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Strategic market planning for value-added natural beef products: A cluster analysis of Colorado consumers

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Abstract

In the past decade, sales of meat products labeled as natural (minimally processed) and produced without antibiotics and hormones have increased dramatically. In response to growing demand for meat products differentiated by various production attributes, many smaller-scale beef enterprises are considering direct marketing of their beef products to end-consumers as a viable approach to sustaining their family farming operations. This research uses survey data from Colorado consumers, and factor and cluster analysis to determine market segments for various (varied by production protocols and other meat attributes) natural beef products. Findings from the cluster analysis indicate that there are multiple segments of consumers who are likely to purchase natural beef, and that different segments are motivated by different factors. The most important factor explaining almost two-thirds of the differences among consumer responses relates to consumers' perceptions of the importance of meat attributes related to production practices (e.g. use of antibiotics, hormones and environmentally friendly grazing). Interestingly, the two consumer segments that are willing to pay a significantly higher premium for natural, local beef are motivated by different aspects of the meat and its intrinsic production attributes. One segment, representing 12.5% of consumers, ranked the importance of all production attributes significantly lower than the sample average. Consumers in this segment appear to be motivated by their perceptions of the extrinsic quality of natural beef products. The other segment, 13% of consumers, appears to be altruistic, ranking all production attributes such as 'no antibiotics', 'no hormones', and 'humane treatment', significantly higher than all of the other clusters. These results indicate the potential strength of production methods (and marketing of such quality differences) as product differentiation criteria. This paper illustrates the type of market research that may be useful for beef producers seeking value-added marketing opportunities, and portrays the types of consumers who are fueling the growth in natural meats in the United States. Such market analysis can facilitate producers' ability to effectively develop product concepts, labeling and promotional strategies targeted at the most receptive consumer segments, and illustrates that there is more than one type of consumer interested in purchasing products differentiated by sustainable production methods.

Key words: natural beef, consumer demand, targeted marketing

Introduction

Natural (minimally processed, containing no artificial ingredients or added color[1]) and organic (from animals given access to the outdoors, fed no antibiotics or growth hormones, and produced by farmers who emphasize the use of renewable resources and the conservation of soil and water[2]) meats and poultry continue to garner increased consumer interest and demand. Retail sales trends for this sector indicate it is the fastest growing segment of the $10.4 billion organic food industry, with a growth of 77.8% between 2002 and 2003[3]. Part of the growth has been due to access and sales of organic food through general supermarkets (rather than specialty natural markets). Sales through mass merchandisers more than doubled from 1993 to 1995 (an increase from $98 to $210 million) and

accounted for 45% of natural/organic food sales in 2001[3]. These trends illustrate the growing mainstream appeal of natural and organic foods.

The increasing complexity of consumer food purchasing trends is an important factor guiding all agribusiness-marketing efforts[4]. Profiling and targeting consumers by demographics or marketing channel may have once been effective, but it appears that natural meat consumers may be increasingly diverse. This is an issue of interest and importance to large agribusinesses, as well as those producers who seek to develop value-added meat products and to market to smaller niches. One area of increasing differentiation relates to the location and types of production methods used to raise the animals. Throughout the United States and Colorado, numerous new business ventures have been initiated to garner either a price premium or more loyal customer base through the marketing of unique production systems to consumer segments. Market research conducted on behalf of Colorado Homestead Ranches (CHR) is presented here in the context of its potential use for market development and further business planning.

The objective of this research is to analyze consumer segments in Colorado based on their interest and willingness-to-pay for various natural beef products (varied by production protocols and potential public good) using cluster analysis. Such an analysis should facilitate producers' ability to effectively develop product concepts, and labeling and promotional strategies targeted at the most receptive consumer segments. The research hypothesis is that there are multiple segments of consumers who are likely to purchase natural beef, and that different segments are motivated by different factors.

