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The economic potential for an origin based marketing and certification system for a meat product in South Africa: Perceptions, preferences, and experiments.

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Abstract

The difference between hypothetical and real values when evaluating consumers' preferences (termed 'hypothetical bias') has received significant attention in scientific literature, as the outcome of this bias is often an overestimation of willingness to pay (WTP) values. This is the main focus of this paper as we unpack South African consumers' perceptions and preferences for an origin based meat product through a set of different methodologies. These different approaches (sensory analysis, perception analysis, conjoint analysis, experimental auction and an in-store experiment) are all employed to illustrate the 'hypothetical bias' but also to establish beyond any doubt the market potential for a specific origin based meat product and also to test the consumers' willingness to pay a premium, and the range of the premium obtained from different methodologies. This paper presents the results of a number of studies applying different methods related to the same product but with different groups of consumers in different locations. The different results suggest that there is sufficient evidence that suggest that the regional identity of the product is important. It is further also evident that the various willingness to pay estimates presented different results. It is however clear that the stated preference methods confirm the hypothesis that consumers recognise the reputation of the product and will be willing to pay premium. This conclusion is strengthened by the positive results from the stated preference methods (the experimental auction and in-store experiment). Together these results present a strong case for the marketing potential of origin based mutton / lamb which could sell at a price premium similar or slightly higher than comparable existing luxury and niche lamb brands on the South African market.

1. Introduction

Countries in the European Union have a long tradition of producing food products whose quality and reputation is linked to the region where they are produced. A common legislative framework in the EU such as regulations EEC 2071/92 and 2082/92 as well as *sue generis* legislation in different countries protect the reputation and image of these typical food products against misappropriation and other practices that lie about the real origin and character of the product. This tradition of protecting origin based food products is not that common in countries outside the European Union although there are cases where Geographical Indications (GIs) for well-known food products are registered such as Basmati rice in India, Colombia Coffee, etc. South Africa is one of those countries where no specific legislation or practises are in place to protect regional identity of food products. As a result origin based food marketing has not developed to its full potential in South Africa although latest food trends show increasing appreciation amongst consumers for 'local' foods.

The question whether there is a potential for the introduction of a system of Geographical Indications (GIs) in South Africa was the subject of a research project initiated in South Africa. Although the study investigated a number of case studies with potential to be operated as a geographical indication, this paper focuses only on one of those case studies namely mutton and lamb from the Karoo region. The Karoo region in the centre of South Africa is a vast semi-arid region of the country where virtually no crop production takes place. Wool and mutton production, on natural grazing with grazing capacity of between 6 to 10 hectares per small stock unit is, the dominant economic activity. At the same time the images of the Karoo are engrained in the minds of many South Africans when they think of the region. Because of these images and the tranquillity and honesty of the Karoo way of life the 'Karoo' concept has become synonymous with quality, tradition and wholesomeness. As a result people and business not even remotely linked to the geography or the values and images of the region; exploit the word Karoo to make profit.

Karoo mutton and lamb has over the years through folklore and South African culture been established as a meat of origin in South Africa, although not necessarily as a formal Geographical Indication. The product has gained reputation over decades for its quality and unique sensory attributes such as the flavour of the meat which has tested direct links with the natural veld. This unique taste in combination with the nostalgia generated by the perception of the Karoo region presents a powerful identity and regional connotation and therefore a clear marketing opportunity.

Convincing producers and other role players that establishing an origin based certification scheme is a good idea is a difficult task, especially in the absence of collective action and in a region that covers 700 km^2 and with producers dispersed across the region and with logistics to the main markets a major concern. It is therefore argued that the only aspect that will influence the ultimate decision to go for a scheme of certified and coordinated marketing is whether the product's image and identity can extract a premium from the market above lamb and mutton from other regions and from different production systems in South Africa. This is the main question this paper will address.

A large number of studies have recently been published in the international agricultural economics literature dealing with consumer preferences on typical food products and origin based food systems or related to consumer preferences for organically produced food. The literature on consumer preferences related to origin based food has largely focussed on how quality (in this case origin) certification influence the behaviour of European consumers (such as the paper by Resano-Ezcaray, Sanjuan-Lopez and Albiso-Aguado, 2010) or how consumers perceive the value of Country of Origin Labelling (COOL) in the United States (e.g. Loureiro & Umberger, 2006; Evans *et al*. , 2008; Lim, *et al*., 2011). Many of these studies used various techniques ranging from standard willingness to pay techniques or including other techniques to measure stated preferences such as conjoint analysis or conjoint ranking experiments and also using revealed preference methods.

In this paper we apply a combination of sensory analysis, perception analysis, stated preference methods (through a conjoint analysis); and a range of revealed preference methods (an experimental auction and a retail store experiment) to establish the South African consumers' willingness to pay a premium for mutton and lamb from the Karoo under a proposed scheme that will guarantee the origin of the product.

2. Methodology and data overview

Willingness to pay (WTP) could be defined as the maximum amount of money a consumer would pay for a given quantity of a product, given a specific set or bundle of attributes present in the product (Kalish & Nelson, 1991). The methods applied in economic scientific literature to measure consumers' willingness to pay (WTP) for products with particular quality attributes could be divided into two main groups: stated preference- and revealed preference methods (Lusk & Shogren, 2007).

Stated preference methods rely on the statements of individuals with regards to their preferences in a set of options in order to estimate their utility function (Kroes & Sheldon, 1988). Loureiro, *et al*. (2003) define stated preference methods as simply asking respondents questions with the intention of eliciting their preferences for a specific good, without requiring that the participant acts accordingly. The three most widely used stated preference methods applied to general analysis of consumers' choices and WTP for products or services, are conjoint analysis, choice experiments and the contingent valuation method (Van Zyl, 2011). The main strength of the family of stated preference methods is that the researcher can create a hypothetical market where goods are bought or sold, implying that consumer choices about hypothetical product can be analysed (Lusk & Shogren, 2007). According to Kimenju, *et al*. (2005) preference methods are relatively easy to control and not as costly as revealed preference methods with the reason being that only hypothetical situations and products are presented. Stated preference methods are also more

flexible in being able to deal with a wide variety of variables within a particular experimental design (Kroes & Sheldon, 1988). The most significant critique against stated preference methods relates to the potential discrepancy between the participants stated preferences and their actual preferences and behaviour implying that WTP values could easily be under- or overstated due to factors such as the hypothetical nature of the product and / or the lack of incentive to state their true WTP as there is no commitment or consequences for their stated value (i.e. lack of incentive compatibility) (Wardman, 1988; Loureiro, *et al*., 2003; Voelckner, 2006; Kimenju, *et al*., 2005).

