Research article

Assessing the potential of a niche market for wool products in South Africa

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Abstract: Ethical consumerism has been on the rise since the early 1900s; thus, increasing discerning consumers. Consumers place greater importance on intangible attributes such as the origin and societal and environmental impacts of the products. Studies focus on agricultural niche marketing in the South African and sub-Saharan context, but none focus on niche markets within the South African sheep wool industry. In this study, we investigated the niche market for local, handmade and socially responsible wool products in South Africa. Our methodology included interviews, a choice-based conjoint analysis and a multinomial logit model. The results revealed that South African high-income consumers preferred locally produced wool products over imported wool products. This was followed by consumers' preferring handmade over machine-made products as well as socially responsible wool products over those that provided no information on social responsibility. The existence of a niche market in South Africa was demonstrated when consumers preferred ethical wool products. We defined consumers' demographic and psychographic factors for a niche market. The findings can assist the South African wool industry and small-scale woolgrowers to identify niche markets for wool products by considering intangible attributes.

Keywords: socially responsible; handmade; local; willingness-to-pay

1. Introduction

South Africa exports more than 90% of the wool clip annually, and local woolgrowers are vulnerable to price fluctuations caused by global supply and demand [1]. Changes in the global market and synthetic products put woolgrowers in a price-cost squeeze, resulting in decreased profitability,

lower production gains and slower innovation adoption [2,3]. Lower profitability is even more of a concern to small-scale woolgrowers who are already resource poor. Small-scale woolgrowers are defined by the Department of Agriculture, Forestry and Fisheries (DAFF) [4] as farmers with herds of less than 100 sheep, generally from previously marginalized communities. The lower profitability severely impacts the livelihood of such small-scale farmers.

Small-scale woolgrowers' profitability is under pressure, which challenges them to find innovative solutions to increase their profit [5]. Theoretically, niche markets, which meet specific consumer needs, can be one way that woolgrowers earn higher profits. There has been an increase in ethical consumerism since the late 1900s with discerning consumers considering the environmental and social impacts of the products they purchase [6,7]. The intangible product attributes of ethical consumerism include origin, handmade, organic, animal-friendly, environmentally friendly, fairtrade and socially responsible agricultural products [8–20]. Corporate sustainability strategy is based on and relies on the concept of sustainable development [21]. A pool of literature consisting of conceptual, methodological, empirical and theoretical literature has been developed on sustainable business models in different regions of research [22–26]. To encourage sustainable development in the context of business, the triple bottom-line approach was introduced [27]. The triple bottom line with three dimensions: Economic, environmental and social was developed by Dyllick and Hockerts [28]. Corporate sustainability includes sustainability activities related to their social and environmental dimensions [21].

Social responsibility includes the producer's ethical behavior towards socially related issues. Some consumers prefer specific producers who behave ethically toward their employees and communities. Socially responsible firms promote employee wellness, community upliftment, diversity and product safety [9,10]. Origin relates to consumer preferences toward a geographic origin of specific products. Consumers may prefer products originating in a particular area for sensory purposes, such as taste or smell, as in the case of Karoo lamb [29]. Some consumers prefer products from their home region or country [8,19]. Handmade relates to consumers preferring handmade than machine-made mass-produced products. Handmade products are preferred for their idiosyncrasies and the human element in production [12]. Preference for handmade products is particularly dominant in the textile industry [13,14].

Niche marketing became popular within the textile industry in the early 2000s [11]. The nature of the wool industry is such that it leans towards ethical issues, which influence purchasing decisions [3]. The production of wool has environmental issues, which include chemical runoff during processing. The chemicals used to clean wool contaminate freshwater sources [11]. The production of wool products has a strong social impact. In many countries, products are produced by hand in sweatshops where employees work under harsh conditions for below minimum wage [10]. Thus, socially responsible practices among producers are increasingly important for consumers [3,6].

Small-scale emerging woolgrowers are uniquely situated to benefit from marketing wool products that are locally produced by hand in a socially responsible manner. The socially responsible attribute for small-scale farmers and their communities can be affiliated with community upliftment and development, a safe work environment and fair wages [9]. The establishment and development of small-scale farmers in South Africa are of interest in the current political climate [30]. Making wool products by hand in a local area can provide employment opportunities, which add to the social responsibility of the product. Small-scale emerging farmers and their communities could benefit from niche marketing to suit their current circumstances [9].

Despite the well-documented advantages of agricultural niche marketing and the expected

contribution to the livelihoods of small-scale woolgrowers, the potential of a niche market for South African wool products has not been explored. International studies show niche market opportunities for agricultural products based on intangible attributes such as socially responsible, organic, handmade, local, environmentally friendly and animal-friendly properties [13,19,31–34]. Thus, there is a global effort to investigate niche market opportunities within the agricultural industry. International studies have also been conducted on ethical consumerism in the wool industry [15,35–39]. However, these studies gained insight into wool apparel niche marketing opportunities in Europe, the United States of America and Australia.

To our knowledge, establishing a niche market for wool products based on intangible attributes has not been explored. As such, no scientific evidence is available to inform the wool industry about establishing a niche market with intangible attributes for wool products produced by small-scale farmers. Our aim of this study was to explore the establishment of a niche market for local, handmade and socially responsible wool products in South Africa. This was done by determining whether a market exists for niche wool products and whether consumers were willing to pay for the products. The first step was to determine whether consumers' valued intangible attributes. Then, the willingness of consumers to pay a premium for a wool product having these attributes was assessed. Insight into the prospect of small-scale woolgrowers being able to charge a higher price for wool products with specific attributes was gained. Last, a market segment based on consumers' demographic, economic and psychographic characteristics was identified to inform the wool industry about a niche market.

