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Consumers' preference and willingness to pay for graded beef in Polokwane municipality, South Africa

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Abstract:

Consumers around the world are progressively becoming more concerned and aware about food standards, quality and safety issues. The purpose of this study was to determine consumers' preference regarding safe and quality beef and willingness to pay (WTP) for graded beef in Polokwane municipality. The research surveyed 150 consumers using a structured questionnaire to collect data on consumer characteristics and responses to different bid levels for graded beef. Analytical methods were descriptive statistics, Likert scales, contingent valuation method to evaluate respondents' mean WTP for graded beef and logit model to determine the dependence of WTP on socioeconomic factors. Results showed that consumers prefer their beef tender, with less fat and bones and labelled with price, grade/class, size or quantity of the product and lastly quality inspection or certification indicator. Over half of the respondents (53%) were aware of grading or classification systems. The results further revealed that most respondents are willing to pay an increase of 16.04 % over the current price for beef. This could be an opportunity for investments in beef label industry. Consumer characteristics including age, income, gender and household size significantly influenced WTP for graded beef in Polokwane Municipality. Marketing strategies considered by beef product investors should target young, female and wealthier consumers. Grading with respect to quality attributes would make beef sales at differentiated prices possible. This will eventually enhance sales volume and returns for all stakeholders along the value chain.

Keywords: Food safety, Graded beef, Preference, Polokwane, Quality, Willingness to pay



CONSUMERS' PREFERENCE AND WILLINGNESS TO PAY FOR GRADED BEEF IN POLOKWANE MUNICIPALITY, SOUTH AFRICA.

INTRODUCTION

The global market for animal food products and the demand for meat based sources of protein have increased significantly throughout the world. Meat has become the fastest growing agricultural product worldwide due to high consumption rates and large quantities of trade (Schutte 2006). Beef represents an important livestock commodity in the international market for animal based food products. Growth in the international market for beef products has endorsed significant expansion of cattle operations throughout the world (Hall 2012).

In spite of the nutritional value beef constitutes to the diets of most consumers, its consumption has turned out to be a very questionable issue. From one viewpoint, beef represents a valuable source of proteins, vitamins (A, B6, B12, D and E), biologically utilizable contents of minerals (Calcium, Phosphorous, Iron, and Magnesium) and micronutrients that are contributing to consumers' health throughout life (Markiewicz 2010 and Mabhera 2015). Hence, the dietary worth has been vital to convey the medical advantages of red meat to buyers. Then again, red meat has been highly topical in the past two decades because of the arising innovations in the meat industry the developments in the market have tarnished the positive image of the value of meat. (Van Wezemael et al. 2010).

Consumers' all over the world have turned out to be progressively worried about food borne diseases, personal health and are aware of the quality of food they consume. (Van Wezemael et al. 2010). On another perspective, Kumm (2002) iterated that consumers are increasingly expressing concerns on the how the production, processing and transportation of meat is done, particularly since producing beef is resource intensive and aggressive on the environment. This has led consumers to seek for beef which is of high-value, safer, healthier and produced in an ecological and ethical harmony with the environment. Radman et al. (2005) explains that these structural modifications in consumer trends result from economic and social factors such as modern lifestyles, increased education, rising incomes and globalization.

As South Africa makes its transition to a developed economy, a percentage of its population is becoming wealthier, demanding more goods, being more health cautious and eating foods of higher quality standards (Vermeulen and Biénabe 2010). This trend has emerged in developed countries and is now increasingly common in growing urban areas of developing and transitional countries (Dhivya 2014). Populations residing in the urban areas of this developing country are increasingly becoming more aware of food safety issues and this requires manufacturers and sellers

to be more concerned with production techniques, packaging, personal hygiene and other food safety requirements to understand what influences consumers' purchasing decisions and to meet their expectations (Uwamaliya 2014).

Appearance of the product, convenience, shopping environment and product quality among others, are external factors that shape consumers' preference and choice in a market place. In an ideal world, consumers choose the package of food products that offers them the highest level of satisfaction, on the chance that they can absolutely decide the quality characteristics of those food items (Owusu-Sekyere 2014). However, in cases where important information about product quality and safety is absent, consumers go through considerable challenges when choosing a product because they do not know risks associated with the product (Schroeter 2005).

Food control measures (certification, traceability, etc.) in developed countries are serving to shape the potential of developing countries, especially for wealthier consumers residing in urban areas (Jaffee 2004). Therefore, it is important for developing countries to comply with international standards as it can help them to upgrade their capacity in regulation and monitoring of food value chains, as well as to participate in international markets (Uwamaliya, 2014).

THE PROBLEM

Beef is an interesting case to analyse in South Africa regarding food safety as the beef industry contributes to food security and the growth of the economy. The beef industry in SA is not yet developed, compared with other industries it is challenged by growing demand surge, globalization, meeting consumers' changing expectations and increased complexities on the production of quality beef (Labuschagne et al. 2010). The South African carcass classification system assumes an imperative part in categorizing red meat carcasses to encourage price creation however, does not include any measure of meat quality. The system provides inadequate description of the meat quality characteristics and does not play a role at the consumer level, it clearly shows that it is strongly inclined towards meat sellers (Vermeulen et al. 2015).

The government has not yet set the required compulsory quality standards for beef in SA, the product sold on the market has no inspection indicators or labels to highlight information about product origin and quality characteristics. The country has experienced multiple health problems as a result of foodborne outbreaks, this has placed most consumers in an uncertain state regarding beef safety and quality (Labuschagne et al. 2011).