Revealed preference methods use actual consumer decisions to model consumers' preference, thereby using actual purchasing behavioural information of the consumer to reveal preferences (Loureiro, *et al*., 2003). Revealed preference methods, in particular experimental auctions, are quickly gaining momentum in terms of food preference research, as confirmed by Corrigan, *et al*. (2009) describing experimental auctions as one of the most common experimental valuation methods in agricultural economics at that point in time. The main strength of revealed preference methods is that real choices are examined and the data obtained is therefore very accurate (Lusk & Shogren, 2007). Some of the weaknesses of this family of methods are that the revealed preference method cannot be used when a novel product is being developed, because no direct observation of consumer behaviour is possible (Kroes & Sheldon, 1988). A further disadvantage of revealed preference methods, as pointed out by Caldas & Black (1997), is that the results and choices made against the actual set of options depends only on the respondent's market perception. Thus, the researcher cannot control the boundaries of the experiment, meaning that boundaries were pre-specified (any external influence that could affect the respondent's market perception) in the actual market situation where data was observed and the researcher has no control over the external influences affecting the consumers choices. Finally, due to generally higher cost implications of these methods lower sample sizes are usually applied compared to stated preference methods.

As mentioned above this paper aims to establish South African consumers' willingness to pay a premium for mutton and lamb from the Karoo under a proposed scheme that will guarantee the origin of the product. This is achieved by constructing a synthesis of a number of methods applied to test consumers' perceptions towards and WTP for mutton or lamb from the Karoo. These methods ranged from sensory analysis, in-depth perception analysis (traditional perception testing through a survey approach as well as an application of the association pattern technique to apply means-end chain theory), stated WTP preference methods (simple WTP perception statement, Van Westendorp's WTP techniqueand conjoint analysis) and two revealed preference methods namely an experimental auction and a retail store experiment. Table 1 provides a summary of the five consumer studies that provide the basis for the synthesis presented in this paper, in terms of research objectives and methodologies applied.

The body of the paper mainly focuses on the results obtained within the various studies and how they contradict or confirm the results of each study. The first results section presents the results from the two studies employed to establish the reputation of Karoo mutton / lamb (i.e. sensory analysis and the initial perception survey). Then further evidence is explored to support the establishment of the reputation of Karoo mutton / lamb and the estimation of WTP (i.e. the conjoint and APT analyses). The final results section focus on the applied revealed preference methods to estimate WTP for Karoo mutton / lamb (i.e. an experimental auction and a retail store experiment). The conclusion presents a synthesis of all the results and explores subsequent marketing and economic implications.

Table 1 (Part 1): Methodology overview of the various studies on Karoo Lamb focusing on consumer behavior, perceptions and willingness to pay

Study scope:	**Initial survey to establish the reputation of Karoo lamb ('Study 1')**	**Applying conjoint analysis to investigate consumers' preference for Karoo lamb('Study 2')**
Year conducted:	**2007**	**2009**
Study objective(s):	To investigate the reputation of Karoo lamb through consumers' awareness and perceptions of the product.	To determine consumers valuation of key attributes and attribute levels that influence their purchasing decision of mutton/lamb with a focus on Karoo lamb (meat-of-origin) (incl traceability).
Methodology overview:	Questionnaire containing a combination of open- and closed questions (i.e. categorical options and rating scale options).	Conjoint analysis with a fractional factorial design & part-wise evaluations(Hair, *et al*., 1998; Koo, *et al*., 1999, North & de Vos, 2002)
Target sample:	Wealthier consumers of all main ethnic groups within LSM 8 to 10[1] who consumes mutton / lamb at least once per month. Geographic focus: Gauteng and Western Cape provinces[2].	Wealthier consumers who consumer mutton / lamb, with variations in gender, income groups and age categories.
Sample size:	Target: Gauteng, n=120; Western Cape, n=120. Valid: Gauteng, n=93; Western Cape, n=99.	Electronic questionnaires were distributed to 1011 respondents. Valid responses: 352 questionnaires (34.9% response rate).
Sampling approach:	A combination of random- and convenience sampling.	A random selection of respondents on the research database of the Consulta marketing research firm.
Data gathering procedure:	A combination of personal interviews and self-completion of questionnaires.	Electronic distribution of self-completion questionnaires.
Main survey components:	Demographic background; Basic questions on the purchasing, consumption and affordability of various meat types; More specific questions on the purchasing and consumption of mutton / lamb; Consumers' awareness, purchase behaviour, consumption and perceptions related to Karoo mutton / lamb and the Karoo region specifically.	The conjoint analysis attributes and attribute levels were: Traceability (to animal/birth farm/abattoir/processing plant/none); Origin (Local region/SA national/No region/Karoo specific region); Quality (through certification/labeling, branding/origin/ Not assured); Safety (through certification/labeling, branding/place of purchase/Not guaranteed/No safety knowledge); Price (9 levels +10% to -10%)
Data analysis procedures:	Descriptive statistics and one-way ANOVA average comparisons conducted in SPSS.	Conjoint analysis syntaxes in SPSS.

[1]Wealthy consumers were targeted, given the expensive nature of mutton. Consumers in LSM 8 to 10 account for an estimated 45% of total household expenditure on mutton in South Africa (calculation based on data from the Bureau of Market Research – Martins, 2005).

[2]Gauteng was included in the study since, according to industry representatives the bulk of Karoo mutton / lamb produced in South Africa is marketing within the Gauteng region. On the other hand the Western Cape was included in the survey given the geographical proximity and cultural links with the Karoo region.