2. Materials and methods

2.1. Study area

The study was conducted in South Africa, situated at the southernmost point of Africa. The country has an estimated population of 59.62 million [40], represented by about 14.1 million households [41]. According to the 2011 census, 7.3% of South African households were considered "high income" household, earning above R 350,000 (USD 48,209[1]) per household per annum [42].

2.2. Sampling and data collection

High-income consumers are typically targeted in ethical marketing strategies, as they have higher disposable income to allocate toward social concerns [43,44]. Following McQuarrie [45], Cochran's [46] formula was used to determine the sample size for this study. Based on the population of 1.03 million "high-income" households and a 95% certainty level, 385 households constituted a representative sample.

The survey was hosted on an online platform, QuestionPro, where 715 consumers were given access to the survey via an invite link distributed by Question Pro from 21 to 25 June 2021. The respondents were presented with an online survey on a mobile device, where they had to answer various demographic questions using a choice-based conjoint analysis exercise. Choice-based conjoint analysis has been widely used in similar studies to assess consumer preferences and willingness to pay for wool product attributes [47], for socially responsible fruit and vegetables [48]; preferences toward

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[1] USD 1 = ZAR 7.26 in 2011 [34].

environmental, ethical and health attributes conducted in the United Kingdom [49]; preferences toward organic apples in Germany [50]; and preferences for fair trade coffee in the Cape Town market of South Africa [51]. Respondents were presented with four product profiles and a "none" option to allow them to choose none of the options. In total, 436 successful responses were received and included in the analyses.

2.3. Method and data analysis

2.3.1. Willingness to pay for wool products

The willingness-to-pay estimates was determined in two ways. The first was through the Garbor Granger question. Consumers were asked to respond with the likelihood of paying the product's presented price. The likelihood choices used a 5-point likelihood semantic differential scale, ranging from 'not at all likely' to 'extremely likely'. If the consumer selected extremely likely, a higher price was presented, up to ZAR 4500 (USD 619.83). If the consumer responded that it was not at all likely, a lower price was shown, down to R 780.00 (USD 107.44). If the consumer was not likely to pay any of the presented prices, "none" was captured in the data. Since an answer of "somewhat" does not show certainty that could result in real market behavior, the levels between "extremely likely" and "extremely unlikely" were excluded from the analysis.

In the second approach, the choice-based conjoint analysis, the willingness to pay was observed by including price as a product attribute at varying levels. The willingness to pay was observed in market behavior, as the consumer base the purchase decision on a set of attributes than only one attribute at a time. Lighthouse Studio version 9.9.2 was used to simulate different willingness-to-pay scenarios based on the consumer choices observed throughout the choice-based conjoint analysis tasks. The data were analyzed using Sawtooth Software Lighthouse Studio software, version 9.9.2, to determine the market segments and to complete market experiment for willingness-to-pay scenarios.

Survey responses regarding consumer preferences were analyzed on the basis of random utility theory [52]. The basic idea of choice theory is that an individual will make a choice from a set of alternatives such that utility is maximized. The utility of the product chosen will therefore be the highest under all available options under consideration by the consumer [53]. Three factors that must be taken into consideration are [54]:

1) The choice set;
2) The attributes influencing the consumer's decision;
3) The model of the individual consumers' choices and the behavior of the population.

In general, any market behavior model considers the external factors to the market, market information and the product attributes contributing to the consumer's decision [53]. The modeling approach to utility recognizes both a deterministic and a random component. The deterministic component is modelled in terms of the various observable factors such as the product attributes. The random component is assumed to represent all the unobservable factors in the choice process that may include taste and other characteristics that are unique to the individual. Let U_{iq} be the utility derived from the qth alternative for the ith individual. Based on Thurnstone [52], it can be written as:

$$U_{iq} = V_{iq} + \varepsilon_{iq} \tag{1}$$

Where V_{iq} represents the utility also known as the deterministic component, and ε_{iq} represents

the random component accounting for the unobserved characteristics of each individual. V_{iq} can be written as:

$$V_{iq} = \sum_{k=1}^{k} \beta_{ik} S_{iqk} + \sum_{n=1}^{N} \emptyset_{in} X_{iqn} \tag{2}$$

Where β_{ik} are the utility parameters for the qth alternative with k attributes. The $\emptyset_{in}$ are also utility parameters for the qth alternative that was chosen by individual I with characteristic n which weights nth characteristic. β_{ik} and ϕ_{ih} are assumed to be the same across all individuals i. Therefore, β_{ik} is simplified to β_k and ϕ_{ih} to ϕ_h. V is a linear utility function representing characteristics of the wool products and the individuals where S_{iqk} is the kth attribute of consumer choice q for the ith subject and X_{iqn} is the nth characteristic belonging to individual i who selected q. Equation 2 is now written as:

$$V_{iq} = \sum_{k=1}^{k} \beta_k S_{iqk} + \sum_{n=1}^{N} \emptyset_n X_{iqn} \tag{3}$$

The respondent will only select q over j only when:

$$U_{iq} > U_{ij} \tag{4}$$

Therefore, for all $j \neq q\epsilon B$, where B is the choice set presented to the respondent. Therefore,

$$V_{iq} + \varepsilon_{iq} > V_{ij} + \varepsilon_{ij} \tag{5}$$

Which can be rearranged as:

$$V_{iq} - V_{ij} > \varepsilon_{ij} - \varepsilon_{iq} \tag{6}$$

Where $\varepsilon_{ij} - \varepsilon_{iq}$ cannot be observed, so only the probability of the condition where 6 is held. The probability (Pr$_{iq}$) of the consumer i selecting choice q rather than choice j is represented as:

$$Pr_{iq} = \Pr[(\varepsilon_{ij} - \varepsilon_{iq}) < (V_{iq} - V_{ij})] = \Pr[\varepsilon_{ij} < \varepsilon_{iq} + v_{iq} - v_{ij}] \tag{7}$$

The independence-from-Irrelevant Attributes (IIA) axiom notes that the introduction of a third, irrelevant alternative to the choice set {A,B} will not affect the status of choice between A and B.