A primary issue in the scandalous nature of meat is the manifestation of food safety cases. The meat sector, particularly the beef industry, is prone to many food scares including, the recent case of *Listeria* in processed meat products, the bovine spongiform encephalopathy catastrophe,

Salmonella, E.coli, dioxin (harmful residues) and genetic modifications (hormones) in the final products. These occurrences have caused financial losses, social interruptions and have damaged the reputation of the meat sector (Van Wezemael et al. 2010).

Consumers generally face considerable challenges in creating quality expectations, particularly for fresh meat because there is little or no information provided about the product. The certainty customers in the safety and suitability of food products, to some extent, originates from the viability of safety control measures such as certification, inspection and traceability on food products (Kimenju and De Groote, 2008). However, these control measures on product labels entails additional costs, which can increase the price of the labelled products (Uwamaliya, 2014).

The specific factors that influence South African consumers' preference regarding safe and quality beef and willingness to pay (WTP) for graded beef are not known because of absence of empirical literature on consumer preferences and willingness to pay for graded beef. Therefore, this study intends to close the gap in literature by providing useful information on beef quality and safety in Polokwane municipality, South Africa.

The purpose of the study is to evaluate consumers' preference regarding safe and quality beef and determine willingness to pay for graded beef in Polokwane. More specifically, the following objectives are included: (1) To assess consumers' awareness on grading of beef. (2) To evaluate consumers' preference in relation to beef quality. (3) To determine consumers' willingness to pay for graded beef in Polokwane municipality. (4) To assess the relationship between consumers WTP and their socioeconomic characteristics

LITERATURE REVIEW

The significant imperatives to the development of the meat business are absence of the essential institutional structure, insufficient research considering biological potential for beef improvements, endemic and rising domesticated animal illnesses, repetitive dry seasons, decreasing animal hereditary qualities, poor promoting channels and static costs of livestock products (Bergevoet and Van Engelen 2014). However, the absence of detailed communication to the consumer from the industry has been alluded as one of the fundamental issues of the meat industry (Soji et al. 2015). Meeting consumer needs for quality and providing them with dependable, unprejudiced information will empower the meat business to grow and to remain in business (Labuschagne et al. 2011).

Food safety can be considered as an attribute that cannot be determined by inspection before purchase but can only be experienced after consumption, that is why consumers unknowingly consume food that is unsafe (Latvala 2010). Generally, consumers expect the food products on the shelves to be, this is based on the grounds that it is forbidden to put hazardous food products in the

marketplace. Information asymmetry characterizes the market for products with credence attributes, meaning that the seller has more information about true product quality than the buyer (Sanderson and Hobbs 2006). However, a single event of food safety incident (e.g. *Listeria*, *E. coli*, etc.) can damage the reputation of the industry and cause huge economic losses. Therefore, signs related with food are significant in communication media. (Jongen and Meulenberg 2005). There is a need to produce effective communication, distinguishing between cues with an intrinsic nature (e.g., tenderness, convenience, taste) and those with an extrinsic one (e.g., food safety). As such Lees and Saunders (2015), accentuate that the most critical strategy for imparting assurance attributes to the buyer is through the use of product labelling.

Quality marks have been acquainted as an honest choice guide for customers, yet they are additionally a method for food control, in that the availability of the label gives confirmation about the traceability of the item to a region where it was produced as well as the utilization of an arrangement of skills (Peters-Texeira and Badrie 2005 and Reid et al. 2006). Organizations of the beef supply chain have made progress in labelling beef quality to consistently meet consumers' expectations by creating strict policies that are focused on food control measures such as certifications, inspection indicators, production processes and traceability of the product to where it was produced. (Tatum, 2015). Countries such as Australia, Canada, United States, Spain and Europe have developed grading systems that assists in conveying information about the quality of the product to consumers. For example, carcasses and beef cuts produced by youthful, steers and heifers are stratified into quality grades being: AAA, AA, A, "Prime, Choice, Select, Standard, Commercial, Utility and Cutter". (Reicks 2006; Angulo and Gil 2007; Watson et al. 2008 and Polkinghorne and Thompson, 2010)

In South Africa, there is a great difference with these countries. In spite of the fact that customers are conscious about quality and food safety of beef products, their perception and preferences towards the control measures differ significantly depending on their socioeconomic characteristics and information they process (Berges et al. 2015). Quality grades and beef labelling are not extensively applied in South Africa. The companies that have developed them, have done so in response to foreign market demands. Vermeulen and Biénabe (2007) corroborates the fact that consumers to a great extent use basic quality and convenience characteristics to choose or purchase a fresh food product in a retail outlet.

Many international studies focusing on the beef market have reported on meat attributes and willingness to pay. Some of these attributes include certification of product origin, traceability, processes, no uses of hormones and antibiotics, price, fat content, cholesterol, artificial ingredients and safety. For instance, Prinsloo et al. (2012) found that packaging and food label information

influence consumers' purchase decisions throughout the consumer decision process and that these influences have become particularly intricate in recent years.

Scozzafava et al. (2013) analysed the Italian consumer preferences for beef using the choice model approach to assess consumer behaviour. The results highlight the crucial importance of beef cut in the final choice, and reaffirm the central role played by the country of origin labelling (COOL). On the contrary, breed information and price marginally affect the final purchasing decision.