Table 1 (Part 2): Methodology overview of the various studies on Karoo Lamb focusing on consumer behavior, perceptions and willingness to pay

Study scope:	**Applying Means-end-chain theory and association pattern technique to investigate consumers' preferences and WTP for Karoo mutton / lamb ('Study 3')**	**Applying experimental economics to determine consumers' willingness to pay for Karoo mutton / lamb (Study 4)**
Year conducted:	**2009**	**2009 / 2010**
Study objective(s):	To investigate the perceptions driving consumers' purchase decisions regarding Karoo lamb by considering relevant attributes, consequences and values according to the Means-end chain theory. To investigate consumers' willingness to pay (WTP) for Karoo lamb	To apply an*n*th price experimental auction to determine consumers' WTP for certified Karoo mutton / lamb and to test the impact of different information treatments on consumers' bidding behavior.
Methodology overview:	The association pattern technique (APT) was applied as a data collection method to apply means-end chain theory (Gutman, 1982; Ter Hofstede, *et al*., 1998; Olson & Reynolds, 1983; Feunekes & den Hoed, 2001; Nielsen *et al*, 1998).Estimation of WTP with Van Westendorp's technique (Draeger & Perham, 2009).	*n*th price experimental auction with six bidding rounds incorporating three information treatments (based on Cunningham, 2003).
Target sample:	Wealthier consumers who consumer mutton / lamb, with variations in gender, income groups and age categories.	Wealthier mutton / lamb consumers who are also the main buyers of meat in the household. Gender and age not specified.
Sample size:	Valid responses: 276 completed questionnaires	60 respondents were invited, of which 31 consumers participated in the auction.
Sampling approach:	A random selection of respondents on the research database of the Consulta marketing research firm.	Convenient sample complying with the target sample selection criteria.
Data gathering procedure:	Electronic distribution of self-completion questionnaires.	Central location *n*th price experimental auction complimented with self-completion survey instrument.
Main survey components:	Initial focus groups. Application of APT to elicit attributes, consequences and values of Karoo lamb consumers. Estimation of WTP with Van Westendorp's technique's perceived price levels (too expensive, expensive, affordable, too cheap – bad quality).	Pre-survey: • Red meat and mutton / lamb (generic & Karoo) purchasing and consumption behavior • Karoo mutton / lamb perceptions • Demographics Experimental auction: Bidding on a 400g packet of lamb chops with a R200 monetary endowment. • Round 1 & 2: Exposure to Karoo lamb logo on label • Round 3 & 4: Exposure to information sheet as well • Round 5 & 6: Exposure to informative talk as well
Data analysis procedures:	Means-en-chains were analysed through Hierarchical Value Maps. WTP was analysed by applying the Van Westendorp's technique.	Pre-survey: Descriptive and comparative statistics (e.g. Pearson Chi-square test) in SPSS Auction: one-way ANOVA to explore differences between bidding rounds and other variables in SPSS

3. Establishing the reputation of Karoo Lamb

Reputation is a shared asset determined by the product's historical presence in the region, product specificity and consumers' perceptions that could be determined on a local, national or international basis (Barjolle & Sylvander, 2002). The historical presence of Karoo lamb within South Africa is a well-established fact. On the other hand, as mentioned earlier, the potential product specificity of Karoo lamb relates specifically to the unique flavour of the meat, associated with the Karoo grazing plants eaten by the sheep. Thus, in order to establish the product specificity of Karoo lamb and mutton it was critical to apply sound scientific methodologies in order to determine whether there is a sensory detectable difference between mutton produced in the Karoo region compared to mutton produced in a different area in South Africa namely Free Sate and a neighboring country (Namibian lamb available in the South African fresh meat trade). The second component of a product's reputation relates to consumers' perceptions regarding the reputation of the product, which in this case had to be investigated on a national level, since Karoo mutton / lamb is not an export product.

3.1 Trained panel sensory evaluation

A scientific evaluation of the link between the unique flavour of the meat associated with the Karoo grazing plants[3], was conducted by an accredited sensory laboratory in 2008 through trained panel sensory analysis (n=10) (Vermeulen, Schönfeldt & Kirsten, 2008). No sensory detectable difference was found between the two main sheep breeds. The significance of these results relates to consistency in the context of a potential GI, since the South African carcass classification system that does not specify breed is scientifically correct in doing so, and that for the purpose of establishing a GI it need not be stricter than current legislation. A comparison of the sensory profile of mutton / lamb from the different Karoo regions revealed the absence of significant sensory detectable differences, which translates into the fact that the Karoo region consistently produces a similar type of mutton / lamb product. Furthermore the Karoo mutton / lamb also did not differ from the mutton / lamb originating from the adjacent Western Free State. Given the fact that mutton / lamb produced in these regions is mostly extensively produced on natural pasture, these results could be explained to some extent by the fact that in years of good rain (as was the case during the plant sampling for this project), numerous grazing plants are present in the wider Karoo region crossing the provincial boundaries between the Karoo and Western Free State.

Principal Component Analysis (PCA) was applied to identify the attributes that differentiate the most between the various mutton samples (Figure 1). A number of interesting observations are evident from the PCA analysis. Mutton / lamb from the De Aar Karoo region were most intense in the herbal and mutton aroma and flavour components. However, even though Namibian mutton / lamb was not significantly different from the other regions the PCA results indicated that Namibian mutton / lamb grouped separate from meat from all the other Karoo-like regions and was most intense in musty and livery flavour and aroma attributes.

[3]The grazing plants were selected based on research conducted by the Department of Agriculture (Carnavon experimental farm), as well as consultation with other experts and Karoo farmers and included *Plnthuskarrooicus* ("Silverkaroo"[3]), *Penziaspinescens*("Skaapbossie"), *Eriocephalusericoides*("Kapokbossie"), *Salsolaglabrescens*("Rivierganna"), *Pentziaincana*("Ankerkaroo") and *Pieroniaglauca / roseniahumilis*("Perdebos").

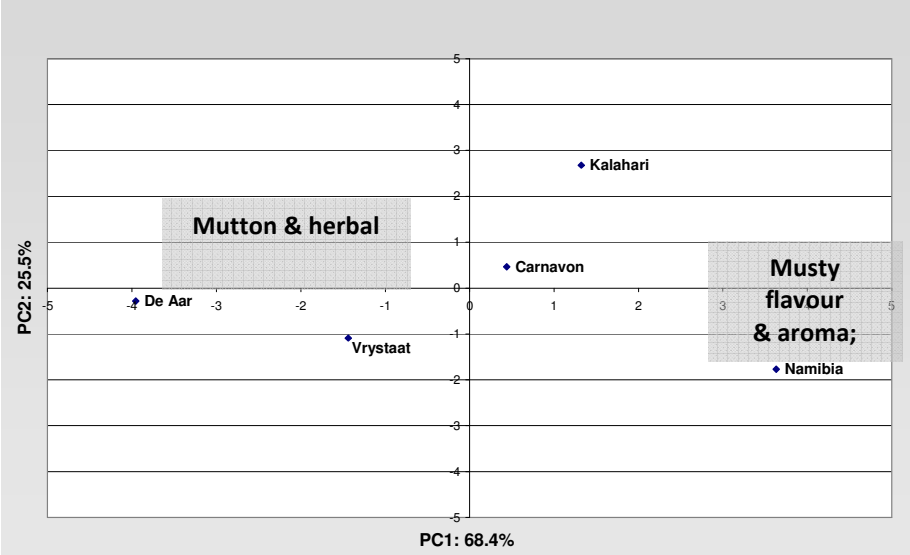

Figure 1: **Graphical representation of the principal component scores of the mutton / lamb samples**

