than price. The sustainability of several of these business model elements is often not promoted toward customers. To integrate the valued business model elements into the value proposition, the yarn value chain must become more transparent and make pro-social and pro-environmental attributes visible to consumers. We suggest that sustainability-oriented firms aiming to capture the value of their sustainability efforts, should leverage the information about consumer segments for sustainable business model elements in their work with the business model trio of customer segments, value proposition, and channels.

1. Introduction

A business model (BM) "provides a link between the individual firm and the larger production and consumption system in which it operates" (Boons and Lüdeke-Freund, 2013). In sustainable business model (SBM) research, it is common to investigate the production system, such as circular supply chains (Geissdoerfer et al., 2018a), circular BMs (Lopes de Sousa Jabbour et al., 2019; Rosa et al., 2019), or sustainable production (Pal and Gander, 2018). The vast majority of SBM archetypes identified by Bocken et al. (2014) focus on the production system of the BM.

The consumption system has received scant attention, apart from a few recent exceptions, focusing on sustainable consumption

in the circular economy (Tunn et al., 2019) or business-led sustainable consumption initiatives (Bocken, 2017). Sustainability-oriented firms need knowledge about consumer preferences for pro-social and pro-environmental attributes to put forward a value proposition that can convince consumers to buy their product. In this paper, we identify sustainable product and store attributes visible to the consumer and relate them to their underlying BM elements. Furthermore, we elicit consumer preferences for the attributes and discuss how the knowledge can be incorporated into SBM literature and practice. We use yarn production and sales as a case, and discuss the implications for sustainability-oriented firms, from an overall perspective and more specifically within the industry.

The SBM concept has its roots in the BM literature. A BM describes the design or logic for creating, delivering, and capturing value in an organization (Osterwalder et al., 2005; Teece, 2010). The SBM is an extension or modification of the BM (Geissdoerfer et al., 2018b) and addresses issues that the traditional BM concept has given little attention to, namely the social and environmental effects of running a business (Joyce and Paquin, 2016; Stubbs and Cocklin, 2008). Although academic inquiry into SBMs is relatively

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new, it has been steadily growing since the seminal article by Stubbs and Cocklin (2008). Empirical investigation into SBMs has focused on topics such as taxonomies (Lüdeke-Freund et al., 2018), archetypes (Bocken et al., 2014), or pattern databases (Remane et al., 2017) of SBMs, as well as firm's willingness (Schaltegger et al., 2012) and extent (Gauthier and Gilomen, 2016) of embracing sustainability in their BMs. SBM research is said to be prolific (Dentchev et al., 2018) and showing the characteristics of an emerging research field (Lüdeke-Freund and Dembek, 2017).

Recently, studies have also started to focus on the consumption system of the SBM. In addition to the traditional pathways - responding to *existing* consumer demand (Cohen and Winn, 2007; Dean and McMullen, 2007; Seyfang, 2005), research suggests that firms can play a proactive role in encouraging sustainable consumer behavior through changing production practices, satisfying consumer needs in new ways, and through new BMs (Bocken, 2017; Tunn et al., 2019). Some of this can be done through informing and educating (Glavas and Mish, 2015), positively or negatively directing (Bocken and Allwood, 2012), and marketing and choice editing (Bocken, 2017). Bocken (2017) and Boons and Lüdeke-Freund (2013) argue that companies need to keep experimenting with their BMs to find new ways to drive sustainable consumption.

The BM canvas synthesized by Osterwalder and Pigneur (2010) is a template encompassing nine elements: *key partners, key activities, key resources, value proposition, customer segments, channels, customer relations, cost structure,* and *revenue streams*. Sustainability-oriented firms can make sustainable choices in several of these BM elements and make them visible to the consumer through marketing them as product or service attributes — a part of the value proposition. An example is the Fairtrade organization, which works to secure better conditions for farmers and workers (Fairtrade International, 2019). The Fairtrade label indicates pro-social choices in the BM elements key partners, activities, and resources. It is marketed to consumers as a value proposition - the value of purchasing ethically.

The textile and fashion industry, because of its numerous sustainability challenges, is an industry where new ways of achieving sustainable production and consumption are sorely needed. The literature on sustainability in this industry shows that it is a major contributor to numerous environmental and social issues (EcoWatch, 2015), such as air and water pollution, loss of biodiversity, land degradation, low wages, unsafe working conditions, and use of child labor, to name a few (Fletcher, 2013; Laitala et al., 2018; Pal and Gander, 2018).

We investigate one aspect of this industry, knitting yarn. In a recent Norwegian survey, every fourth adult respondent (nearly half of all women) said they had knitted something in the last 12 months, while estimates of knitters in the UK equal about 9% of the population (Laitala and Klepp, 2018). As the interest in handicraft such as knitting has grown rapidly among young women in recent years (Myzelev, 2009; Stannard and Mullet, 2015), the sustainability of the different operations in the yarn value chain has become an increasingly important topic for its producers and sellers.