Sriwaranun et al. (2013) investigated the factors affecting consumers' willingness to pay a premium price for organic products. Results display that respondents are willing to pay a premium price of 88% for Chinese kale, 51% for jasmine rice and 51% for organic pork, if respondents experienced, good health, strong ethical and environmental in purchasing organic products.

Berges et al. (2015) examined consumers' perceptions of safety in Argentina and identified factors that helped explain consumers' willingness to pay for different attributes related to safety of the beef products, including, a hypothetical hygiene certification in handling and retailing. Consumers were willing to pay for fresh meat attributes such as personalized attention in a butcher counter, the presence of a "safety certification" in the place of purchase and the bright red colour on the product. Lewis et al. (2017) evaluated German and British consumer willingness to pay for beef labelled with food safety attributes. Results showed that British consumers had the lowest WTP for beef from Argentina and German consumers had the lowest WTP for beef from Great Britain. In both the nations, the hormone-free label was the highly preferred label by consumers and those who considered food safety issues to affect their meat consumption patterns.

Most studies have mainly focused on international countries, where beef sold in the market is labelled with all necessary food safety information, while very little research has been done in Africa where there are a lot of food scandals and crises (Owusu-sekyere 2014 and Mabhera, 2015).

In environmental economics literature, lifestyles and socioeconomic characteristics including age, gender, occupation, income, education and household size can all have an effect on the willingness to pay, preferences and buying patterns of consumers on all food products. Furthermore, as individual socioeconomic characteristics change, so will the WTP and demand for the type and number of food products, beef included.

Among the work that highlights the influence of willingness to pay with socioeconomic characteristics, focusing on beef the following may be mentioned. Angulo et al. (2005) evaluated consumers' willingness to pay a price premium for certified beef. Results showed that age and income had positive and significant effects on willingness to pay a price premium for certified beef. Older respondents and respondents with higher incomes were willing to pay a premium for certified

beef. Also, respondents who frequently bought beef were more willing to pay a premium for certified beef. However, education did not have any significant effect on willingness to pay a price premium for certified beef.

Lyford et al. (2010) assessed the effect of consumer demographics and meat consumption preferences on willingness to pay for beef quality grades. The authors reported that age was the only significant factor affecting willingness to pay. Older consumers were more likely to pay more for beef quality than younger consumers. Income, number of children in the house, number of adults in the house, main grocery purchaser, occupation, and gender did not have significant effects on willingness to pay for quality beef.

Alinda et al. (2016) determined consumer willingness to pay for quality beef in Uganda. They reported that income and beef attributes such as fat content, bone content, colour of the lean and fat influenced the willingness to pay for quality beef.

RESEARCH METHODOLOGY

Data sources, types and Sampling methods

The study was conducted in Polokwane Municipality of Limpopo province. The municipality was selected because it is the largest municipality, a major economic centre, the most urbanised and has the highest population size of 628 999, increasing at a rate of 2.31 to 5.61% (STATS SA, 2015), which indicates a high potential for beef consumption. Primary data was used in this study and a sample of 150 respondents was collected using a two-stage stratified sampling method, based on the income stratification of respondents in the municipality. For the first stage, the areas were purposefully sampled. In all, a total of 8 areas were considered in the survey for this study; 3 areas from low income group, 2 areas from middle income group and 4 areas from high income group. At the second stage, households were randomly selected from the various areas

A structured contingent valuation questionnaire served as a key survey instrument used to interview the consumers and composed of both open and close ended questions. The first section provided information on socioeconomic characteristics of respondents; such as age, gender, ethnicity, education, employment status, level of income and household size. The second section contained Likert scales questions on consumers' preferences on product safety and quality, product characteristics, safety concerns and purchasing behaviours. The final section contained a scenario and questions on WTP graded beef. The scenario presented explained in detail the product description of the hypothetical market. Willingness to pay questions were designed with a double bounded dichotomous choice format. In the double-bounded, dichotomous choice contingent valuation questionnaire, the consumer is given the initial bid. If the consumer is willing to accept

the first bid, a second or follow up bid which is higher is proposed. The follow up bid was different between the respondents. In cases where the respondent was not willing to accept the first bid, a follow up bid which is lower was then given. The choice of the first bid and the second or follow up is the most important element in the setup of the dichotomous choice survey. Hence, the open-ended format was used on the pilot survey to come up with the starting bids.

Empirical model used

Contingent valuation method (CVM) is an analytical tool commonly used to reveal the public's WTP to protect non-marketed resources, such as recreation, wildlife, and environmental quality (Lin et al. 2002). In examining the feasibility of an innovative product, factors such as costs of production and consumer demand for the product must be taken into consideration (Kimenju and De Groote 2005). Studies which have assessed goods or services that are not yet on the market asked consumers to value their products contingent upon market availability of the product. This helps to determine the consumer demand or willingness to pay (WTP) for such products in a speculative market circumstance. WTP is the maximum amount of money a consumer would be willing to pay for the new product (Owusu 2009). CVM is the most widely used method and consists of asking respondents how much they would be willing to pay for a specific change or improvement compared to the current situation using an open-ended or close-ended question (Lusk and Hudson 2004). In an open-ended question the respondent is asked to declare the amount they would be willing to pay and in close-ended the respondent is asked if they would be willing to pay for the new product or not (Owusu 2009).

Among different methodological alternatives to elicit respondents' willingness to pay for graded beef, the CVM method was employed. There are around four main elicitation methods that exist in CVM, namely open-ended format, bidding game, payment cards and dichotomous choice. One of the widely used method to produce information about respondents' willingness to pay is the so-called dichotomous choice format.