3.2 Consumer survey to investigate the reputation of Karoo lamb

The second component of a products reputation relates to consumers' perceptions regarding the reputation of the product. Thus, in order to develop further evidence towards establishing the reputation of Karoo lamb consumer research was undertaken on a national level to investigate consumers' awareness and perceptions of Karoo lamb and to estimate the demand for Karoo lamb and consumers' willingness to pay a premium for the product. The study methodology is summarised in Table 1 above (referred to as 'Study 1' of the process).

A significant 53.6% of the consumers indicated that they are aware of Karoo mutton / lamb, even though only 68.0% of these consumers (i.e. 36.5% of the total consumer sample) purchase Karoo lamb if it is available. Consumers from the Western Cape, as well as white and coloured consumers revealed a significantly greater awareness and knowledge of Karoo mutton / lamb and willingness to purchase the product. Furthermore, only 39.8% of these consumers (i.e. 21.4% of the total consumer sample) indicated a particular preference for Karoo mutton / lamb.

The similarities between the purchasing frequencies and the consumption frequencies for Karoo mutton / lamb indicate a tendency among consumers to only buy Karoo mutton / lamb for a specific meal occasion, which is in contract to the tendency towards bulk buying behaviour observed for mutton / lamb in general (i.e. purchasing frequencies generally larger than consumption frequencies) (refer to Table 2 for detail). These results could be indicative of the 'niche' nature of Karoo mutton / lamb, confirmed by the observation that the Karoo mutton / lamb purchasing and consumption frequencies are significantly lower than the frequencies for mutton / lamb in general (i.e. 48.6% consuming 'regular' mutton / lamb at least once per week or more often, compared to only 4.7% for Karoo mutton / lamb).

Table 2: Overview of mutton / lamb purchase and consumption frequencies

Frequency:	**'Regular' mutton / lamb:**		**Karoo mutton / lamb:**	
	Purchasing:	**Consumption:**	**Purchasing:**	**Consumption:**
Once per week or more	23.4%	48.6%	4.7%	4.7%
Once or twice per month	60.5%	41.8%	14.6%	14.1%
Less than once per month	16.1%	9.5%	16.7%	17.2%

The most widely supported purchase location for all mutton / lamb is the supermarket and butchers (supported by 82.3% and 37.0% of consumers respectively)[4]. For Karoo mutton / lamb only 55.3% of the consumers who were aware of Karoo mutton / lamb, knew where to buy the product and only 23.3% of these consumers indicated that the product is widely available. Karoo mutton / lamb was perceived as the least affordable meat option, since only 21.4% of the total consumer sample indicated that the product was affordable (average affordability rating of 2.8) contrasting with for example chicken meat (rated as affordable by 77.1% of consumers and average affordability rating of 1.9[5]).

In terms of consumers' awareness of meat origin in general and Karoo mutton / lamb specifically, a significant 61.3% of the sample of the total sample indicated that they do not have a preference for mutton / lamb with a specific regional origin. Among the consumers with mutton / lamb origin preference the most preferred options in terms of mutton / lamb origin were 'Any region in South Africa' and the Free State, while mutton / lamb from the Karoo were among the lesser preferred options.

The nature of the Karoo mutton / lamb reputation was investigated through different approaches. The respondents were initially asked to list the three main differences (if any) between Karoo mutton / lamb and mutton / lamb from other regions in South Africa (i.e. in an open question format to elicit non-prompted answers). Many of the consumers who are aware of Karoo mutton / lamb did not have any idea regarding the differences between the product and mutton / lamb from other regions (41.7%). Among the respondents' top three responses, taste and tenderness dominated in the perception sets of more than 20% of the sample who are aware of Karoo mutton / lamb, even though the tenderness of Karoo mutton / lamb and other mutton / lamb should not necessarily differ. Given the potential product specificity of Karoo lamb related to the unique flavour of the meat, the perceptions related to flavour and taste are of particular importance.

In order to further investigate the reputation of Karoo mutton / lamb based on consumers' perceptions, consumers were also asked to indicate their level of agreement with a number of statements covering issues related to the difference and superiority of Karoo mutton / lamb in terms of quality, aroma, colour, tenderness and taste through a 5 point rating scale. A summary of the average rating scores for the various statements are shown in Figure 2. Among the sample of consumers who are aware of Karoo mutton / lamb, 63.1% of the consumers perceived Karoo mutton / lamb as 'different', particularly in terms of taste and aroma dimensions (63.1% and 53.4% respectively). These observations have positive implications for the establishment of a GI for Karoo mutton / lamb. However, only 47.6% of these consumers perceived it as being 'better' than 'generic' mutton / lamb, a trend that is particularly reflected in the specific attributes of mutton / lamb taste and aroma (42.7% and 34.0% respectively).This is also reflected by the average ratings in Figure 2(taste [$F=13.584$, $df=1$, $p=0.000$] and aroma [$F=12.014$, $df=1$, $p=0.001$]). Considering willingness to pay (WTP) only 27.2% of these consumers indicated a willingness to pay more for Karoo mutton / lamb compared to 'regular' mutton / lamb.

Finally the nature of the Karoo image in consumers' minds were investigated through an open question stating "When you think about the Karoo, please describe the first images and words that come to your mind".The main Karoo image in the consumers' minds related to the Karoo being a desert, dry, hot and dusty (54.2% of consumers) thus indicating that the majority of consumers have a rather negative image of the arid Karoo region. Only a small share of consumers recalled the Karoo

[4]Shares add to more than 100% due to shopping at multiple outlets.

[5]Mean affordability score scale: 1=Very affordable; ...; 4=Very expensive

bush (12.3%) and some positive images such as positive food images (7.4%), open spaces (6.9%) and the peacefulness of the Karoo region (4.4%).