Many of the Norwegian yarn stores and producers incorporate some level of sustainability in BM elements such as key activities, partners, and resources. Yarn consumers cannot observe the SBM elements directly, but the elements can be presented to consumers through sustainable product or service attributes. Such sustainability attributes include selling ecological or organic yarn, yarn from natural fibers, recycled materials, fair trade yarn, firms contributing to charitable causes, or having an environmental focus

in transportation and packaging. However, it remains unclear to what extent consumers are interested in these attributes and the underlying SBM elements, or which of them are more important for consumers. To elicit consumer preferences related to sustainability in yarn production and sales, we conducted a survey with two discrete choice experiments, using best-worst scaling. We tie the findings of these experiments back to the SBM concept and provide suggestions on how knowledge about consumer preferences for sustainability attributes can be used to inform the SBM literature and practice.

2. Methods and data

2.1. Data collection

Data were collected through an online survey of active knitters in Norway in the spring of 2018. The survey was conducted with the help of the organizer of the largest knitting festival in Norway (Oslo Strikkefestival, which had 6200 participants in 2017) and included questions about handicraft experiences, yarn-shopping habits, as well as two choice experiments. The knitting festival's newsletter and social media accounts were used to recruit participants. A total of 444 knitters responded. Five respondents did not agree to their answers being used for scientific research and publication, while another 45 did not complete the choice experiment questions, leaving 394 useable survey responses. The majority of the respondents were women (88.8%) and knitted every day or several times a week (93.2%). Most were in the age groups 35—44 y (28.2%), 25—34 y (26.4%), and 45—54 y (20.1%) (see Table 1). Almost two-thirds came from Norway's capital, Oslo, and neighboring municipalities (63.2%).

We divided the knitters into pro-environmental segments based on their motives to knit or crochet. The survey included a four-point Likert-scale question inquiring about the main reasons why respondents knitted. Among the 11 alternatives, two pro-environmental motives for knitting were present - "to reduce the amount of clothing I buy" and "to reduce my negative impact on the environment". Respondents obtained scores between two (if they strongly disagreed to both statements) and eight (if they strongly agreed to both statements). The GreenL segment consisted of those with the lowest score (2—3) and included respondents that had none or low pro-environmental motivation for knitting. The GreenM segment consisted of those with a medium score (4—5) and included those with medium pro-environmental motivation to knit. The GreenH segment consisted of those with a high score (6—8) and included those with strong pro-environmental motivation to knit. It is important to note that all respondents had a multitude of reasons to knit and pro-environmental motives were never the sole driver. Reasons such as relaxing, being able to use things made by oneself, expressing creativity, and being productive during spare time were among the most common for all segments.

Three respondents did not answer the motivation questions. As a result, the data analysis for the full sample includes three respondents more than the sum of the pro-environmental segments. Table 1 presents the means and standard deviations of the motivation scores for all segments and the full sample, as well as age, expenses when buying yarn and most frequent raw materials used.

2.2. BM elements as choice experiment attributes

Consumers interact with the outcome of the BM — the product or service — not the BM as a conceptual tool. This poses challenges

Table 1
Full sample and segments. Means and percentages of answers of selected questions.

Question	Answer options	Full sample (N = 394)	GreenL (N = 110)	GreenM (N = 148)	GreenH (N = 133)
Age (y)	15—24	3.1%	3.2%	2.3%	4.0%
	25—34	29.4%	29.8%	27.3%	31.8%
	35—44	31.1%	27.6%	29.7%	36.5%
	45—54	22.4%	25.5%	23.4%	19.1%
	55—74	13.5%	13.9%	13.6%	8.8%
Motivation to knit/crochet Mean* (standard deviation)	1. To reduce the amount of clothing bought	2.3 (1.0)	1.2 (0.4)	2.1 (0.7)	3.3 (0.6)
	2. To reduce own negative impact on the environment	2.4 (1.0)	1.3 (0.5)	2.3 (0.6)	3.4 (0.5)
	Both 1 and 2	4.6 (1.8)	2.5 (0.5)	4.4 (0.5)	6.7 (0.8)
Typical amount spent on a skein of yarn	0—49 NOK**	18.1%	23.9%	17.8%	13.6%
	50—74 NOK	49.9%	46.8%	53.4%	47.8%
	75—99 NOK	19.3%	18.4%	15.1%	25.0%
	100 NOK and more	12.7%	11.0%	13.8%	13.6%
Highest amount spent on a skein of yarn in the last 12 months	0—74 NOK	9.9%	11.9%	12.9%	4.6%
	75—124 NOK	34.0%	35.8%	30.5%	36.1%
	125—174 NOK	28.4%	31.2%	27.0%	28.6%
	175 NOK and more	27.7%	21.1%	29.8%	30.8%
Most and least common raw materials in yarn used Mean*** (standard deviation)	Wool and other animal fibers	4.8 (0.4)	4.8 (0.5)	4.8 (0.5)	4.9 (0.3)
	Synthetic fibers	1.2 (0.5)	1.2 (0.5)	1.3 (0.6)	1.2 (0.5)
	Blends of natural and synthetic fibers	2.3 (1.1)	2.2 (1.1)	2.3 (1.1)	2.3 (1.1)
	Cotton	2.0 (0.9)	2.0 (0.9)	2.1 (0.9)	2.0 (0.9)
	Linen	1.8 (0.8)	1.7 (0.7)	1.7 (0.8)	1.8 (0.8)
	Blends of natural materials	2.9 (0.9)	2.8 (0.8)	3.0 (0.8)	2.8 (1.0)