For this study, the double bounded dichotomous choice format was chosen. In double bounded dichotomous choice questions, the respondent is presented with two bids, a first bid (B) for the good in question and a follow up bid contingent upon the previous one. For example, if the respondent gives a positive response to the initial bid, a higher second bid is offered (B^H) since the respondent has a higher WTP than the initial bid, and if the response to the first bid is negative it is followed by a lower bid (B^L) since the first bid is greater than the respondents' WTP. Ongoing beef prices in the market and results obtained from the pilot survey were used to determine the bid prices to elicit WTP. (Loureiro et al. 2002 and Jerop, 2012).

Building from the dichotomous choice format, there are four possible combinations of responses to the questions:

(1) “yes” to both bids (YY), (2) “no” then a “yes” (NY), (3) “yes” then a “no” (YN), and (4) “no” to the first and second bid (NN).

The WTP function is represented as:

$$WTP = \alpha - \rho B + \lambda'Z + \varepsilon \quad (1)$$

The model expressed in the terms of the probability of purchasing graded beef to a bid amount can be specified as follows:

$$Pr \{ WTP \leq B \} = \Phi (\alpha - \rho B + \lambda'Z) \quad \text{where,} \quad (2)$$

WTP: the minimum acceptable price discount for graded beef

B: the bid price (in percent discount) offered to graded beef,

Z: a set of observable characteristics for consumers,

Φ : a cumulative distribution function,

α, ρ and λ : unknown parameters and

ε : a random term

The probability that a given respondent is willing to pay for graded beef is given by;

$$(1) \text{ the YY group, } Pr \{ B^H \leq WTP \} = 1 - \Phi (\alpha - \rho B + \lambda'Z) \quad (3)$$

$$(2) \text{ the YN group, } Pr \{ B \leq WTP \leq B^H \} = \Phi (\alpha - \rho B^H + \lambda'Z) - \Phi (\alpha - \rho B + \lambda'Z) \quad (4)$$

$$(3) \text{ the NY group, } Pr \{ B > WTP \geq B^L \} = \Phi (\alpha - \rho B + \lambda'Z) - \Phi (\alpha - \rho B^L + \lambda'Z), \quad (5)$$

$$(4) \text{ the NN group, } Pr \{ B > WTP \} = \Phi (\alpha - \rho B^H + \lambda'Z), \quad (6)$$

Joining the probabilities of the four outcomes under the assumption of utility maximization, the log-likelihood function for a sample takes the form:

$$\begin{aligned} \ln L = \sum \{ & I_{d=1} \ln [\Phi (\alpha - \rho B + \lambda'Z)] + I_{d=2} \ln [\Phi (\alpha - \rho B + \lambda'Z) - \Phi (\alpha - \rho B^L + \lambda'Z)] + I_{d=3} \\ & \ln [\Phi (\alpha - \rho B^H + \lambda'Z) - \Phi (\alpha - \rho B + \lambda'Z)] + I_{d=4} \ln [1 - \Phi (\alpha - \rho B + \lambda'Z)] \} \end{aligned} \quad (7)$$

Where $I_{d=1}$, $I_{d=2}$, $I_{d=3}$ and $I_{d=4}$ are binary variables with 1 representing the occurrence of that particular result, and 0 otherwise. The parameters are estimated by maximizing the log-likelihood function of the four discrete outcomes (Jerop, 2012).

$$\text{The mean WTP was calculated by } \alpha/\rho \quad (8)$$

The logit model was used to assess the dependence of WTP on socioeconomic characteristics. The model is as shown in Equation below:

$$WTP = \beta_0 + \beta_1 \text{Age} + \beta_2 \text{Gen} + \beta_3 \text{Ethn} + \beta_4 \text{Edulevel} + \beta_5 \text{Marstat} + \beta_6 \text{HH} + \beta_7 \text{Emp} + \beta_8 \text{Inc} + \beta_9 \text{Awa} + \beta_{10} \text{Fre} + u_i \quad (9)$$

Table 1: Description of variables and expected signs

Dependent variable	Description	Unit of measure
WTP	1 if consumers are willing to pay for graded beef	dummy
Independent Variable	Description	Unit of measure
Age	Age of the respondent	years
Gender	1 if respondent is female, and 0 if otherwise	dummy
Ethnicity	Ethnicity of the respondent	dummy
Education level	1 if tertiary education, and 0 if otherwise	dummy
Marital status	Marital status of the respondent	dummy
Household size	Size of the household	number
Employment	1 if employed, and 0 if otherwise	dummy
Income	Income of the respondent	rand
Awareness of beef grades	1 if respondent is aware, and 0 if otherwise	dummy
Frequency of beef purchase	1 if frequently purchasing, and 0 if otherwise	dummy

RESULTS AND DISCUSSION

Consumers' socioeconomic characteristics

The results of the socioeconomic characteristics of beef consumers sampled are as presented in Table 2 below. This is based on households in the Polokwane municipality. From the total sample, 95 which is 63.3% of the respondents were females and 55 which is 36.7% were males. The high percentage of females may be attributed to the fact that most females are involved in grocery buying and food preparations; an observation consistent with the South African culture. Forty seven percent (47%) of the respondents are single, followed by married respondents (44%), while the divorced and widowed were the least represented categories (8.6%). This implies that single and married people should be targeted. About 76.7% of consumers interviewed were African, while Whites and Coloureds were represented by less than 30%.