Background

CHR began in November of 1996 as a group of five ranches from the Western Slope of Colorado seeking to provide a healthy, quality beef product directly to the consumer. The current strategic position of CHR is to develop a niche, differentiated line of beef products, targeted at consumers who want a consistent quality product, raised on Colorado ranches, with natural production practices. The company strives to grow marketing activities through retained earnings from marketing and processing revenues, while also assuring a premium is returned to each member for the beef animals that are used as inputs, on a per pound basis.

Since 2002, CHR's marketing and business strategies have focused on the development of a diverse set of marketing channels (farmers markets, retail store, restaurant sales) to connect with an increasingly large consumer base in Western Colorado. Beyond the expected revenue and equity gains from integrating added value into their beef products, CHR seeks to manage the risk inherent in livestock price cycles through a fixed return to participating ranches, thereby relying on a loyal and expanding customer base. At this point in time, there is continued sales growth (exceeding 50% annual growth between 2002 and 2004),

and CHR hopes to maintain their annual sales growth through modifications of their current marketing strategy. Changes CHR is currently considering are labeling and certification of various production-related meat product attributes, developing alternative pricing strategies, and creating promotional materials used to market CHR beef.

Historically, CHR's marketing and sales strategies were very small-scale and personal, reflecting the direct connections made with consumers through farmers' markets. However, more formal market planning is expected to be necessary as marketing channels continue to expand, and because personal interaction between the ranchers and consumers may not be feasible if sales continue to grow as rapidly as in the recent past.

The primary competition and substitute products for CHR beef can be described with three segments:
1. Generic, unbranded beef marketed through convenient, large-scale supermarkets.
2. Branded beef products, with some combination of genetic, quality, production practice or production location claims, marketed through supermarkets, natural food stores and meat shops. Examples include Coleman, Maverick, Laura's Lean, Oregon Country and Certified Angus Beef. These products are closer substitutes to CHR beef than those in (1), as production practice assurances are provided to consumers. However, these companies rely on larger marketing channels and do little with convenience products such as ready-to-heat entrees and meat sticks.
3. Direct market beef sales by producers at ranch sites, farmers' markets, small retail stores, mail order and the Internet, with most product information communicated and promoted through personal sales relationships. This is the most direct competition with CHR, but there are few other ranches with established markets on the Western Slope of Colorado.

The primary purposes of CHR's market research and planning are to:
1. Segment the market to help target consumer groups with the greatest potential to purchase CHR's beef products.
2. Create a sustainable competitive advantage among the competition by further developing CHR's beef product line based on consumers' interests in various product attributes.
3. Analyze consumer willingness to pay and assess potential market share at various price points for four different beef products—a representative sample of the CHR product portfolio.

CHR markets frozen beef quarters, halves, individual cuts, processed beef products (jerky, meat sticks) and ready-to-heat entrees through several direct marketing channels throughout the Western Slope of Colorado. The meat is differentiated by its production location (beef is produced on five ranches that have a long history of cattle production and environmental stewardship in the Paonia, Colorado area) and practices (beef is raised without the use of antibiotics and hormones). One might describe CHR's

marketing strategy as a unique combination of intrinsic product development (meat quality assurance for a variety of beef products), along with personal sales and service. However, their personal sales strategies are also targeted toward consumers with interests in broader social benefits, including civic agriculture (support of small and local agricultural producers), environmental benefits (practices friendly to the landscape, water and wildlife) and public health concerns (antibiotic and hormone usage in meat production).

Literature Review

There is a growing set of literature on consumer interest in beef with production quality assurances, such as locally raised designations[5,6]. However, only a small share of this existing literature focuses on the existence, size and characteristics of particular consumer segments. Ziehl[7] found that consumers who have previously purchased natural beef or occasionally buy meat at alternative markets (not supermarkets) are more willing to pay a premium for natural products. Consumers' stated importance and interest in attributes such as natural and/or grass-fed production practices, traceability, and tested for Mad Cow Disease also impact their decision to pay a premium for natural, regionally produced beef.