Notes: *Values: 1-totally disagree, 2-somewhat disagree, 3-somewhat agree, 4-totally agree; **NOK — local currency, the Norwegian Krone; ***Values: 1-never/almost never, 2-rarely, 3-sometimes, 4-often, 5-always/almost always.

when trying to uncover consumer preferences for BM elements. However, this can be done through inquiring about the attributes of a product or service, which are the result of a firm's unique configuration of various BM elements. To operationalize the BM elements as product and store attributes that consumers would recognize, we visited the websites of 20 yarn producer brands, 20 online shops, and the locales of 10 physical shops. The producers investigated constitute the vast majority of yarn producers in Norway, including large-, small-, and micro-actors, but not farms selling their own produce. Selection criteria for online shops required retailers with a Norwegian country domain and an exclusive focus on yarn. To avoid overlap, we did not include websites of yarn brands, producers, or physical shops. The physical yarn shops were selected from Oslo and neighboring municipalities, the area where the majority of survey respondents also came from.

When investigating the firms, we looked for product and store attributes visible to the consumer, both generic (e.g., offering a wide selection of yarn and knit accessories) and sustainability-oriented (e.g., the availability of ecolabel yarn). Each identified attribute was categorized under one or more relevant elements of the BM canvas synthesized by Osterwalder and Pigneur (2010), such as key resources key activities or key partners.

In line with Gauthier and Gilomen (2016), we observed that firms varied in the extent to which they embraced sustainability. To further ensure that the choice experiments contained attributes familiar to most consumers, we selected the ones occurring most frequently. The attribute list was tested in a pilot study and refined thereafter. In the end, we had 15 attributes related to the BMs of yarn producers and 15 to yarn stores. Tables 2 and 3 present the final list of attributes, their respective BM canvas elements and labels used in the data analysis and results section.

All identified attributes, except 'positive previous experiences' and 'recommended by others', can be considered as part of the value proposition. However, the creation and delivery of each of the value proposition attributes require the engagement of other BM elements as well. For instance, the production of ecolabel yarn uses environmentally friendly raw materials as *key resources* and has a relatively low environmental impact as a *key activity*, whereas a shop selling ecolabel yarn indicates *key partners* with reduced negative environmental impact. The column 'BM elements' in Tables 2 and 3 captures this aspect and contains relevant BM elements (other than the value proposition) required to create or deliver a given attribute.

2.3. The choice experiment

We conducted two choice experiments with best-worst scaling. The best-worst scaling format was first presented by Finn and Louviere (1992) and used in studies of consumer preferences for food (Bazzani et al., 2018; Lusk and Briggeman, 2009), consumers' ethical beliefs (Auger et al., 2007), and healthcare (Flynn et al., 2007).

The store attributes and product attributes were randomly divided into three store choice sets and three product choice sets. To get variation in the attribute combinations, we created five triples of store choice sets and five triples of product choice sets. The respondents were randomly assigned one triple containing store attributes and one triple containing product attributes. Hence, each respondent saw each of the attributes once during the choice experiment.

In each choice set, the respondents were asked to indicate which of the five attributes were most and least important for their choice of product or store. In our case, participants were asked to indicate which of the subsets of attributes from Tables 2 and 3 where *most* and *least* important in their choice of yarn and yarn store, respectively (Illustrations 1 and 2).

Illustration. 1. Example of product choice question from the survey.

If you were to choose between two types of YARN of the same color and thickness, what would then be other relevant selection criteria? Please choose one that is most important and mark it with 1 and one that is least important and mark it with 5. You do not need to mark 2, 3, and 4.

The suppliers of the yarn producer provide good working conditions for their employees
The yarn's place of origin
Price
The whole production process is situated in Norway
The yarn producer provides good working conditions for its employees

Illustration. 2. Example of store choice question from the survey.

What is most and least important to you when you choose a YARN SHOP? Please choose one that is most important and mark it with 1 and one that is least important and mark it with 5. You do NOT need to mark 2, 3, and 4.

The shop is at a convenient location
Price level at the shop
The shop has a flexible return policy
The shop sells yarn from Norwegian producers
The shop sells yarn that is certified to be environmentally friendly

It is important to note that we asked which attributes were most and least important if one chose between two yarns *of equal color and thickness*. These two attributes are closely related to the product to be made. As such, they are likely to rank higher than the less tangible attributes included in the choice sets. Thus, when we discuss consumer preferences for product attributes, the preferences are conditional on the person finding yarn of desirable color and thickness.