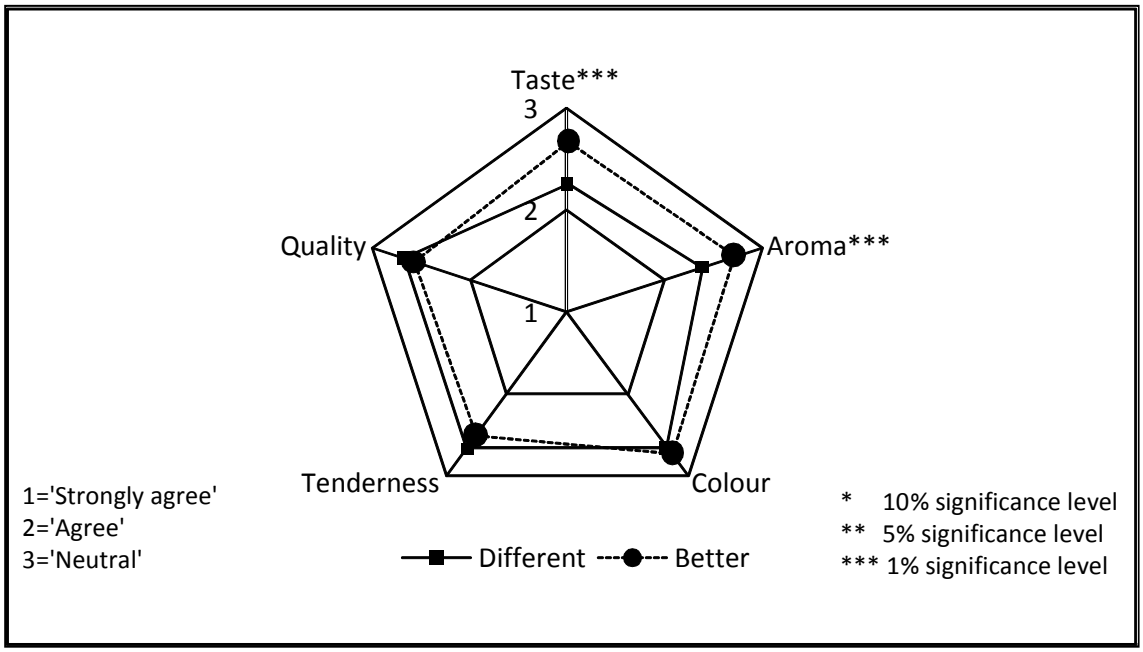

Figure 2: A spider graph illustrating the perceptions of the consumers who are aware of Karoo mutton / lamb based on a series of evaluation statements, expressed as mean rating scores

4. Further evidence to support the reputation of Karoo Lamb among target consumers

4.1 Conjoint analysis

The conjoint analysis study was aimed at identifying and valuating the key attributes and attribute levels that influence the purchasing decisions of lamb, with a specific focus on attributes related to traceability, quality and traceability. The analysis specifically considered the relative importance of the five attributes in the consumers' purchasing decision of mutton / lamb. The results (Table 3) show that price has the largest impact (30.4% contribution) followed by safety, quality, traceability and origin.

The utility values of the product attribute levels were estimated to establish the value that consumers place on certain product attributes levels. It is clear that consumers strongly prefer mutton / lamb that is traceable to birth farm (and abattoir), originates from the Karoo and has quality and safety guaranteed through certification. On the other hand the least preferred attributes are (i) the absence of traceability, (ii) no particular region of origin and (iii) quality and safety not assured. Thus, it is clear that the consumer preferences are focused on a more sophisticated and clearly identifiable product with a specific identity. However, considering price the sampled consumers derived the highest utility from a price discount of 5% to 7%.

Table 3: Conjoint analysis estimation results

Attribute	Attribute relative importance (%)	Attribute levels	Attribute level utility value
1. Traceability	15.7	Trace to animal	-0.001
		Trace to birth farm	**0.075**
		Trace to abattoir	0.031
		Trace to processing plant	0.001
		No trace	-0.106
2. Origin	13.8	Origin: Local region	0.003
		Origin: National (SA) region	-0.052
		Origin: No region	-0.070
		Origin: Specific region (Karoo)	**0.118**
3. Quality	17	**Quality through certification**	**0.089**
		Quality through labeling/branding	0.049
		Quality through origin	0.054
		Quality not assured	-0.193
4. Safety	23.1	**Safety through certification**	**0.162**
		Safety through labeling/branding	0.063
		Safety through place of purchase	0.144
		Safety not guaranteed	-0.181
		No safety knowledge	-0.188
5. Price	30.4	10% more	-0.118
		7.5% more	-0.103
		5% more	-0.084
		2.5% more	-0.036
		Same price	-0.033
		2.5% less	0.040
		5% less	**0.135**
		7.5% less	**0.138**
		10% less	0.061

4.2 Application of means-end-chain theory and association pattern technique (APT)

The next component deals with an investigation of the perceptions driving consumers' purchase decisions regarding Karoo lamb by considering relevant attributes, consequences and values according to the Means-end chain theory. It was established that 79% of consumers will, if given the choice prefer to consume Karoo lamb, with the remaining 21% not having a specific preference regarding origin. According to the attribute-consequence (A-C) matrix (see Table 4) there seems to be a clear difference between Karoo and non-Karoo lamb consumers. The A-C matrix clearly indicates that Karoo lamb consumers associate the price attribute with quality, contrasted with the value-for-money perception of the consumers with no preference for origin who associated quality with the brand attribute. Karoo lamb consumers associated product image with quality and the brand and origin attributes with confidence in local produce. However, minimal differences were found in the C-V matrix. All of the most mentioned linkages between consequences and values indicated similar end-states (values) illustrating that the physical properties of Karoo lamb (the visible attributes) are important to consumers; however, at a higher level of abstraction (emotionally), the origin becomes less important.