Most of the respondents had tertiary education (59.3%), about 30.7% of the respondents had high school education, while 6.0% had primary education, and 4.0% of the respondents had no formal education. This indicates that most of the consumers who specialize in the purchase of beef

have attained tertiary education. This could be because some form of education is needed to fit into the urban way of life.

Table 2: Socioeconomic characteristics of consumers

Variable		Frequency	Percentage (%)
Gender	Male	55	36,7
	Female	95	63,3
Educational level	No formal education	6	4
	Primary school	9	6
	High school	46	30,7
	Tertiary education	89	59,3
Marital status	Single	71	47,3
	Married	66	44
	Divorced	2	1,3
	Widowed	11	7,3
Ethnicity	African	115	76,7
	Coloured	18	12
	White	17	11,3
Employment status	Employed	104	69,3
	Unemployed	46	30,7

Source: Authors' computation from survey data

The results as shown in Table 2.1 below show that, the mean household size is 5.28 members in each household with a standard deviation of 11.56. The mean age of respondents is 37.05 years with a standard deviation of 2.32. The average age suggests that beef products in South Africa are patronized by younger people. The average household income per month is 14480.15 Rands and a high number of respondents were employed.

Table 2.1: Summary statistics of respondents' socioeconomic characteristics

Variable	Mean	Standard Deviation
Age	37,05	11,562
Household size	5,28	2,317
Monthly income	14480,15	14557,47

Source: Authors' computation from survey data

Awareness of beef grades

To assess if respondents were aware of the grading or classification system in place in the South

African meat industry; respondents were asked if they had knowledge about the quality and safety of beef, which control measures assured safety and quality and they were asked if they understood the classification marks on meat as the form of coloured marks. Results show that slightly more than half of the interviewed beef consumers (53%) mostly being males, perceived knowledge of the classification system or marks on some cuts of the meat. This is attributed to the fact consumers interviewed purchases beef at supermarkets where price is the only differentiating attribute and there are little or no standards for safety and quality, and consequently must depend on the use of classification marks on beef to decrease the danger of purchasing meat that is not safe. Results could also be attributed to the high literacy level of the respondents. Even though the results states that consumers are aware of the system, there is still a small increasing awareness on grading systems as compared with the other countries (Vermuelen et al. 2015). Respondents indicated the lack of availability of labels to show grades or classification, as a primary reason that they did not know or understand the classification or grading system.

Consumer preferences regarding safe and quality beef

There is a continuing need to examine consumers' preferences for quality beef attributes to properly develop and use those characteristics as the industry attempts to provide consumers with easy and convenient meats. Bone and fat content in the meat, fat colour, meat colour and juiciness were beef quality attributes that consumers accounted as their most preferred attributes. Respondents (87%) showed a strong preference for beef with less fat, less bones, white fat, tender and slightly red meat. This is supported by Labuschagne et al. (2011) who found that SA consumer traditionally prefer beef that is tender. When asked to account for their choice of preferences, most consumers revealed that fat content was the most important underlying characteristics for beef quality. It is also perceived as indicators of beef tenderness and palatability, which increase utility derived from beef consumption. The bone content is important because respondents explained that they would want to maximise utility by paying for what they can eat. The remaining respondents (13%) preferred juiciness and appearance (red colour). While these are considered as important qualities in analysing preferences for beef consumers, they appear to be somewhat less important in this study.

To determine which food safety scares consumers are concerned about while procuring beef products these days, the respondents were requested to rate five given concerns. Figure 1, shows that animal disease is the most threatening issue for beef consumers, followed by salmonella, hormones and fat or cholesterol. Consumers seem to be less affected by antibiotics used in the beef industry.