This implies that the ratio of probabilities of choosing one alternative over another is unaffected by the presence or absence of any additional alternatives in the choice set [54]. IIA implies that the random elements within the utility function (s, ø and ε) are independent across identically distributed alternatives.

Under the assumption that errors are distributed according to extreme value type 1 distribution, Equation 8 can be written as:

$$Pr_{iq} = \Pr(\varepsilon_{ij} < b + V_{iq} - V_{ij}) = \prod_{j=1}^{J} \exp(-exp - (b + Viq - Vij)) =$$

$$\exp(-b) \, exp\left[-\sum_{j=1}^{J} exp - (b + V_{iq} - V_{ij})\right] \tag{8}$$

The probability function shown in Equation 8 can be integrated over all possible values of ε to calculate probability of individual i choosing alternative q and can be written as Equation 9:

$$Pr_{iq} = \int_{b=-\infty}^{b=\infty} \exp(-b) \exp\left[-\sum_{j=1}^{J} exp - (b + v_{iq} - v_{ij})\right] db = \frac{1}{\sum_{j=1}^{J} \exp -(V_{iq} - V_{ij})} \tag{9}$$

Equation 9 is known as the multinomial logit (MNL) model and can be simplified to Equation 10:

$$Pr_{iq} = \frac{\exp(V_{iq})}{\sum_{j=1}^{J} \exp(V_{ij})} \tag{10}$$

To obtain estimates for willingness-to-pay (WTP), Equation 3 is adapted to Equation 11 which is written as:

$$v_{iq} = \alpha_q P_{iq} + \sum_{k=1}^{K} \beta_k S_{iqk} + \sum_{n=1}^{N} \emptyset_n X_{iqn} \tag{11}$$

Where α_q is the utility parameter for price Piq of the qth alternative as chosen by respondent i.

Examining the effect of the consumer's demographic and psychographic variables on consumer choices, these variables are included in the model through interaction terms with the attributes. Therefore, the utility function can be written as Equation 12:

$$V_{iq} = \alpha_q P_{iq} + \sum_{k=1}^{K} \beta_k S_{iqk} + \sum_{n=1}^{N} \phi_n X_{iqn} + \sum_{k=1}^{K} \gamma_{1k} S_{iqk} + \sum_{k=1}^{K} \gamma_{2k} S_{iqk} X_{iqn} + \sum_{k=1}^{K} \gamma_{3k} S_{iqk} X_{iqn} + \sum_{k=1}^{K} \gamma_{4k} P_{iq} + \sum_{k=1}^{K} \gamma_{5k} P_{iq} X_{iqn} + \sum_{k=1}^{K} \gamma_{6k} P_{iq} X_{iqn}$$

$$\tag{12}$$

Where λ_1, λ_2, λ_3 and λ_4 represent the interaction terms which are used to show how preferences toward attributes are related to individual respondent characteristics [52].
The Equation is further simplified to Equation 13:

$$V_{iq} = \alpha_q P_{iq} + \sum_{k=1}^{K} \beta_k S_{iqk} + \sum_{n=1}^{N} \phi_n X_{iqn} + \sum_{m=1}^{3} \sum_{k=1}^{K} \gamma_{mk} S_{iqk} Z_{iqnm} +$$

$$\sum_{m=4}^{6} \sum_{k=1}^{K} \gamma_{mk} P_{iq} Z_{iqnm} \tag{13}$$

Where z_{iqnm} represents the individual characteristic variable. The assumption is that consumers select alternative q over alternative j because the kth attribute is preferred in q rather than in the j alternative, so, $V_{iq} > V_{ij}$. Assuming that consumers are WTP a price premium (WTP_k) for alternative q, $v^2 iq = v_{ij}$ and P^2_{iq} is the sum of P_{ij} and WTP_k where v^2_{iq} represents the new utility where consumers pay more at price P^2_{iq}.

Therefore:

$$V_{iq}^2 = \alpha_q(P_{ij} + WTP_k) + \sum_{k=1}^{K} \beta_k S_{iqk} + \sum_{n=1}^{N} \phi_n X_{iqn} + \sum_{m=1}^{3} \sum_{k=1}^{K} \gamma_{mk} S_{iqk} Z_{iqnm} + \sum_{m=4}^{6} \sum_{k=1}^{K} \gamma_{mk}(P_{ij} + WTP_k) Z_{iqnm}$$

$$= V_{ij} = \alpha_j P_{ij} + \sum_{k=1}^{K} \beta_k S_{ijk} + \sum_{n=1}^{N} \phi_n X_{ijn} + \sum_{m=1}^{3} \sum_{k=1}^{K} \gamma_{mk} S_{ijk} Z_{ijnm} + \sum_{m=4}^{6} \sum_{k=1}^{K} \gamma_{mk} P_{ij} Z_{ijnm}$$