Smith's[8] seminal work on market segmentation is now a common method for strategically developing the marketing mix for a variety of products. Nearly every market has some distinctive segments. Almost all markets are segmented by price and quality issues. Generally, however, price and quality do not provide the most clear or definitive market segmentation. Much stronger segmentation can usually be found through an evaluation of product or service uses and importance of production attributes to various consumers.

Market segmentation and consumer profiling strategies have been used in agribusiness management analysis to understand consumer response to a number of issues. In a segmentation analysis of supermarket consumers, Mangaraj and Senauer[9] found three distinct market segments: Middle Americans (motivated by price and value), Sophisticates (concerned with quality and service), and Time-pressed, Convenience Seekers (with young children and little time). Carlson et al.[10] conducted an analysis focused on where consumers purchase foods (including away from home) and found nine segments that varied significantly by demographics, but did not consider food attitudes.

In a study measuring food safety preferences related to produce, Baker and Crosbie[11] found three segments, one concerned with pesticide use, one concerned with the level of damage to produce (the majority of respondents) and one primarily concerned with price and quality. Baker and Burnham[12] conducted a similar study in 2000 considering genetically modified foods, and again, found three segments. The three clusters, Brand Buyers, Safety Seekers and Price Pickers, were motivated by different concerns,

attitudes toward risk and knowledge of genetically modified organisms, but had demographics that were very similar to each other, illustrating that demographics are not always effective market segmentation factors.

Empacher et al.[13] found four clusters of consumers: (1) Well-organized Eco-families who support local and sustainable agricultural practices (civic agriculture), (2) Strugglers, consumers who are low-income and price sensitive, (3) Rural traditionalists, consumers with traditional agrarian values who have historical ties to agriculture, and (4) Professionals, consumers without children and singles in urban areas with a focus on quality and image.

Following Empacher et al.'s[13] focus on social concerns, this study seeks to extend past consumer profiling by considering more of the civic agricultural issues that may motivate natural beef consumers. Sunding[14] asserts that, in addition to consumers' traditional concerns about nutritional content, purity, and freshness, consumers also may value a product more because it addresses a social concern or has a public good aspect, even though the product may not necessarily be 'more valuable' or 'higher quality' than a conventional product. Attributes such as 'free-range', 'organic', 'natural', and 'locally produced' are a few examples of more publicly oriented food attributes, which are now being labeled[1,2,14–16]. Recently, producers have been trying to target consumers who might value food products with attributes that some believe will positively impact the environment, society, or animal welfare[15,16].

A few studies have looked at how consumers value foods that are produced locally[5,17]. A set of earlier studies conducted by Thilmany et al.[18] and Grannis and Thilmany[19] examined the potential market for natural pork and natural freezer beef in the Intermountain West. The present study updates their work, focuses on specific value-added beef products, and further explores the unique consumer segments that are the most likely consumers of natural, local beef.

Data and Methods

The data were collected from a national online survey conducted by the National Family Opinion organization in April 2004. The National Family Opinion organization was directed to obtain a stratified sample ($n \geqslant 800$), representative of the United States Census; and another stratified sample ($n \geqslant 400$), representative of the Colorado Census, with 30% of the Colorado sample or $n \geqslant 120$ respondents from the Western Slope of Colorado. A total of 1840 members of the National Family Opinion organization's online survey database were solicited to take the survey and a total of 1288 responses were returned, providing a 70% response rate. CHR's goal is to remain a local business, and CHR is only interested in marketing to consumers within the state of Colorado. Therefore, to focus the results on the relevant market for CHR, Colorado consumers, the research discussed in this paper only utilizes survey data from the representative sample of 416 Colorado respondents.

Table 1. Summary statistics for the demographic variables ($n = 416$).