Table 4: The A-C (attribute-consequence) matrix

	Consequences:	
	Consumers preferring Karoo lamb (n=219)	**Consumers with no origin preference (n=57)**
Attribute 1: Price	Quality indicator (23.6%)	Good value for money (33.3%)
Attribute 2: Image	Quality (21.4%)	No health risk (6.5%)
Attribute 3: Brand	Confidence in local produce (16.6%)	It is a quality product (22.9%)
Attribute 4: Origin	Confidence in local produce (20.4%)	Confidence in local produce (27.4%)

According to the hierarchical value map (HVM) for Karoo lamb is illustrated in Figure 3, the most important attribute for Karoo lamb was taste and for non-Karoo, taste and tenderness were most important. The most prominent and strongest link from attributes to consequences for Karoo lamb was the attributes price and label, indicative of the consequence of a quality product. For non-Karoo, a clear link between the attribute price and consequence value for money was evident indicating that the choice of a non-labelled product comes down to a lower price.

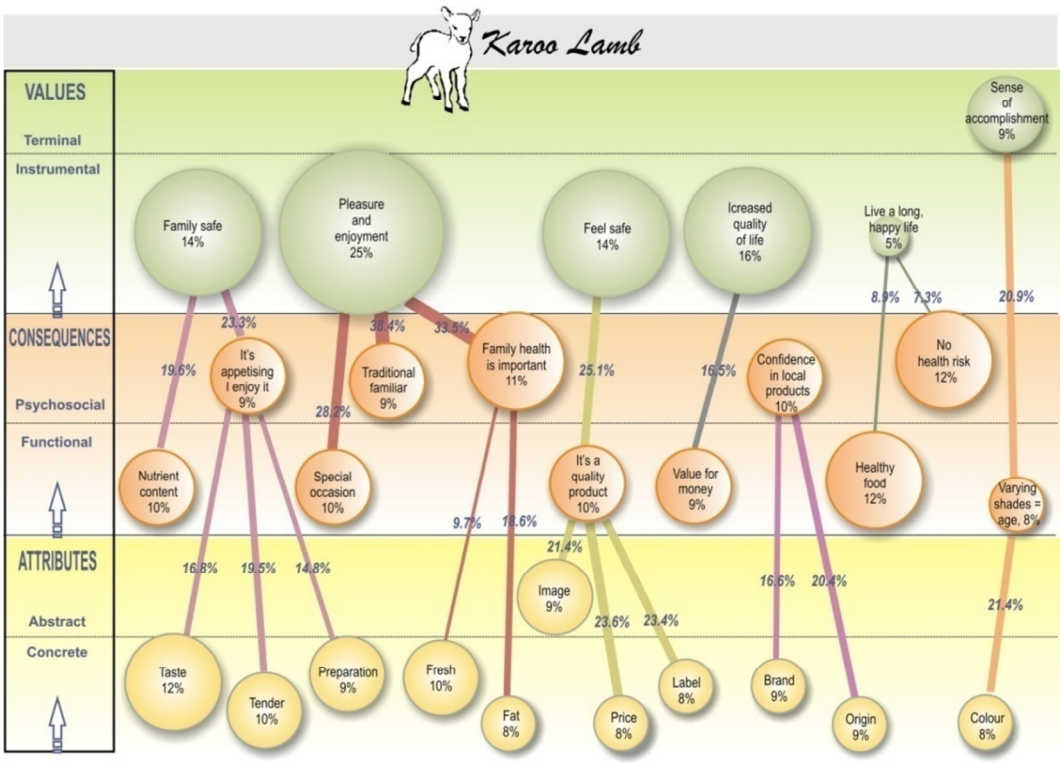

Figure 3: The hierarchical value map for consumers with a preference for Karoo lamb

5. Detailed investigations of consumers' WTP for Karoo lamb

5.1 Stated preference methods: The Van Westendorp price sensitivity analysis

Our research furthermore also investigated consumers' willingness to pay (WTP) for Karoo lamb through the Van Westendorp's technique, based on simple questions about the price of the product or service (Draeger & Perham, 2009):

1. At what price on the scale would you consider the product or service to be expensive?
2. At what price on the scale would you consider the product or service to be cheap?
3. At what price would you consider the product or service to be so expensive that it is beyond you considering buying?
4. At what price do you consider the product or service to be so cheap that you would question the quality?

The Van Westendorp price sensitivity analysis (Figure 4) indicates that Karoo lamb consumers are willing to pay 6% more for the product of origin. On the other hand non-Karoo consumers revealed a significant price sensitivity. This further links non-Karoo lamb consumer's linkage of price and value for money, illustrating their extreme price sensitivity.

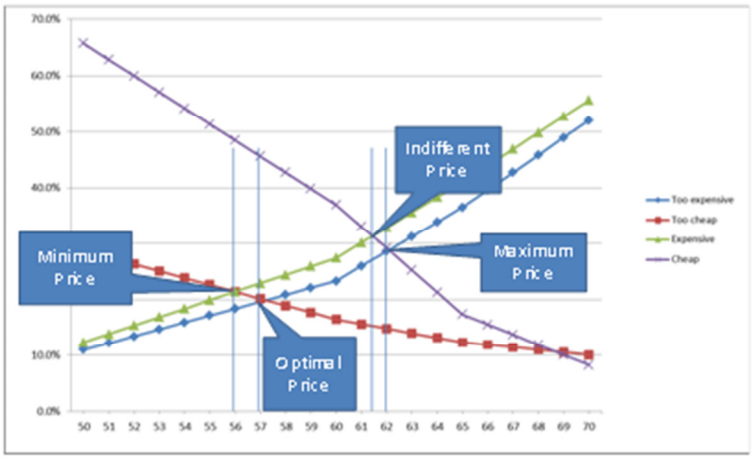

Figure 4: Van Westendorp price sensitivity analysis for Karoo lamb

5.2 Revealed preference methods: The random nth-price experimental auction

The experimental auction applied the random *n*th-price auction (Shogren, *et al*., 2001) which combines the features of the Vickrey second-price auction, which encourages competition amongst bidders, and the Becker-DeGroot-Marschak mechanism, which gives all bidders a chance to win the auction (Lusk & Shogren, 2007). The key element of the random *n*th-price auction is a *random* and *endogenous* market-clearing price. The randomness of the price ensures that all bidders are engaged, while the endogenous price guarantees that the payment (market-clearing) price is in line with the value that the consumer attaches to the product (private value) of the bidders (Shogren, *et al*., 2001). Shogren, *et al*. (2001) found that each bidder should bid sincerely in a random *n*th-price auction because they cannot depend on the random market-clearing price as a marker or price indicator.

In the experimental auction real money was given to participants as part of an attempt to create a more realistic experiment, as supported by Horowitz & McConnell (2002).An unmarked packet of approximately 500g of lamb loin chops (base product) was sent around the auction audience. At the time of the experiment the market value of this product was around R50. A second similar 500g packet of lamb loin chops was sent around, with a prototype "Karoo lamb" label.