$$\tag{14}$$

and

$$\alpha_q(P_{ij} + WTP_k) + \sum_{\substack{l=1 \\ l \neq k}}^{K-1} \beta_l S_{iql} + \beta_k S_{iqk}^2 + \sum_{n=1}^{N} \phi_n X_{iqn} + \sum_{m=1}^{3} \sum_{\substack{l=1 \\ l \neq k}}^{K-1} \gamma_{ml} S_{iql} Z_{iqnm} + \sum_{m=1}^{3} \gamma_{mk} S_{iqk}^2 Z_{iqnm}$$

$$+ \sum_{m=4}^{6} \sum_{\substack{l=1 \\ l \neq k}}^{K-1} \gamma_{ml} Z_{iqnm}(P_{ij} + WTP_k) + \sum_{m=4}^{6} \gamma_{mk} Z_{iqnm}(P_{ij} + WTP_k)$$

$$= \alpha_q P_{ij} + \sum_{\substack{l=1 \\ l \neq k}}^{K-1} \beta_l S_{iql} + \beta_k S_{iqk}^1 + \sum_{n=1}^{N} \phi_n X_{iqn} + \sum_{m=1}^{3} \sum_{\substack{l=1 \\ l \neq k}}^{K-1} \gamma_{ml} S_{iql} Z_{iqnm} + \sum_{m=1}^{3} \gamma_{mk} S_{iqk}^1 Z_{iqnm} + \sum_{m=4}^{6} \sum_{\substack{l=1 \\ l \neq k}}^{K-1} \gamma_{ml} Z_{iqnm} P_{ij}$$

$$+ \sum_{m=4}^{6} \gamma_{mk} Z_{iqnm} P_{ij}$$

$$(15)$$

Where $S^2{}_{iqk}$ means the kth attribute is improved and preferred by individual i compared to $S^1{}_{iqk}$. Therefore, the individual's WTP for the kth attribute is calculated as:

$$WTP^k = -\left[\frac{\beta_k\left(S_{iqk}^2 - S_{iqk}^1\right) + \sum_{m=1}^{3} \gamma_{mk} Z_{iqnm}\left(S_{iqk}^2 - S_{iqk}^1\right)}{\alpha_q + \sum_{m=4}^{6} \gamma_{mk} Z_{iqnm}}\right] \qquad (16)$$

The standard error of WTP estimates is determined using the Delta method. A negative α_q is expected as the law of demand indicated a negative linear relationship. The consumer perception will determine whether β_k is positive or negative. When β_k is positive, it indicates that the consumer prefers the k attribute. A positive β_k results in a positive WTP. A positive WTP is indicative of consumers being willing to pay a premium for products with the attribute k.

The probability function is derived in terms of the indirect utility function where:

$$Pr_{iq} = \frac{\exp(V_{iq})}{\sum_{j=1}^{J} \exp(V_{ij})} \qquad (17)$$

Is rewritten by substituting Equation 11 for the indirect utility to get:

$$\bar{Pr}_{iq}^* = \frac{\exp(V_{iq})}{\sum_{j=1}^{J} \exp(V_{ij})} = \frac{e^{\alpha_q P_{iq} + \sum_{k=1}^{K} \beta_k S_{iqk} + \sum_{n=1}^{N} \phi_n X_{iqn}}}{\sum_{j=1}^{J} e^{\alpha_j P_y + \sum_{k=1}^{K} \beta_k S_{jk} + \sum_{n=1}^{N} \phi_n X_{ijk}}} = \frac{\left(e^{\alpha_q P_{iq} + \sum_{k=1}^{K} \beta_k S_{iqk}}\right) e^{\sum_{n=1}^{N} \phi_n X_{iqn}}}{\left(\sum_{j=1}^{J} e^{\alpha_j P_{ij} + \sum_{k=1}^{K} \beta_k S_{jjk}}\right) e^{\sum_{n=1}^{N} \phi_n X_{ijn}}} =$$

$$\frac{e^{\alpha_q P_{iq} + \sum_{k=1}^{K} \beta_k S_{iqk}}}{\sum_{j=1}^{J} e^{\alpha_j P_{ij} + \sum_{k=1}^{K} \beta_k S_{ijk}}} = \frac{\exp\left(V_{iq}^*\right)}{\sum_{j=1}^{J} \exp\left(V_{ij}^*\right)} \qquad (18)$$

Therefore:

$$U_{iq}^* = \alpha_q P_{iq} + \sum_{k=1}^{K} \beta_k S_{iqk} + \varepsilon_{iq} \qquad (19)$$

Equation 19 can be estimated by means of the maximum likelihood method. The parameters obtained can then be applied to estimate the WTP for the basic model where the effects of individual consumer characteristics are not considered [52]. The WTP can be determined with the effects of individual consumer characteristics by:

$$U_{iq}^{**} = \alpha_q P_{iq} + \sum_{k=1}^{K} \beta_k S_{iqk} + \sum_{n=1}^{N} \phi_n X_{iqn} + \sum_{k=1}^{K} \gamma_{1k} S_{iqk} Ver_{iq} + \sum_{k=1}^{K} \gamma_{4k} P_{iq} Ver_{iq} + \varepsilon_{iq} \quad (20)$$

2.3.2. Consumer Preferences for specific attributes

A MNL model is used to estimate the probability of the chosen alternatives as functions of the

alternatives' attributes. The attributes that were estimated using the MNL are presented in Table 1. There were three attributes included in the model. The estimated equation is represented in the following equation:

$$V_{iq} = \alpha Price + \beta_{ORG}ORG + \beta_{CSR}CSR + \beta_{HM}HM \tag{21}$$

Table 1. Descriptions of Attribute Variables.