Variable name	Description (coding)	Mean	Standard deviation
Age	In years	47.685	14.112
Gender	1 if female, 0 if male	0.721	0.449
Weekly Grocery Expenditures	1 = < $50,	2.317	1.034
	2 = $50–99,		
	3 = $100–149,		
	4 = $150–199,		
	5 = $200–299,		
	6 = $300–399,		
	7 = $400–499,		
City Size	1 = Rural (< 5000)	3.190	1.438
	2 = Small town (5000–24,999)		
	3 = Small suburban (25,000–99,999)		
	4 = Large suburban (100,000–249,999)		
	5 = Metro area ($\geqslant$ 250,000)		
Income	1 = < $22,500	3.070	1.478
	2 = $22,500–39,999		
	3 = $40,000–59,999		
	4 = $60,000–89,999		
	5 = + $90,000		
Race	1 if Caucasian, 0 if otherwise	0.873	0.334
Hispanic	1 if Hispanic, 0 if otherwise	0.029	0.168
Household Size	Actual number in household, range: 1–7 members	2.344	1.212
Life Stage	1 if single, no children, 0 otherwise	0.221	0.416
	1 if couple, no children, 0 otherwise	0.413	0.493
	1 if children <6 living in household, 0 otherwise	0.103	0.305
	1 if children >6 living in household, 0 otherwise	0.094	0.292

In general, the survey elicited information on consumer shopping behavior, ratings for different beef production attributes (hormone and antibiotic use, grass-fed, traceable to source, and open range), and attitudes about the perceived benefits (private, public environmental or public health benefits) of different attributes. In addition, a contingent valuation method was used to elicit consumer willingness to pay for natural, regionally produced beef. The beef products considered were two relatively unprocessed products (ground beef and ribeye steaks) and two convenience entrée products (chili verde and beef stroganoff), and were based on product lines carried by the natural meat producers who supported this study with a USDA Value-Added grant, and our interest in whether different segments were interested in basic or convenience entrée choices. The National Family Opinion organization also provided socio-demographic characteristics for each respondent, which they store in their database.

The summary statistics of the socio-demographic information and other responses are given in Table 1. The sample is comparable to the Colorado population based on the US Census[20] in terms of income, household size, and the percentage of households with children living at home. However, the sample includes fewer minorities, more females, and slightly older respondents than the Colorado averages reported by the US Census. The fact that this sample is predominantly female is consistent with the results of several previous food-based surveys because females are generally the primary grocery shopper in a household[4]. The online survey method may have led to lower minority numbers.

There are countless variables to consider when analyzing consumer behavior, and this issue is increasingly complex in a marketplace that emphasizes consumer choice and product customization as strategies to secure higher market share, customer loyalty and an ability to secure premium prices. One analytical tool for examining consumer preferences and behavior is factor analysis, which allows a business to reduce market factors down to a smaller number of 'factors' that can be used to determine important characteristics motivating purchases. High factor loadings indicate a relatively high amount of variability among consumers' responses that can be explained by specific factors, thereby identifying absolutely important factors, as well as delineating those that jointly influence consumer responses. Subsequently, factor analysis will be the first method used to analyze the data, and results will influence the choice of cluster analysis criteria (although

comparisons of clusters will be based on a broader set of factors).

Market segmentation is the process of grouping a market into smaller subgroups that are not arbitrarily imposed, but instead, are derived from the recognition that the total market is often made up of submarkets (called segments). Segments are homogeneous (i.e. people in the segment are similar to each other in their attitudes about certain variables). Because of this intra-group similarity, consumers within a certain segment are likely to respond somewhat similarly to a given marketing strategy[8].

When enough information is combined to create a clear picture of a typical member of a segment, this is referred to as a buyer profile. A statistical technique commonly used in determining a profile is cluster analysis. Cluster analysis is a class of statistical techniques that can be applied to data that exhibits 'natural' groupings with relatively homogeneous characteristics, but with heterogeneous characteristics relative to objects outside the cluster. Cluster analysis, like factor analysis and multi-dimensional scaling, is an interdependence technique: it makes no distinction between dependent and independent variables. The requirements for successful segmentation are: homogeneity within the segment, heterogeneity between segments, segments that are measurable and identifiable, segments that are accessible and actionable, and segments that are large enough to be profitable. Initial analysis of data indicate that all of these factors are present in these data[7]. For this analysis, we used a *k*-means clustering technique embedded in STATA 7.0[21].