Stated preferences studies have some limitations. They might not capture the attitude-behavior gap common in sustainable consumption (Boulstridge and Carrigan, 2000). In addition, studies on sustainable behaviors can suffer from socially desirable responding (Paulhus, 2001) with all attributes indicated as very important. The best-worst scaling was chosen to reduce some of these challenges. In this comparative method, the respondents can only choose one attribute as best in each choice set and are therefore forced to compare and rank the attributes. Hence, they cannot say that all attributes are very important.

2.4. Data analysis

To analyze the choice data, we use a mixed logit model that allows random taste variations, correlation over choices, and correlation over alternatives (Alfnes, 2004; Bazzani et al., 2018; Train, 2009). The mixed logit model is consistent with random utility models and assumes that consumers are able to choose the attributes most and least important to their utility. We specify the following random utility model:

$$U_{nij}^m = V_{nij}^m + \varepsilon_{nij}^m = \sum_{n=1}^{15} \beta_{ni}^m x_{nij}^m + \varepsilon_{nij}^m \qquad (1)$$

where U_{nij}^m is individual i's utility from attribute n in choice situation j in evaluation m; x_{nij}^m are dummy variables indicating the attributes and the β_{ni}^m are the corresponding random effect parameters; ε_{nij} is an extreme value distributed error term; and $m \in [store, yarn]$, $i \in [1; 394]$, $n \in [1; 15]$, and $j \in [1; 3]$. The dummy variables follow the maximum-difference procedure described in Flynn and Marley (2014), where the worst choice attribute is coded with negative dummies.

For identification, one of the parameters must be selected as a baseline and predefined. We chose price as the baseline parameter and normalized it to zero. The values of the parameters are interpreted relative to each other within the same estimation. The attribute with the highest parameter value is on average viewed as most important, while the attribute with the lowest value is on average viewed as the least important. Since the price parameter was chosen as the baseline, the signs of the other parameters indicate whether the corresponding attributes are seen as more or less important than price in the average consumer's choice.

3. Results

Tables 4 and 5 present the results from the mixed logit model for the producers and stores, respectively. For evaluating the results, it is important to know that we can compare parameter sizes within one column, and rankings across columns. We cannot compare parameter sizes across columns. For easy interpretation of the preference ranking, the attributes in each column are presented ranked in descending order of importance. The first column shows the ranking for the whole sample, while columns two to four show the ranking for the three pro-environmental motivation segments. The subsamples GreenL, GreenM and GreenH have low, middle, and high pro-environmental motivation for knitting, respectively (see section 2.1 for a more detailed description on how respondents were allocated to the different subsamples).

From Table 4, we can see that positive previous experiences and tactile features are the most important attributes when choosing between yarns of equal color and thickness. These two attributes were ranked highest in both the overall sample and in all three segments. Similarly, from Table 5, we can see that selection, nice staff, positive previous experiences, and selling yarn from Norwegian producers were the four most important attributes when choosing a store in both the overall sample and in all three segments. Hence, sustainability attributes were not ranked at the top, neither when choosing a store or product, nor in any of the segments.

There is a clear difference between segment GreenL on the one hand and the segments GreenM and GreenH on the other. For both products and stores, the former ranked all sustainability attributes as less important than price, while the latter two ranked most sustainability attributes as more important than price (in bold font in Tables 4 and 5).

The higher ranking of price within the GreenL segment can

Table 2
Product and producer attributes evaluated by consumers.

	Label	Attribute	BM elements
1	Env. impact - raw materials	The raw materials used are environmentally friendly ☘	Key resources Key partners
2	Env. impact - production process	The production process has a relatively low environmental impact ☘	Key activities Key resources
3	Env. impact - suppliers	The suppliers of the yarn producer have a relatively low environmental impact ☘	Key partners
4	Working conditions - producer	The yarn producer provides good working conditions for its employees ↗	Key activities Key resources
5	Working conditions - suppliers	The suppliers of the yarn producer provide good working conditions for their employees ↗	Key partners
6	Contributing to charitable causes	The yarn producer contributes to charitable causes ↗	Key activities Revenue streams
7	Yarn's origin	Yarn's place of origin	Key partners Key activities Key resources Cost structure
8	Produced in Norway	The whole production process is situated in Norway	Key partners Key activities Key resources Cost structure
9	Tactile features	The yarn is pleasant to the touch	Key resources Key activities
10	Price	Price	Cost structure Revenue streams
11	Attractive packaging	The yarn is nicely packed and labeled	Customer relationships Channels
12	Ordering online	The yarn producer sells its yarn online	Channels
13	Buying directly from producer	It is possible to buy yarn directly from the producer	Channels
14	Positive previous experiences	Previous positive experiences with yarn from the producer	Customer relationships
15	Recommended by others	The yarn producer is recommended by others	Customer relationships Channels

Notes: BM = business model; ☘ - pro-environmental attributes; ↗ - pro-social attributes.

Table 3
Store attributes evaluated by consumers.