Attributes	
Price	The price for a 100% merino wool blanket.
HM	Binary variable: 1 represents a blanket that was made by hand, and 0 otherwise.
ORG	Binary variable: 1 represents a blanket that was made entirely in South Africa and 0 otherwise.
CSR	Binary variable: 1 represents a wool blanket that was produced by a socially responsible producer and 0 indicates that no CSR information is included in the product label.

Sources: Author's.

Utility functions were then expanded to determine the relationship between consumer preferences and their characteristics. Demographic and psychographic data were collected from the survey and the variables of these characteristics are defined in Table 2 The demographic analysis focused on the gender of the consumers (GENDER), age (AGE), education (EDU), income (INCOME), province of residence (PROV). Ethical consumers have been shown to have higher education levels, with a majority having completed secondary school [55,56]. Research has found that ethical consumers are more frequently found within high-income earning groups [10,44,56,57]. The use of e-commerce is a popular marketing platform for ethical consumerism, increasing its popularity specifically among youth age groups [12]. The provinces with the largest urban areas are home to the majority of high-income consumers in South Africa [58]. Although South Africa is classified as a developing country, there are households earning high incomes within the country [40].

Socially responsible attributes influence product choice even when other intangible product attributes are featured in the design [59]. It has been shown that consumers value socially responsible attributes along with attributes such as origin, hand-made, organic and animal welfare [3,13,60,61]. For psychographic analysis the historical purchase behavior of organic (ORN), environmentally-friendly (ENV), hand-made (HMM), socially responsible (SR), animal-friendly (ANI) and charity affiliated (CHAR) products, which are illustrated by the following equation:

$$V_{iq} = \alpha Price + \beta_{ORG}ORG + \beta_{HM}HM + \beta_{CSR}CSR + \gamma_p Price + \gamma_{ORG}ORG + \gamma_{HM}HM + \gamma_{CSR}CSR \tag{22}$$

This data was utilized by Sawtooth Software Lighthouse Studio version 9.9.2 to determine the market segments and to complete market experiment for WTP scenarios. Sawtooth Software is a market leader in the field of market research software, and it is used by corporations around the world for market analysis in real markets. To conduct this research, a scholarship to use the software was awarded. However, the processes and exact mathematical operations of the market experiment tool are unknown and protected by intellectual property laws and patents.

Table 2. The demographic, economic and psychographic variables.

Variable	
GENDER	Binary variable where 1 represents male respondents and 0 represents female respondents.
AGE	Five defined age groups: 20–29 years, 30–39 years, 40–49 years, 50–59 years, 60–69 years, 70 years and more.
EDU	Represents the education of the consumer. Five defined groups: primary school, secondary school with no NSC, NSC, tertiary education, postgraduate qualification.
INCOME	Represents the monthly household income group of the consumer measured in South African Rand. Eight predefined groups: R41,000–R50,000, R51,000–R60,000, R61,000–R70,000, R71,000–R80,000, R81,000–R90,000, R91,000–R100,000, R100,000 and more
PROV	Represents the province in which the respondent resides. Nine categories: Gauteng, Mpumalanga, Limpopo, Eastern Cape, Western Cape, North West, Free State, KwaZulu-Natal and Northern Cape.
ORN	Represents whether a consumer has or has not purchased organic products in the past. Binary variable: 1: Yes 0: No
ENV	Represents whether a consumer has or has not purchased environmentally friendly products in the past. Binary variable: 1: Yes 0: No
HMM	Represents whether a consumer has or has not purchased hand made products in the past. Binary variable: 1: Yes 0: No
SR	Represents whether a consumer has or has not purchased socially responsible products in the past. Binary variable: 1: Yes 0: No
ANI	Represents whether a consumer has or has not purchased animal-friendly products in the past. Binary variable: 1: Yes 0: No
CHAR	Represents whether a consumer has or has not purchased products with charitable affiliation in the past. Binary variable: 1: Yes 0: No

Sources: Author's.

2.3.3. Consumer segments of the potential target market

Multinomial logit (MNL) was used to analyze the data collected from the survey since the dependent variable is categorical consisting of five categories (four product profiles and an option to choose none of them). Consumers make a discrete choice from a set of $J + 1$ alternatives. The utility for the ith subject belonging to segment j is shown as follows:

$$U_{ij} = \sum_{n=1}^{N} \beta_j X_{in} + \varepsilon_{ij}, J = 0, \dots, J \tag{23}$$

$$V_{ij} = \sum_{n=1}^{N} \beta_j X_{in}, j = 0, \dots, J \tag{24}$$

Where X_{in} represents the ith consumer's nth characteristics, β_j represents the parameters associated with segment j and ε_{ij} represents the associated error term. The subject belongs to segment j instead of segment k when $U_{ij} > U_{ik}$, for $k \neq j$. According to Nerlove and Press [62], the error

terms in MNLs are independent across segments and are distributed identically with Gumbel distribution:

$$F(\varepsilon_{ij}) = \exp\left(-e^{-\varepsilon_{ij}}\right) \tag{25}$$

Therefore, the probability of a subject with *n* characteristics belonging to the *j*th segment is written as:

$$\Pr(Y_i = j) = \frac{\exp(V_{ij})}{\sum_{k=0}^{J} \exp(V_{ik})} = \frac{e^{\sum_{n=1}^{N} \beta_j X_{in}}}{\sum_{k=0}^{J} e^{N_{n=1}^{N} \beta_k X_{in}}}, j = 0, \dots, J \tag{26}$$