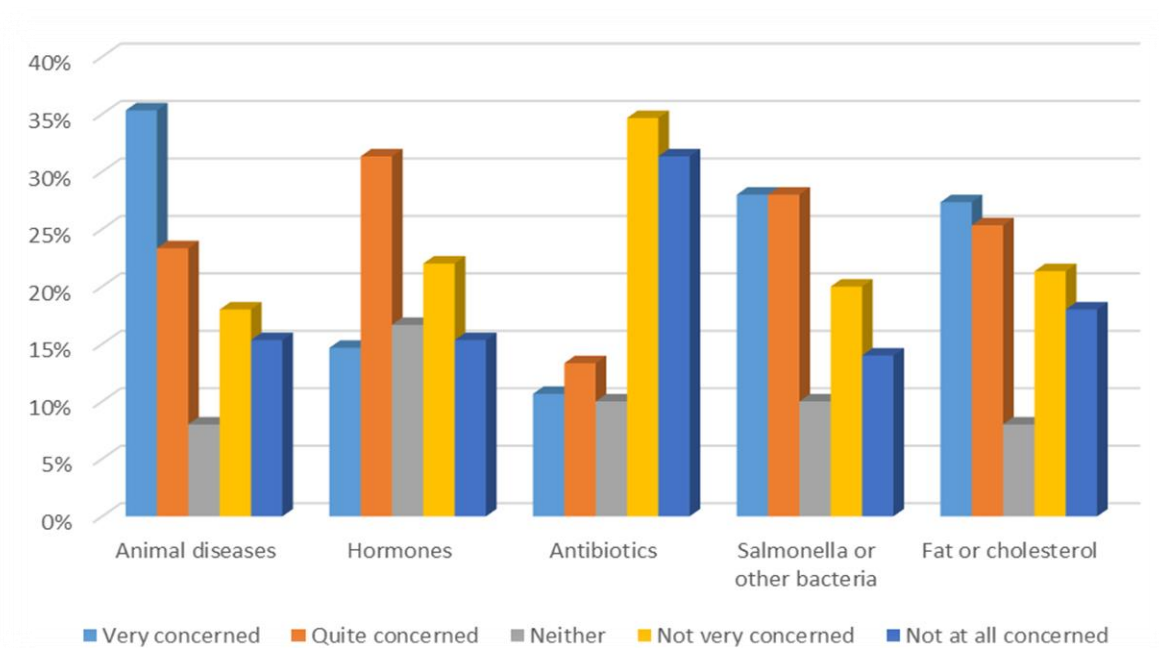


Figure 1: Consumers' safety concerns

It is understood by the respondents that the beef marketing chain can be risky, so 53% of the respondents want their beef to be free from physical objects as a sign of safety, followed by microbes (bacteria, E. coli, etc) 40% and lastly chemicals (pesticides, drugs, etc.) 7%. Overall, most of the respondents believed that the meat in the market place (grocery stores and butcheries) is safe for consumption and of great quality.

Purchasing behaviour of consumers

Beef meat remains as one of the food most preferred in our country, the findings indicate that most of the respondents (60.7%) purchase beef at a monthly basis, followed by 31.3% who purchase on a weekly basis. This could be attributed to higher prices of beef when compared to its substitutes. About 61.7% of the respondents purchased beef at the supermarket (Table 3) because the acquired product is packaged. The butchery was selected second, because respondents were considering factors such as freshness, bulkiness and knowledge and trustworthiness of the butcher. Lastly approximately 10% of the respondents purchase beef from local shops, hawkers and others self-produce.

Table 3: Purchasing behaviour

Frequency in beef purchasing	Frequency	Percentage (%)
Daily	12	8.0
Weekly	47	31.3
Monthly	91	60.7

Location for beef purchase		
Supermarket	92	61.7
Butchery	43	28.9
Street hawkers	11	7.4
Other	3	2.0
Reason for purchasing at location		
Most convenient		66
Best value for money		86.6
Quality of the meat		83.3
Trust that the meat is safe for consumption		83.3
The service is excellent		61.3
Availability		56.7
Nearness of beef source		38.7

Source: Authors' computation from survey data

Price (86.6%) and convenience (66%) are some of the reasons why South African consumers have a habit of purchasing meat in accessible retail places including, supermarkets, hypermarkets and small grocery stores. In South Africa fresh meat is mostly sold through supermarkets where consumers enjoy doing their household shopping in one retail outlet. Butcher shops are as well dominating the meat market in South Africa and this channel applies mainly to consumers who prefer purchasing fresh meat in bulks and who value the knowledge which only trained and experienced butchers provide, such as the quality of the meat (83.3%) and making sure the meat is safe (83.3%).

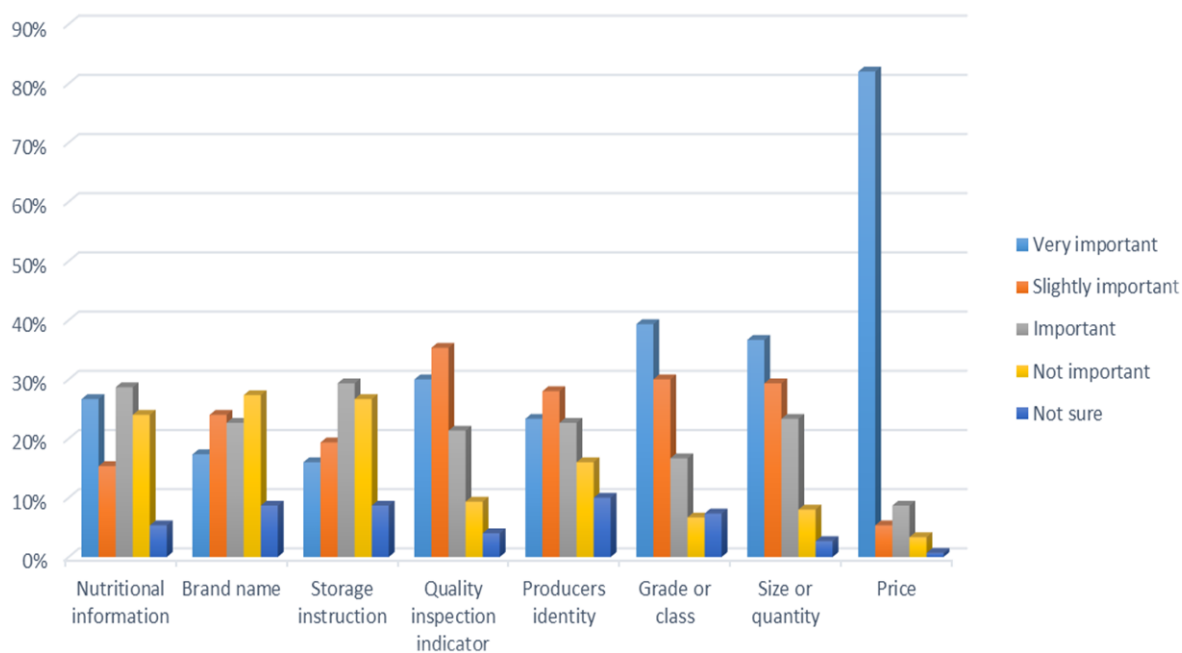


Figure 2: Importance of information on beef labels

As shown in Figure 2 the importance of information available on the beef package was ranked by consumers as follows: price, grade or class and size/quantity of the product were the most important labels followed by quality inspection or certification indicator. These findings are consistent with those of Peters-Teixeira and Badrie, (2005) and Prinsloo et al. (2012), who found that consumers had higher interest of nutritional information on food packages. Slightly lower attention was given to nutritional information and brand name. Producer's identity was found to be the last information in which consumers were interested. These results show that beef front-pack labels in SA should include nutritional information, storage instruction, quality inspection, price, size and grade or class.