	Label	Attributes	BM elements
1	Env. focus in packing and transport	The shop has an environmental focus when it comes to packaging and transportation ☘	Channels Key activities
2	Sells ecolabel yarn	The shop sells yarn that is certified to be environmentally friendly ☘	Key partners
3	Working conditions - suppliers	The shop's suppliers provide good working conditions for their employees ↗	Key partners
4	Contributing to charitable causes	The shop contributes to charitable causes ↗	Key activities Revenue streams
5	Selection	The shop has a wide selection of yarn and knitting accessories	Key activities Key resources Key partners
6	Sells yarn from Norwegian producers	The shop sells yarn from Norwegian producers	Key partners
7	Price	Price level at the shop	Cost structure Revenue streams
8	Loyalty discounts	The shop offers various discounts to loyal customers	Customer relationships Revenue streams
9	Ordering online	The possibility to order yarn online	Channels
10	Delivery time	The shop has a fast delivery time when ordering yarn online	Channels
11	Flexible return policy	The shop has a flexible return policy	Customer relationships Channels
12	Location	The shop is at a convenient location	Channels
13	Nice staff	The staff are friendly and knowledgeable	Customer relationships
14	Positive previous experiences	Positive experiences with previous visits to the shop	Customer relationships
15	Recommended by others	The shop is recommended by others	Customer relationships Channels

Notes: BM = business model; ☘ - pro-environmental attributes; ↗ - pro-social attributes.

either mean that the segment is more price-sensitive than the other segments, or that the other attributes are irrelevant to GreenL. When asked in another question how much they on average tend to spend for a skein of yarn, as well as the cost of the most expensive skein of yarn purchased within the past 12 months, all groups provided very similar answers (see Table 1), showing little evidence of differences in price sensitivity. Hence, our interpretation is that the other attributes are seen as irrelevant by the GreenL segment. Indeed, Tables 4 and 5 show that segments with stronger pro-

environmental motivation to knit ranked more sustainability attributes higher than those with weaker motivation.

When it comes to sustainability attributes, the first thing that stands out is that the use of environmentally friendly raw materials in yarn is an attribute that ranked consistently high for all groups (Table 4, rank 3 and 4). We did not specify the raw material in the experiment, but another survey question revealed that most respondents almost always used yarn from wool or other animal fibers and almost never used yarn made only from synthetic fibers

Table 4
Consumer preferences for product and producer attributes.

Rank	Full sample (N = 394) *Mean (Std. Err)*	GreenL (N = 110) *Mean (Std. Err)*	GreenM (N = 148) *Mean (Std. Err)*	GreenH (N = 133) *Mean (Std. Err)*
1	Positive previous experiences 2.44*** (0.30)	Tactile features 4.70*** (1.59)	Positive previous experiences 3.00*** (0.48)	Positive previous experiences 1.91*** (0.42)
2	Tactile features 1.96*** (0.30)	Positive previous experiences 3.88*** (1.22)	Tactile features 1.73*** (0.47)	Tactile features 1.77*** (0.45)
3	Env. impact - raw materials 🌿 1.27*** (0.25)	**Price** **0 (not estimated)**	Env. impact - raw materials 🌿 1.70*** (0.39)	Env. Impact - raw materials 🌿 1.53*** (0.37)
4	Produced in Norway 0.61*** (0.23)	Env. impact - raw materials 🌿 −0.20 (0.52)	Produced in Norway 0.90** (0.40)	Produced in Norway 1.22*** (0.40)
5	Env. impact - production process 🌿 0.24 (0.18)	Produced in Norway −0.68* (0.40)	Env. impact - production process 🌿 0.47 (0.29)	Env. impact - production process 🌿 1.17*** (0.33)
6	Yarn's origin 0.11 (0.22)	Working conditions - suppliers ↗ −0.73* (0.38)	Yarn's origin 0.45 (0.37)	Env. impact - suppliers 🌿 0.85*** (0.32)
7	**Price** **0 (not estimated)**	Yarn's origin −0.97** (0.45)	Working conditions - producer ↗ 0.39 (0.28)	Yarn's origin 0.63* (0.37)
8	Env. impact - suppliers 🌿 −0.03 (0.21)	Recommended by others −1.01** (0.42)	Env impact - suppliers 🌿 0.16 (0.38)	Working conditions - producer ↗ 0.47* (0.28)
9	Working conditions - suppliers ↗ −0.05 (0.17)	Env impact - production process 🌿 −1.09*** (0.35)	Working conditions - suppliers ↗ 0.13 (0.29)	Working conditions - suppliers ↗ 0.41 (0.29)
10	Working conditions - producer ↗ −0.11 (0.16)	Working conditions - producer ↗ −1.32*** (0.32)	**Price** **0 (not estimated)**	**Price** **0 (not estimated)**
11	Recommended by others −0.89*** (0.24)	Env. impact − suppliers 🌿 −1.35*** (0.41)	Recommended by others −0.43 (0.41)	Recommended by others −0.53 (0.38)
12	Buying directly from producer −1.35*** (0.24)	Attractive packaging −1.84*** (0.54)	Buying directly from producer −1.03** (0.40)	Buying directly from producer −0.91** (0.37)
13	Ordering online −1.45*** (0.24)	Buying directly from producer −1.93*** (0.48)	Ordering online −1.49*** (0.42)	Ordering online −0.99*** (0.38)
14	Contributing to charitable causes ↗ −1.99*** (0.25)	Ordering online −2.11*** (0.61)	Contributing to charitable causes ↗ −1.55*** (0.38)	Contributing to charitable causes ↗ −1.13*** (0.33)
15	Attractive packaging −2.24*** (0.30)	Contributing to charitable causes ↗ −3.09*** (0.54)	Attractive packaging −2.38*** (0.54)	Attractive packaging −2.03*** (0.50)

***p < 0.01, **p < 0.05, *p < 0.1. Baseline − price. 🌿 - pro-environmental attributes; ↗ - pro-social attributes.

Table 5
Consumer preferences for store attributes.