Where Y_i is a random variable which indicates the consumer segment that the *i*th subject belongs to. Seeing that total probabilities equal one, normalizing the variables associated with the first segment to zero proves convenient [62]. Marginal effects of the characteristics on the probabilities with everything else remaining constant can be derived from the estimated coefficients. The probabilities in Equation 26 are differentiated with respect to the *i*th individual's characteristics (X_i):

$$\frac{\partial \Pr(Y_i = j)}{\partial X_i} = \frac{e^{\beta_j X_i}}{\sum_{k=0}^{J} e^{\beta_k X_i}} \left(\beta_j - \sum_{l=0}^{J} \frac{e^{\beta_1 X_i} \beta_l}{\sum_{k=0}^{J} e^{\beta_k X_i}}\right) \tag{27}$$

The total probabilities should equal to one. The marginal effects of the probabilities with respect to a change in a certain variable should sum to zero. Marginal effects are calculated at the sample mean. Marginal effects of single dummy variables are determined by the differences between the estimated probabilities at the boundaries of zero and one:

$$\Pr(Y_i = j \mid X_{ij} = 1) - \Pr(Y_i = j \mid X_{ij} = 0) \tag{28}$$

In the case of grouped dummy variables, the marginal effect of each dummy variable are calculated by a respective value and the rest of the variables within the group are held at a constant of zero.

3. Results

3.1. Descriptive statistics of consumers

Geographically, most consumers were from Gauteng (48.2%), followed by the Eastern Cape (19.5%) and KwaZulu-Natal (13.1%). The least consumers were from the Northern Cape and Free State. There were 52% male and 48% female responses. Most consumers (41%) were aged between 30 and 39 years. The 20–29 and 40–49-year age groups represented 21.1% and 21.3% of the consumers, respectively. About half of the consumers completed a tertiary qualification (52%) with 23% indicating a postgraduate qualification as their highest level of education. Eighteen percent of consumers completed secondary school as the highest qualification, while 5% had been to secondary school but did not receive a National Senior Certificate. Only two consumers (0.5%) reported attending primary school as their highest qualification.

When considering income levels, most of the consumers (31%) reported a monthly household

income between ZAR 31,000 (USD 4270) and ZAR 40,000 (USD 5510). The income group with the second highest representation was between R 41,000 (USD 5647) and R 50,000 (USD 6887) per month, with 21.3% of consumers in this category. A monthly income between R 51,000 (USD 7025) and R 60,000 (USD 8264) was reported by 12% of the consumers. A total of 27% of the consumers reported a monthly income greater than R 71,000 (USD 9780). This resembled the distribution in education.

The summary of the consumers' historical purchasing of ethical products is presented in Table 3. Environmentally friendly products were previously purchased by 61%, handmade products by 51% and fairtrade products by 51% of the consumers. Although not ranked at the top of the list, many consumers selected organic, socially responsible and animal-friendly products at 49%, 48% and 43%, respectively. Most consumers (92%) reported having purchased wool products.

Table 3. Consumers' historical purchasing of ethical products.

Product attributes	Number of responses	Percentage of responses
Organic	212	49%
Environment friendly	264	61%
Animal friendly	185	42%
Socially responsible	207	48%
Charity	117	27%
Fairtrade	222	51%
Handmade	223	51%
Wool purchases		
Have previously purchased wool	402	92%
Have not previously purchased wool	34	8%

Sources: Author's.

3.2. Willingness-to-pay for wool products

Consumers were presented with 100% wool, handmade, socially responsible and locally produced blankets at price ranges used in the choice-based conjoint study and one additional level of ZAR 4500 (USD 619.83). Regarding consumers willing to pay for a blanket with specified product attributes, 13% were not highly likely to purchase the blanket at any price. In comparison, 9% were likely to pay the lowest price. The consumers willing to pay the middle price points of ZAR 1560.00 (USD 214.88) and ZAR 2340.00 (USD 322.31) represented 5.5% and 6.2%, respectively. Fewer consumers (4%) were extremely likely to pay ZAR 3120.00 (USD 429.75), and 2.3% were highly likely to pay the highest price of ZAR 4500.00 (USD 619.83).

The first willingness-to-pay scenario was for a 100% wool, handmade, socially responsible and locally produced blanket. This combination of attributes was of specific interest in this study. This experiment was conducted with the minimum price option of ZAR 760.00 (USD 104.68). Therefore, only four price attributes were included. Results showed that 52% of consumers were willing to pay ZAR 1510.00 (USD 207.99) (premium of 94%), while 15% were willing to pay ZAR 2270.00 (USD 312.67) (premium of 191%) and 8% were willing to pay ZAR 3020.00 (USD 415.98) (premium of 287%). The highest price point of ZAR 3780.00 (USD 520.66) was selected by 7% of the consumers at a premium of 385%. Consumers unwilling to pay any specified prices represented 18% of the total.

3.3. Consumer preferences for specific attributes

Multinomial logit models were used to determine consumer preferences for the selected attributes, the utilities for each attribute and the willingness to pay for that attribute. This was done to estimate the premiums consumers would pay for local, handmade and socially responsible wool products and for the establishment of a potential niche market. The results from these analyses are shown in Table 4. The intangible product attributes and price were all significant contributors to consumers' purchase decisions ($p < 0.01$). The two-way interactions between each of the intangible product attributes (origin and social responsibility, origin and handmade and handmade and social responsibility) were insignificant for consumers' purchasing decisions. However, the two-way interactions between the intangible product attributes and the price were significantly influenced consumer choices ($p < 0.01$). Table 4 shows that price was the most critical attribute influencing consumer purchasing behavior. The negative value indicated that a price increase was associated with a decreased purchase probability. After price, the handmade attribute was the second-most important, followed closely by origin and social responsibility. The handmade attribute increased the probability of purchasing frequency to the largest extent. This was followed by the presence of a "Made in South Africa" (ORG) and "Social Responsibility" (CSR) labels, respectively.