Participants were then asked to place a bid to upgrade the base product to the product certified as Karoo lamb. No verbal or written constraints on bids were placed during the auction. If participants wished to bid more than R200 as the premium, they would have the option to pay the difference from their own pocket (as would be the realistic market situation).It is important to note that participants were only bidding their willingness to pay a premium above current retail prices for 'generic' South African lamb. The study thus aims to assess the value of clearly identifying and market a meat product of origin for the consumer, similar to studies done by Alfnes and Rickertsen (2003) and Evans, *et al*. (2008) where consumers' willingness to pay for meat of origin was tested using an experimental auction. The reason, in this specific experiment, for not bidding on the entire product is to simplify data analysis (extraction of bidding values) (Corrigan, *et al*., 2009) and the method was also suitable since the specific product in this auction is only an 'upgraded' version of an existing product which is well known to participants. All the bids were collected and sorted from the highest to the lowest bid. A random number (*n*) was drawn to determine the cut-off position indicating the market clearing price.

Table 5 presents a summary of the results of average bids of each of the six bidding rounds as well as grouped bids within each information treatment group. A one-way ANOVA analysis to check for consistency between the duplicate bidding rounds revealed that no significant difference was found

at a 10% level of significance. Thus, the average sample bids were consistent and justify the further use of an average between the duplicate rounds within the various information treatments in further analyses. It is also interesting to note that throughout the entire auction, most of the participants submitted a non-zero bid, indicating a general willingness to pay a premium for certified Karoo lamb. Furthermore, when the average bids obtained from the auction were linked to demographic variables, it was found that females bid generally higher than male participants, while older participants (>40 years of age) submitted higher bids than younger participants.

As mentioned earlier, an important objective of this study was to investigate the potential impact of information treatments on bidding behaviour by comparing the average bids for the various treatments (as shown in Table 5).As evident from Table 5, there was a significant difference [F=9,199; df=2; p=0.004] between the average bid from bidding rounds one and two (where participants were only exposed to the Karoo lamb label) and the average bid from bidding rounds three and four (where participants were further exposed to the Karoo lamb information sheet) with a 55% increase in the premium participants are willing to pay. It is important to note that there was no significant difference between the average bid from bidding rounds three and four (where participants were further exposed to the Karoo lamb information sheet) and the average bid from bidding rounds five and six (exposure to Karoo lamb presentation).Thus, the presentation did not add significant value to participants' bidding behaviour. An increase in average bids of only 15% was observed, which is not statistically significant. Thus, the exposure to the Karoo information sheet resulted in the largest significant increase in average bids, implying that printed media can have a significant positive impact on consumers' willingness to pay for Karoo lamb.

Table 5: Average bidding amounts during the experimental auction for a 500g packet of loin lamb chops certified as meat form the Karoo region

Bidding round:	Information Treatment	Individual bidding rounds:			Information treatments:		
		Average premium price bid (R/kg)	SD	Significant Differences	Average premium price bid (R/kg)	SD	Significant differences:
Round 1	Exposure to Karoo lamb Label (IT1)	R16.52/kg	7.742	None, p>0.1	R15.12/kg (a)	5.266	Significant differences [*f*=9.199, df=2, p<0.000] Between: IT1 & IT2 (p=0.004) IT1 & IT 3 (p=0.000) No significant difference was found between IT2 & IT3 (p>0.1)
Round 2		R13.74/kg	4.225				
Round 3	Exposure to Karoo lamb information sheet (IT2)	R21.42/kg	5.113	None, p>0.1	R23.38/kg (b)	5.443	
Round 4		R25.36/kg	6.274				
Round 5	Exposure to Karoo lamb Presentation (IT3)	R26.58/kg	5.878	None, p>0.1	R26.88/kg (c)	5.879	
Round 6		R27.16/kg	5.949				

The general lack of availability of Karoo lamb was pointed out, with approximately 82% of participants who indicated that they had not bought Karoo lamb before due to the product not being readily available. Another serious concern that was brought to light from the survey results, was that 18.2% of participants who indicated that they had not bought Karoo lamb before was

because they did not trust the authenticity of the product. Despite the obvious concerns regarding Karoo lamb, approximately 58% of the sample indicated that they are willing to pay a premium for Karoo lamb. This is a very important observation, serving as a clear indication of the possibilities for certified Karoo lamb as meat of origin.

From a marketing perspective, an obvious opportunity and case for intellectual property protection exists when considering the Karoo lamb case. The results from the experimental auction suggested that participants are willing to pay a premium for certified Karoo lamb, with an average bid of R21.80/kg recorded. At the time of the experiment market prices for lamb loin chops ranged from R89.95/kg to R118.16/kg, as observed form butcheries and supermarkets in the survey area (Pretoria).

5.3Revealed preference method: The supermarket experiment

The difference between hypothetical and real values when evaluating consumers' preferences (termed 'hypothetical bias') has received significant attention in scientific literature, as the outcome of this bias is often an overestimation of WTP values (e.g. Moser *et al.*, 2010; Little & Barrens, 2003; Murphy *et al.*, 2005; Harrison, 2006; Lusk & Schroeder, 2004; Alfnes *et al.*, 2009). Furthermore, some studies indicate that the initial endowment given to participants in experimental research could create a 'house money effect' where consumers will spend more money since it is viewed as bonus money and thus not spent according to the same considerations as regular income (Moser *et al.*, 2010; Battalio et al., 1990; Arkes et al., 1994; Keasy and Moon, 1996; Carlsonn et al., 2009). A market experiment setting where consumers have to use their own money if they are interested in buying a particular product could be a potential solution but could cause lower participation rates or an underestimation of consumers' WTP (Moser *et al.*, 2010; Lusk *et al.*, 2008). Examples of market-level experiments to evaluate consumers' WTP for products with particular attributes are relatively limited. Kiesel and Villas-Boas (2010) investigated the impact of information cost on consumers' choices in the context of nutritional labels through a supermarket experiment. The role of production methods such as production systems that employ different mixtures of chemicals, natural substances and beneficial microorganisms providing a progressive healthier and safer product, in fruit purchasing behaviour was investigated by Moser *et al.* (2010) by comparing the results from a hypothetical choice experiment and real payment supermarket choice experiment. Birol *et al.* (2010) investigated consumers WTP for grapes in the context of information and credible certification on food safety through a randomized market experiment.