Rank	Full sample (N = 394) *Mean (Std. Err)*	GreenL (N = 110) *Mean (Std. Err)*	GreenM (N = 148) *Mean (Std. Err)*	GreenH (N = 133) *Mean (Std. Err)*
1	Selection 3.53*** (0.37)	Selection 3.24*** (0.71)	Selection 4.11*** (0.61)	Selection 2.49*** (0.60)
2	Nice staff 2.23*** (0.25)	Positive previous experiences 2.16*** (0.50)	Nice staff 2.51*** (0.41)	Sells yarn from Norwegian producers 2.23*** (0.51)
3	Positive previous experiences 2.04*** (0.23)	Nice staff 1.77*** (0.45)	Sells yarn from Norwegian producers 2.17*** (0.39)	Nice staff 2.06*** (0.43)
4	Sells yarn from Norwegian producers 1.96*** (0.24)	Sells yarn from Norwegian producers 1.20*** (0.37)	Positive previous experiences 1.73*** (0.38)	Positive previous experiences 2.01*** (0.36)
5	Location 1.22*** (0.23)	Location 0.94** (0.43)	Location 1.65*** (0.42)	Env. focus in packing and transport 🌿 1.20*** (0.32)
6	Working conditions - suppliers ↗ 0.62*** (0.20)	Ordering online 0.19 (0.43)	Working conditions - suppliers ↗ 0.83*** (0.32)	Location 1.11*** (0.39)
7	Env. focus in packing and transport 🌿 0.40** (0.19)	**Price** **0 (not estimated)**	Env. focus in packing and transport 🌿 0.75** (0.31)	Working conditions - suppliers ↗ 0.97*** (0.32)
8	Sells ecolabel yarn 🌿 0.27 (0.22)	Loyalty discounts −0.01 (0.41)	Sells ecolabel yarn 🌿 0.30 (0.36)	Sells ecolabel yarn 🌿 0.72* (0.37)
9	**Price** **0 (not estimated)**	Working conditions - suppliers ↗ −0.31 (0.39)	Delivery time 0.10 (0.41)	Recommended by others 0.05 (0.33)
10	Recommended by others −0.17 (0.20)	Recommended by others −0.37 (0.38)	Ordering online 0.06 (0.35)	**Price** **0 (not estimated)**
11	Ordering online −0.18 (0.22)	Delivery time −0.44 (0.46)	**Price** **0 (not estimated)**	Contributing to charitable causes ↗ −0.54 (0.38)
12	Loyalty discounts −0.25 (0.23)	Sells ecolabel yarn 🌿 −0.56 (0.44)	Recommended by others −0.21 (0.33)	Loyalty discounts −0.57 (0.41)
13	Delivery time −0.49** (0.25)	Flexible return policy −0.88** (0.44)	Contributing to charitable causes ↗ −0.35 (0.33)	Delivery time −0.63 (0.45)
14	Flexible return policy −0.59*** (0.22)	Env. focus in packing and transport 🌿 −1.11*** (0.38)	Loyalty discounts −0.36 (0.40)	Ordering online −0.70* (0.37)
15	Contributing to charitable causes ↗ −0.80*** (0.22)	Contributing to charitable causes ↗ −1.95*** (0.47)	Flexible return policy −0.39 (0.37)	Flexible return policy −0.74* (0.41)

***p < 0.01, **p < 0.05, *p < 0.1. Baseline − price. 🌿 - pro-environmental attributes; ↗ - pro-social attributes.

(see Table 1). The choice of raw material is one of the core issues when it comes to cleaner production in textiles. This concerns both the effects of producing the raw material, such as land and water use (Pfister et al., 2011), as well as the environmental effects the material has when in use, e.g. shedding microplastic particles during wash (Laitala et al., 2018).

The production process having a reduced negative environmental impact was ranked high for groups GreenM and GreenH (Table 4, rank 5). The production process in yarn encompasses many elements, from the procurement of the fiber, various mechanical and chemical treatments, to spinning and twisting. As in textiles generally (Laitala et al., 2018), washing, dyeing and application of other properties, such as 'superwash' treatment are the common stages where environmental impacts occur. Both the choice of raw material and a cleaner production process are attributes that are important in sustainable apparel consumption as well (Henninger et al., 2016; Lundblad and Davies, 2016; Peterson et al., 2012).