Table 4 depicts the utility consumers perceived for each product attribute. The sum of utilities for a product must be equal to one. Price was the attribute with the highest contribution to utility, at 65%, with handmade, origin and social responsibility following, at 13%, 12% and 10%, respectively. These utilities indicated the order and portion of the importance of each attribute in consumers' choices. Consumers were willing to pay ZAR 276.57 (USD 38.10) more for a handmade product than a machine-made product, ZAR 232.25 (USD 32.00) more for a locally produced product than an imported product and ZAR 212.96 (USD 29.33) more for a product that was produced in a socially responsible manner.

Regarding intangible product attribute levels, consumers preferred handmade to machine-made products 55% of the time. Consumers selected the socially responsible alternative 64% of the time. The most popular was the locally produced product attribute, which consumers preferred over imported products 71% of the time. The data suggest consumers valued handmade, socially responsible and locally produced product attributes. When products were presented with these exact attribute combinations, consumers usually selected the lowest price point. Interestingly, 3% of the consumers preferred the highest and second-highest price points.

Table 4. Multinomial logit model estimation of consumers' willingness-to-pay (WTP) and utility for different attributes.

	Coefficients				Utility estimates	
Variable	Coefficient	WTP	df	Significance	Utility estimates	t-Statistic
Price	−0.724***		1	p < 0.01	0.650	0.341
HMM	0.323***	276.57* (0.042)	1	P < 0.01	0.131	0.296
ORG	0.289***	232.25* (0.038)	1	p < 0.01	0.118	0.128
CSR	0.272***	212.96* (0.027)	1	p < 0.01	0.101	0.238
HMM_ORG	0.023		1	Not significant		
HMM_CSR	0.019		1	Not significant		
CSR_ORG	0.001		1	Not significant		
Price_ORG	0.523***		1	p < 0.01		
Price_HMM	0.418***		1	p < 0.01		
Price_CSR	0.462***		1	p < 0.01		

Note: Number of observations: 436; parentheses denote standard errors for willingness-to-pay estimations; ***, **, *: statistically significant levels of 1%, 5% and 10%, respectively; HMM: handmade products; ORG: origin of the blanket made in South Africa; CSR: wool blanket produced in a socially responsible manner. Sources: Author's.

3.4. Consumer segments of the potential target market

Consumer preference for handmade, socially responsible and locally produced wool blankets at defined price points per province in South Africa is given in Table 5. Gauteng represented 48.2% of the consumers, and 80% were willing to purchase the specified blanket. The Western Cape represented only 3.9% of the consumers, of which 76% were willing to buy the specified blanket. The Eastern Cape represented 19.5% of the total consumers, with 78% indicating that they were willing to buy the blanket. KwaZulu-Natal accounted for 13.1% of the consumers, of which 84% were willing to purchase the product. Those consumers from the Eastern Cape and KwaZulu-Natal who were willing to buy the blanket represented 15% and 11%, respectively, of the entire South African market. Interestingly, all the consumers from Limpopo, Free State and the Northern Cape were willing to purchase the specified product.

Table 5. Consumer preference for handmade, socially responsible and locally produced wool blankets at defined price points (ZAR) from each province.

	Gauteng		Eastern Cape		KwaZulu-Natal		Mpumalanga		Limpopo		Western Cape		North West		Free State		Northern Cape		Total for South Africa	
Product price (ZAR)	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
R 1510	114	26%	43	10%	30	7%	8	2%	10	2%	8	2%	7	2%	8	2%	3	1%	231	53%
R 2270	30	7%	12	3%	9	2%	3	1%	4	1%	2	0%	2	0%	2	0%	1	0%	65	15%
R 3020	14	3%	5	1%	5	1%	3	1%	3	1%	1	0%	1	0%	1	0%	1	0%	34	8%
R 3780	11	3%	6	1%	4	1%	4	1%	2	0%	2	0%	1	0%	0	0%	0	0%	30	7%
None	41	9%	19	4%	9	2%	2	0%	0	0%	4	1%	1	0%	0	0%	0	0%	76	17%
Total	210	48.2%	85	19.5%	57	13.1%	20	4.6%	19	4.4%	17	3.9%	12	2.8%	11	2.5%	5	1.1%	436	100%
Share of the total market		39%		15%		11%		4%		4%	3%			3%		3%		1%	436	100%
Consumers willing to buy a blanket	169	80%	66	78%	48	84%	18	90%	19	100%	13	76%	11	92%	11	100%	5	100%	360	83%

Sources: Stats SA [41] and Author's calculation.

The percentage of each willingness-to-pay experiment was expressed as the likelihood that a consumer had previously purchased each specified product. The results reported in Table 6 shows the probability that a consumer who was willing to buy the specified wool blanket had previously purchased products with the listed intangible attributes. Whether consumers had previously owned wool products or not was included in the same estimation.

Table 6. The likelihood of consumers having previously purchased the specified intangible product attribute and/or wool products.

Intangible product attribute	Percentage likelihood of previous purchase (%)
Organic	49
Environment friendly	61
Animal friendly	31
Socially responsible	48
Charity	27
Fairtrade	52
Handmade	53
Wool purchases	
Previously purchased wool	94
Had not previously purchased wool	6

Sources: Author's.