In order to validate South African consumers' demand and WTP for Karoo mutton / lamb as a branded and guaranteed meat-of-origin a market experiment was conducted in two Checkers supermarkets in Cape Town's northern suburbs on a month-end weekend in February 2011. Both these supermarket outlets stock 'generic' lamb meat and the well-established Certified Natural Lamb brand. The well-established premium brand Certified Natural Lamb (CNL) shares several similarities with Karoo lamb. CNL is guaranteed to be free range, natural (no chronic antibiotics or added hormones to aid growth), microbiologically safe, traceable to accredited farms of origin and produced by farms that are ecologically audited to ensure sustainability.

The Karoo lamb product was sourced under the CNL code of practices with the added qualification that it should be from farms in the identified Karoo region. The carcasses were delivered at the stores and packed. The Karoo lamb packets were branded with the Karoo certification mark and barcoded with unique barcodes to enable extraction of scanner sales data after completion of the experiment. All the different Karoo meat cuts were sold at a R5/kg price premium above the prices of the similar cuts of Certified Natural Lamb. The particular price premium was selected based on the following considerations:

- Mutton / lamb prices were observed at selected general retail and butchery locations in Cape Town and Pretoria during January 2011 and ranged from R3/kg to R27/kg above the price above the price of Checkers generic lamb at that time.
- The random nth-price experimental auction indicated an average premium of about R23/kg.
- Certified Natural Lamb is usually sold at premiums of roughly R3/kg to R10/kg above generic lamb in Checkers stores.

After consultation with the experts from Checkers Meat Markets a premium of R5/kg above the price of Certified Natural Lamb was agreed upon as a 'high but potentially feasible' price level. Due to logistical considerations, such as the carry-over of meat on shelves between trading days as well as complexities surrounding the creation of different price levels (which have to be done from the Meat Markets head office) it was not possible to work with more than one price premium level.

The in-store promotion of certified Karoo lamb was based on four point-of-sale items: packaging labels (displaying the certification mark), shelf dividers, shelf strips as well as a large in-store banner advertising Karoo Lamb. All artwork and manufacturing of the POS items were handled and coordinated by a professional branding company. Checkers Meat Markets allocated a share of the lamb procured for anticipated CNL sales towards Karoo Lamb, which amounted to about a third of the CNL volumes. Thus, during the experiment Checkers Meat Markets procures the same quantity of meat they would have procured in the absence of Karoo Lamb of the shelves (which amounted to about four to five Karoo carcasses per store for the three experimental days). In both stores the Karoo Lamb display was in close proximity to the CNL display.

At the price level of R5/kg above CNL and about R8/kg above generic lamb, the scanner data sales results for the Karoo lamb during the experimental period contributed about 20% of sales volumes (21% of sales values) and represented 47% of generic lamb sales and 52% of CNL sales. The best trading days for Karoo lamb (and the generic lamb) were Saturday and Sunday even though the CNL sales were more consistent over the three trading days of the experiment possibly indicating a well-established brand. The lower sales volumes of Karoo lamb on the Friday could also be attributed to a problem experienced on that day where the product codes and descriptions of three of the Karoo lamb meat cuts were incorrect and subsequently those meat cuts were only shelved on Saturday once the codes were fixed at the Meat Markets head office. The Karoo lamb sales volumes were significantly higher at the one store which could be attributed to the existence of a local butcher nearby the store which had been selling Karoo lamb for many years to customers in the suburb. The two stores revealed similar shares for generic lamb and CNL.

6. Conclusions

This paper presented results from a set of studies applying different methodologies to test the reputation, willingness to pay for a meat product which truly originates from the Karoo region in South Africa. In order to confirm consumers' views and perceptions about this mutton and lamb form the Karoo, the paper reported the results of:

- A sensory analysis
- A perception survey
- A Conjoint analysis of consumer preferences
- A means-end-chain analysis of consumer preferences
- An experimental auction
- A supermarket experiment

The results confirm the reputation of the product but show that there is still amongst some consumers no real appreciation of the 'origin' attribute of food products. Price and food safety remain the dominant attributes. Although this is true there are some evidence as reflected in the summary table below (Table 6) that suggest that the Karoo origin identity could be important. It is further also evident that the various willingness to pay estimates presented different results but at least the stated preference methods confirm the hypothesis that consumers will be willing to pay premium. However, the positive results from the experimental auction and the in-store experiment (despite the limited promotional activities during this experiment) could be viewed as a very positive indication of the marketing potential of origin based Karoo mutton / lamb that could potential be sold at a price premium similar or slightly higher than comparable existing luxury and niche lamb brands on the South African market. This premium will certainly be confirmed by effective promotion and information dissemination programmes.

Table 6: Summary table of key findings

Study:	**Key finding:**
'Study 1': Initial survey to establish the reputation of Karoo mutton / lamb	Only 15% of the total sample of mutton / lamb consuming consumers was willing to pay a premium for Karoo mutton / lamb. The potential magnitude of the WTP was not investigated in this study.
'Study 2': Conjoint analysis to investigate consumers' preference for Karoo lamb	Even though the sampled consumers derived the highest utility from a 'sophisticated' product (that is traceable to birth farm (and abattoir), originates from the Karoo and has quality and safety guaranteed through certification) the sampled consumers derived the highest utility from a price discount of 5% to 7%.
'Study 3': Means-end-chain theory and APT to investigate consumers' preferences and WTP for Karoo mutton / lamb through Van Westendorp's technique	WTP 6% price premium (i.e. R6/kg) for Karoo lamb. One of the strongest links in the hierarchical value map for Karoo lamb related to the association between price and a positive quality perception.
'Study 4': Randon*n*th-price experimental auction	Average bidding premiums for Karoo lamb: • After information sheet exposure: R23/kg • After informative talk: R27/kg Generally higher bids for older consumers and females.
The supermarket experiment	At a premium for Karoo lamb of R5/kg above the price of Certified Natural Lamb (CNL) and about R8/kg above generic lamb sold at Checkers stores Karoo lamb sales contributed 20% of sales volumes (21% of sales values) representing about 50% of CNL sales during the experimental period.

The paper also presents some clear indication how different study methods provide different results and that greater attention should be given to the choice of methodology in consumer perception and willingness to pay studies to successfully address particular research objectives.

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