Social attributes (marked with ↗ in Tables 4 and 5), such as working conditions, were typically ranked lower than environmental attributes (marked with 🌿 in Tables 4 and 5). Some scholars speculate that one of the reasons why they are less important to consumers might be the research setting (Henninger et al., 2016) such as Norway, which has strict labor laws and a well-developed union network. Furthermore, all groups in both experiments ranked one social attribute, contributing to charitable causes, consistently low. One possible explanation for the low ranking is that this attribute has no connection with the yarn production or sales process. Interestingly, this attribute is increasingly popular among yarn producers in Norway.

Origin attributes were ranked high, especially yarn being produced in Norway (Table 4, rank 4 and 5) and shops selling yarn from Norwegian producers (Table 5, rank 2 and 4). Consumers often express preferences for domestic products in apparel (Hustvedt et al., 2013; Peterson et al., 2012) and food (Alfnes, 2004), as well as other goods (Upadhyay and Singh, 2006). However, the existence of a positive relationship between local origin and sustainability is debated (Curtis, 2003; DuPuis and Goodman, 2005; Hess, 2008).

Among the highest-ranking sustainability attributes for stores was having an environmental focus when it comes to transportation and packaging (Table 5, rank 4 and 5 for groups GreenH and GreenM respectively). This is an interesting finding, because, on the one hand, very few stores actually had such a focus. On the other hand, issues such as carbon gas and plastic pollution are currently very central in the public debate on sustainability, which might explain why consumers would rank it as important, even though it was not commonly encountered.

Another sustainability attribute that ranked high for stores was having suppliers that provide good working conditions for their employees (Table 5, rank 6 and 7 for groups GreenM and GreenH respectively). This attribute is, in essence, about yarn producers rather than stores. Yet, interestingly, this attribute ranked lower in the product experiment than in the store experiment. This result also goes against the general trend where sustainability attributes were, on average, ranked lower for stores than for products.

In fashion, online retailing is becoming increasingly popular (Jacobs et al., 2018); however, respondents in our sample ranked online availability of yarn consistently low (Table 4 rank 13 and 14, Table 5 rank 10 and 14 for groups GreenM and GreenH respectively), irrespective of the distance from their closest yarn shop. One possible explanation could be that tactile features of yarn are a very important attribute for all groups. Online shopping does not provide the opportunity for customers to investigate tactile features prior to purchase. In yarn retail, this points to the importance of having a physical outlet for the goods sold.

To sum up, we have found evidence of consumer segmentation with respect to preferences for sustainability attributes, but also some stable general attribute preferences across segments. Pro-environmental attributes ranked higher than pro-social ones and product sustainability attributes ranked higher than those of stores. The use of environmentally friendly raw materials in yarn was one attribute that ranked consistently high for all segments, but no sustainability attribute ever topped the preference rankings.

4. Discussion

One of the main challenges sustainability-oriented apparel firms face is how to make sustainable purchases easier for consumers (Henninger et al., 2016). Recent research suggests that one of the factors influencing sustainable apparel consumption is knowledge regarding the social and environmental effects of its production and consumption (Connell, 2010), and how consumer action can affect it (Henninger et al., 2016). However, the effects of such information on consumer behavior can be mixed (Joshi and Rahman, 2017; Peterson et al., 2012). As a result, firms have to be careful when deciding which sustainability-related information to market and to whom (Peterson et al., 2012; Sneddon et al., 2012). Our findings point to the importance of two BM elements to address this challenge, namely *customer segments* and *value proposition*.

4.1. Different strokes for different folks

A value proposition is a description of a product or service as well as the articulation of its benefits (Ladd, 2018). Creating and delivering a value proposition to the customer requires the whole BM, but the customer is typically only aware of the value proposition because that is the BM element that is marketed to them. This lack of transparency of the BM and value chain is one of the criticisms directed at the apparel industry, because it helps hide unsustainable and unethical practices from the customers (Fashion Revolution). However, this trend is changing (Human Rights Watch).

Our findings point to a clear customer segmentation with respect to their preferences for sustainability attributes. Customer segments encompass the "groups of paying customers with common needs and attributes" (Ladd, 2018). In our sample, we identified at least two distinct segments with common needs and attributes: those interested in sustainability attributes and those that were not. The GreenL segment shows little interest in sustainability attributes. In addition, this segment ranked all sustainability attributes lower than price, which indicates that they are not likely to pay a price premium for such attributes. However, GreenM and GreenH are customer segments that show clear interest in these attributes. Both ranked most sustainability attributes higher than price, which indicates willingness to pay a price premium for sustainability attributes. This corresponds to recent literature pointing to a higher willingness to pay for sustainable apparel items among interested consumers (Chekima et al., 2016; Jacobs et al., 2018; Lundblad and Davies, 2016). The top ranked sustainability attributes have interesting implications for firms' BMs in general and value propositions specifically.