Empirical results

Willingness to pay for graded beef

The distribution of respondents willing to pay for graded beef is shown in Table 4. Of all consumers, 64.67% were willing to do so and the remaining 35.33% were not willing to pay anything.

Table 4: Distribution of consumer willingness to pay

Willingness to pay	Frequency	Percentage
Willing to pay	97	64.67
Not willing to pay	53	35.33
Total	150	100

Source: Authors' computation from survey data

Initially the respondents were asked if they would pay more for beef. Respondents who accepted were additionally asked if they would be willing to pay for graded beef at a higher price. The actual or base price of beef was R42.20/kg.

Table 5: Consumer response to different bid levels

Bid	Willingness to pay	Response (%)				
		5% bid	10% bid	15% bid	20% bid	25% bid
Premium	Yes	68.0	65.6	79.7	51.5	56.7
	No	32.0	34.4	11.3	48.5	44.3
Discount	Yes	33.3	54.5	80.0	80.3	100.0
	No	66.7	45.5	20.0	19.7	0.0

Source: Authors' computation from survey data

The bid sets were randomly distributed to the questionnaire. These initial and second bids were obtained during the pilot survey. Over half of the respondents would be willing to pay more although the proportion diminished with the level of the extra cost. Respondents given a 5%

premium, only 68% were willing to pay. For respondents given a 10% premium, only 56.7% were willing to pay. This is consistent with economic theory because the amount of the respondents willing to pay decreased as the bid they were asked to pay increased.

Respondents who rejected the initial bid (35.3%) were presented with a lower bid (discount), also at different percentage to the actual price of beef. Respondents presented with a discount of 5%, 33.3% were willing to pay. One hundred percent (100%) of respondents with a 25% discount accepted the bid.

To evaluate the mean WTP empirically, the logit model explaining WTP without consumer characteristics ($\lambda_i = 0$) was estimated (Jerop, 2012). Table 6, shows estimated mean WTP for the graded beef considered in the study.

Table 6. Estimates for the double bounded dichotomous choice model

Variable	Estimate	Standard error
Constant (α)	4.0258	0.4355***
Bid (ρ)	0.0822	0.0786***
Mean WTP (α/ρ)	48.97	
Number of observations	150	
Log-likelihood	102.611	
Chi squared	15.125	
Pseudo R ²	0.666	

***Statistically significant at 1%

Source: Authors computation from survey data

Following equation 8, the mean willingness to pay can be derived from the α/ρ ratio, where, where α is the coefficient of the intercept term and ρ is the coefficient of the bid. Therefore, mean WTP = α/ρ = R48.97/kg. The positive mean WTP for graded beef is expected, given studies in other countries (Chung et al. 2012). Results show that consumers would be willing to pay an increase of 16.04% for graded beef, as opposed to normal beef with no differentiation. It is important for all the stakeholders in the beef industry to consider this attribute as a tool for differentiation. This is supported by Berges et al. (2015), who found out that the mean willingness to pay for purchasing certified beef with the presence of “safety certification” label, was approximately 20% higher than the current price. Sriwaranun et al. (2013) indicated that respondents were willing to pay a premium price of 88% for organic products. Lewis et al. (2017) also found that consumers were willing to pay more for safety attributes in Germany.

The effects of socioeconomic characteristics on WTP

To analyse the effects of different characteristics on willingness to pay, equation 9 was estimated. The model included a total of 10 variables and only four were found to significantly influence WTP.

Table 7: Logit results of socioeconomic factors influencing consumer willingness to pay

Variable description	Coefficient	Standard error	Marginal effects
Constant	3.2958	0.2873	-
Gender	1.222	0.0016***	0.0131
Income	0.087	0.050**	0.0229
Age	-0.139	0.065*	-0.004
Education	0.106	0.557	0.0157
Household size	-0.231	0.069*	-0.0143
Ethnicity	0.429	0.109	0.0191
Marital status	-0.216	0.527	-0.104
Employment	0.033	0.061	0.0175
Frequency of purchase	0.035	0.138	0.003
Awareness of beef grades	0.137	0.167	0.059
Number of observations	150		
Log-likelihood	98.224		
Chi squared	20.095		
Pseudo R ²	0.578		

Note * **and ***; Significant at 10%, 5% and 1% respectively.

Source: Authors' computation from survey data

The results in Table 7 reveal that, the gender of the respondents had an expected positive and significant effect on the willingness to pay for graded beef at 1%. This means that female would pay more for graded than males. The results indicate that, female consumers who are responsible for buying groceries and cooking for the entire household would be willing to give out more of their income to keep the household healthy. The marginal effect of 0.013 implies that each additional year of age from the mean increases the probability of the respondent to pay more for graded beef is 1.3%. The positive sign was expected and significant at 1% indicating that female consumers are likely to pay high premiums than male consumers.