Further, Table 6 shows that a consumer willing to purchase the specified wool blanket had most likely previously purchased environmentally friendly products (61%). The various intangible product attributes all showed at least a 27% likelihood of prior consumer purchases showing a preference for the specified wool blanket. The average probability of a consumer purchasing an ethical product with any of these attributes was 45.9%. At 94%, the consumers were highly likely to have made prior wool product purchases. This strongly suggested that the willingness of these consumers to purchase the specified wool blanket was related to their previous experiences and familiarity with wool products. Of the intangible attributes, consumers were more likely to have previously purchased a handmade product than a socially responsible one. The probability of consumer willing to purchase the specified wool blanket had a 53% likelihood of having previously purchased a handmade product. In comparison, 48% were likely to have previously purchased a socially responsible product.

4. Discussion

We gained an understanding of South African consumers' preferences toward local, handmade and socially responsible wool products. Consumer choices with different combinations of attribute levels were evaluated using choice-based conjoint analysis. The results showed that within the South African high-income market, 71% of consumers preferred locally produced wool products over imported wool products. This finding relates to Adams and Salois, Soley et al. and van Zyl et al. [8,19,29] who found that origin is an important determinant of consumers' preferences. Similar to Czaplewski [12], about 55% of consumers preferred handmade over machine-made products. Socially responsible wool products were preferred over those giving no information by 64% of consumers, which was similar to findings of Andersone and Gaile-Sarkane, and Bhattacharya and Sen [9,10]. Consumers in the South African market valued intangible and ethical product attributes. This is in accordance with Fuchs et al., Soley et al., Brown et al., Henderson and Arora, Janssen and Hamm and Kanta and Srivalli [13,19,31–34]. Therefore, there is a niche market for consumers who prefer local, handmade and socially responsible wool products in South Africa. While a preference for food with certified origin has been found amongst South African consumers [29], the results revealed that a market for certified wool products

also exists. A niche market could help small scale wool growers to increase their profit [5]. This will contribute to benefit the surrounding community through a spill-over effect when they become involved in making handmade products [9].

The results that showed 52% male and 48% female was consistent with 2020 census estimates of the South African population, which reported 51% females and 49% males in South Africa [40]. A discrepancy was found between the study and census reports on education statistics where 59% of the South African population had a National Senior Certificate and only 7% had tertiary qualifications [38]. The discrepancy may have been caused by the selection of a higher income population. Consumers preferences towards ethical products could be an indication of preferences toward ethical product attributes among highly educated, high-income consumers in South Africa.

The willingness to pay for the specified wool blanket revealed that 9% of consumers were willing to pay R 780, with 5.5% at R 1510.00, 6% at R 2270.00, 4% at R 3020.00 and 2% at R 3780.00. The price attributes included in the choice-based conjoint analysis resulted in 53% of consumers showing a willingness-to-pay a premium of 94%, 15% at 191%, 8% at 287% and 7% at 385% for the specified wool blanket. Thus, some consumers were willing to pay a premium for the product. However, the potential market is small and will not provide sufficient demand for all the wool in the country. It is thus important to target potential buyers who have already bought wool products in the past and are familiar with the characteristics.

These results provide information on the potential premiums that could be derived from the specified market, which can determine the feasibility of a market in the wool industry. Based on demographic, economic and psychographic factors, the regions with the most consumers, who preferred local, handmade, socially responsible products and were willing to pay a minimum premium of at least 94%, lived in Gauteng (49%), Eastern Cape (15%) and KwaZulu-Natal (12%). Products with the specified intangible attributes should be marketed in these regions first. While a large share of the consumers in the Northern Cape, Free State, North West, Western Cape, Limpopo and Mpumalanga provinces indicated that they were willing to pay premiums for wool products, the size of these markets (share of total market) will make it challenging for physical retail stores to operate profitably and should rather consider online platforms.

5.   Conclusions

Our results suggest that premiums could be earned on niche wool products with specific intangible attributes. An implication of this study is that a market exists for niche wool products for which a premium could be earned. Producers are encouraged to pursue practices that appeal to these niche markets. Another implication is that the potential niche markets in South Africa seemed to be region-specific. It is recommended that wool products for niche markets should be introduced into these areas first to increase their chances of uptake and continued existence. Farmers are encouraged to collaborate with businesses, governments, communities and cooperatives to establish projects in South Africa. Establishing such operations could provide small-scale farmers with alternative marketing channels. Farmers and their communities can integrate into value-adding activities, increasing their product's value and profitability.

This study is novel in the sense that choice based conjoint analysis was used to determine consumer willingness to pay for these wool products. Limitations to the study include that this study took place in 2020 and 2021, during the peak of the coronavirus pandemic. As a result of the pandemic,

many face-to-face research techniques posed health risks and several logistical obstacles. Due to financial, time and logistic limitations, an online survey was chosen to gather the data from consumers. Online surveys are infamous for low response rates, respondent fatigue and order bias [45]. Here, we relied on the physical attributes of the product under consideration by consumers remaining constant. Information could be gathered about the consumers' preferences toward intangible product attributes, but no information is presented on the type of product that consumers prefer, based on the physical characteristics. Recommendations for future studies include investigating other intangible wool product attributes in the South African textile market. Intangible product attributes include environmental, organic and animal welfare attributes, which were not the focus of this study. Feasibility studies should be conducted on whether marketing wool products with local, handmade and socially responsible attributes would be profitable while accounting for the related increased production costs.

Use of AI tools declaration

The authors declare that they have not used Artificial Intelligence (AI) tools in the creation of this article.

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Conflict of interest

The authors declare no conflict of interest.

Ethical consideration

Ethical clearance for the protocol was approved by the Research Ethics Committee at the University of the Free State in accordance with the General/Human Research Ethics (GHREC) guidelines and regulations. Reference number UFS- HSD2021/0183-0001.

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