We see in our findings that the pro-environmental customer segment, contrary to Cowan and Kinley (2014), is interested in sustainability attributes that happen early in the production process. Interest in sustainability attributes such as the use of environmentally friendly raw materials or the production process having a relatively low environmental impact shows that consumers care about such BM elements as key partners, resources, or activities that were traditionally not visible to them. The same is apparent in the store experiment, where an environmental focus in

transport and packaging was among the highest ranking sustainability attributes; an attribute that concerns the channels of the BM. Reaching out to interested consumers with such attributes implies moving other BM elements, such as key partners, resources, activities, or channels into the realm of the value proposition. By default, this makes both the BM and the value chain more transparent, which is identified as one possible SBM archetype by Bocken et al. (2014) and a potential source of competitive advantage (Human Rights Watch).

This finding is tightly interconnected with another important aspect of the value proposition—that it contains not only the functional aspects of the offering, but also the articulation of its benefits (Ladd, 2018) and other types of value, such as environmental or social (Ojasalo and Ojasalo, 2018). Traditionally, the value proposition of a physical product has been seen as an offering of use value of that product (goods-dominant logic cf. Vargo and Lusch (2004)). However, most of the sustainability attributes included in the experiment provide no direct use value for the consumer. This indicates that many consumers are interested in multifaceted value propositions that bring value not only to themselves, but also to the environment and other people.

However, it is important to note that sustainability attributes might come at odds with other desirable attributes and few consumers are willing to compromise desired attributes such as quality or functionality for sustainability attributes (Song and Kim, 2018; Tunn et al., 2019). This is highlighted by the fact that sustainability attributes were not ranked as the top attributes in any of the experiments; instead, attributes such as selection, tactile features, or previous positive experiences were. In addition, sustainability attributes were only ranked high for two of the three sample groups. Group GreenL showed very little interest in such attributes. This can pose challenges in crafting desirable value propositions and reaching out with them to the relevant customer segments.

4.2. From consumer preferences to the BM

Firms can leverage the information on consumer preferences for SBM elements through incorporating it back into their BM. If deliberately selected and pursued, the sustainability-oriented consumer segmentation can form the basis for a firm's marketing approach (Ladd, 2018). In addition to creating value propositions that contain the desired sustainability attributes, firms need to promote them, so consumers know they exist and where to find them (Tunn et al., 2019). Hence, firms must work on both the channels for communicating information and delivering the offerings. Together, this points to the importance of a tight integration of three BM elements — customer segments, value proposition, and channels. This supplements the findings of Ladd (2018), who suggested that focusing on just this BM element trio in the nascent stages of business development could improve firms' performance.

Furthermore, through focusing on channels, firms can also reach out to new consumer groups with an untapped demand for sustainability. From the findings, we see that the least sustainability-oriented customers have almost the same ranking of a sustainability attribute, such as the use of environmentally friendly raw materials, as the other segments. Focusing marketing on the sustainability attributes that are most important to the sustainability-oriented customers might therefore have a positive spillover to the less sustainability-oriented customers as well. By playing a proactive role in encouraging sustainable consumer behavior through informing (Glavas and Mish, 2015) and positively directing (Bocken and Allwood, 2012), firms can increase their customer base for sustainable products.

5. Conclusion

There is a need for more sustainable production and consumption practices if we are to move toward a more sustainable future (Druckman and Jackson, 2010). Firms have a role to play through, for instance, changes in their BMs (Tunn et al., 2019). In this article, we contributed to this debate by investigating ways to incorporate knowledge about consumer preferences and sustainable consumption into SBM literature and practice.

On the theoretical side, our research contributes to the SBM literature by informing it with a consumer preference perspective, providing an illustration of how to both elicit consumer preferences for BM elements and integrate consumer preference data into an SBM canvas. SBM literature has had considerable developments when it comes to the supply or production side of the BM (see Bocken et al. (2014) for an overview). However, BMs do not focus solely on the creation of offerings. They are also a link to the larger consumption system in which they operate (Boons and Lüdeke-Freund, 2013). Investigating the consumer aspect of BMs is therefore essential in order to gain a holistic perspective of BMs. Investigating the consumer side of BMs is especially relevant in the context of sustainable business. Recent studies suggest that firms have a role to play in actively encouraging more sustainable consumer behavior (Bocken, 2017; Tunn et al., 2019). To do that, we need more research explicitly investigating the interconnections between a firm's BM and their customers.

When it comes to implications for practice in cleaner production, one of our core findings is that consumers ranked sustainable attributes related to BM elements of key resources, activities, partners, and channels higher than price. For practitioners this implies that consumers are willing to reward sustainable production practices. However, these BM elements traditionally have not been visible to the consumer and reaping the benefits of this consumer interest requires making the BMs more transparent. Our findings also uncovered heterogenous consumer preferences for sustainability attributes, which points to the importance of carefully selecting the attributes of the value proposition that are marketed to the different customer segments.

Firms can contribute to increased sustainable consumption through making purchase of sustainable items easier. We suggest that this can be done through addressing the preferences of different sustainability-oriented consumer segments, including preferences for more BM transparency, and importantly, through selecting suitable channels for communication and purchase. Through making sustainable purchase easier, firms help build demand for sustainable offerings, which in turn can stimulate other firms to turn to more sustainable production practices.

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