The coefficient of income showed significance at 5% and had a positive sign, implying that consumers were willing to pay more as their income increased. This finding agrees with Alinda *et al.* (2016), who reported that income influenced the willingness to pay for quality beef. The marginal effect indicates that having higher income levels increases willingness to pay by 2.3%. Beef is a highly valuable food item for which the market price remains relatively higher compared to other foods. Willingness to prioritise expenditure on beef will therefore increase with increase in income.

Results shows an unexpected negative sign on the coefficient of age and a significant effect of 10%. A one-year increase from the mean reduces the probability of the respondent's willingness to pay by 0.4%. This indicates that, older respondents are not willing to pay for graded beef when

compared to younger consumers. The results indicate that, the youth who still have more years to live, for all things being equal are likely to be cautious of the quality and safety of the food they consume as opposed to the aged who have lived their youthful age without concern to the safe measures to what they consume. This is supported by Owusu-sekyere (2014), who indicated that consumer characteristics such as age and income significantly influenced preferences and willingness to pay for beef products.

The coefficient for household size variable was negative and shows a significant effect of 10% on willingness to pay for quality beef. The finding implies that an additional member in the household reduces the probability of respondents WTP by 4.3%. This means that there is a negative correlation among household size and willingness to pay. The higher the household size, the less likely the willingness to pay more for graded beef. The reason might be that, in larger households the disposable income per person decreases, therefore less willing to pay more. This finding differs from a study by Radman et al. (2012), who found that household size was the most vital and significant factor that influenced and determined the willingness to pay.

Estimated coefficient for education was positive. The marginal effect indicated that for each additional increment in educational level, the probability of the willingness of the respondent to pay for graded would rise by 1.6%. This could be because education raises awareness on food safety and quality and that educated respondents are concerned about health.

The ethnic background of the respondents (ethnicity) influences WTP for graded beef but it is not significant. Frequency of purchase increased the probability of WTP by 0.3%. Result also revealed that an increase in the level of awareness of respondent on the grading system, the higher the probability (5.6%) of their willingness to pay more for graded beef. Therefore, the information given about grading systems was able to affect the actual liking of beef. This in contrast with Jerop (2012), who found that awareness decreased the probability of consumers to pay for goat milk.

The marital status of the respondents was found to have a negative sign. The finding implies that were not willing to pay for graded beef as opposed to those who were single or divorced/separated. This could be explained by the fact that married respondents are likely to live in households which have more economic obligations (i.e. children) than those with single or divorced/separated households

CONCLUSION AND RECOMMENDATIONS

Heightened awareness on food-related safety issues, knowledge on the link between health and eating habits, consumers' changing food demands as well as elevated standards of living have contributed to the increasing needs for ethical food production systems from all over the world.

Generally, consumers are progressively becoming concerned on where and how food products are being produced. Understanding the preferences of consumers regarding quality and safe beef and the WTP for graded beef is therefore relevant. This study examined the consumers' preferences and willingness to pay for graded beef. By means of the contingent valuation, beef attributes and socioeconomic factors that are important in explaining consumer willingness to pay were determined and their coefficients estimated. Primary data was collected and a two-stage stratified sampling method was used to identify 150 beef consumers to participate in the study.

The findings reveal that consumers prefer less fat, less bones, white fat and slightly red colour meat. Also, they prefer beef products to be labelled with price, grade/class, size or quantity of the product and lastly quality inspection or certification indicator. Over half of the respondents (53%) were aware of grading or classification systems and their major source of information was through the butcher's information. Small-scale producers and processors should consider these attributes to implement differentiation to stimulate further demand.

Consumers are willing to purchase graded beef because it will be fully labelled, indicating the grades which will help them choose cuts suitable for their type of preparations and reveal that the product is free from chemicals, drugs, etc. The results disclose that respondents were willing to pay extra if they think that the product also provides greater quality and health benefits. Approximately 65% of the respondents are willing to pay an increase of 16.04 % over the current price of beef with no differentiation. About 35% of the respondents were not willing to pay anything, as they feel the extra cost for graded beef is unreasonable and too high. This could be an opportunity for investments in beef front-pack label industry in Polokwane, since more educated consumers are likely to be more informed on beef quality standards. Moreover, they are aware of nutrition content and concerned with labelled and graded beef.

The information produced by respondents prove that a grading or classification scheme could achieve the objective of promoting marketing of beef by using the marking or labelling of quality marks (grading information) on beef up to the point of retail, this can satisfy consumer choices with different levels of willingness to pay. Grading with respect to quality attributes would therefore make beef sales at differentiated prices possible. Ultimately, it would enhance sales volumes and returns for beef producers, processors and traders in the value chain. Graded beef could also facilitate the development of beef exports.

Among socioeconomic characteristics, age, gender, income and household size significantly influence WTP. Elderly respondents were not willing to pay for graded beef when associated to younger consumers, and those with higher level of income per month and few members in the household have higher WTP than those with little income and bigger household size. All

Polokwane municipality consumers are a great target market for this campaign however, it is important to reach out to the young consumers, females and high-income earners because they showed positive WTP for graded beef. It is therefore recommended that investors use selective targeting of socioeconomic characteristics to develop a strong market for quality characteristics and food safety of beef products. As shown in the results, when income increases the respondents were willing to pay more for graded beef.

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