Research Findings

Factor analysis

The results from the factor analysis of Colorado consumers are presented in Table 2. The factors can be described in two ways: by the types of variables that have high loadings, and thus, play an important role in explaining consumer differences, and also, by the absolute amount of consumer variability explained by any one factor. The first factor could be defined as concern about production practices, since it is highly related to a consumer's response to the questions about the importance of almost all beef production attributes. This factor is only slightly influenced by willingness to pay, meat attributes, and past purchases of natural beef, as well as concerns about societal health (issues discussed in more detail below). As a whole, this factor explains 61% of the variability among the Colorado survey sample.

The second most important factor, 2, explains almost 20% of the variability, and appears to be most closely related to willingness to pay (or price sensitivity), with few other loadings greater than 0.10. This variable does seem slightly influenced by past natural beef purchases and societal health concerns as well. The third most important factor, 3, explains about 12% of the variability, and seems

closely aligned with traditionally marketed meat attributes, notably a premium brand, fresh, pre-seasoned, ready to eat, nutritional, and is a good value for the price. Additionally, the factor loading for the share of the price premium consumers attribute to personal (private) benefits (versus societal or public health benefits) is higher for factor 3 than for any other factor. The variables with high factor loadings for factor 3 may indicate that a segment of consumers exists who are more interested in personal satisfaction from traditionally marketed meat with quality attributes such as brand, convenience, freshness and nutrition. Finally, factor 4 explains 7%, and appears related to only the production attributes ('no antibiotics', 'no hormones', and 'percentage lean') that influence some consumers' perceptions of the 'health aspects' of the product rather than environmental and animal concerns.

These factors represent little that is informative on their own, but demonstrate how a large number of variables relate to one another and justify the inclusion of these factors in subsequent analyses. Some variables (product attributes) could be considered as a related set; for example, 'no antibiotics', 'no hormones', and 'protect endangered species' have similar loadings for factor 1. However, other variables have unique interpretations depending on the context they are considered within ('no antibiotics' and 'protect endangered species' have counter effects on factor 4), suggesting consumers with mixed feelings. This factor analysis motivates the types of variables included in the subsequent analysis of consumer clusters.

Consumer analysis

The consumer clusters are simply the result of a statistical segmentation process that groups like-minded consumers by their similar perceptions and responses. Simple mean comparisons across a wide range of variables are used to develop statistical descriptions of the clusters of consumers that are likely to be most receptive to CHR's natural and locally produced marketing concept. In particular, we focus on clusters of consumers who are willing to pay the price premium that CHR may need to charge in order to recover higher beef production and direct marketing costs.

The five clusters identified in the cluster analysis vary significantly in means across a wide set of variables, including demographics; therefore, these differences are used to name each cluster. Results of the descriptive statistics for the total sample as well as the five clusters are presented in Tables 3a and b, with the results of pairwise *t*-tests of means reported with superscripts (for example, if Cluster 1 differed significantly at the 95% significance level from Clusters 3 and 5, its mean is denoted with superscript 'c' and 'e').

The first cluster is labeled Quality Seekers, and makes up 52 of the 416 surveyed Coloradans (12.5%). The second cluster is labeled Health and Natural Consumers (55 individuals, or 13.2% of all consumers). These two clusters are akin to Empacher et al.'s[13] Professionals and

Table 2. Factor loadings among Colorado consumers.

	Factor Loadings			
Variable	**Factor 1: Production Practices**	**Factor 2: Willingness to Pay**	**Factor 3: Brand and Convenience**	**Factor 4: Perceived Health**
Maximum Willingness to Pay (1 to 8, in 10% Price Increments)				
Willingness to Pay for Ground Beef	0.1178	0.6256	0.0804	0.0411
Willingness to Pay for Ribeye Steak	0.1508	0.6923	0.0652	−0.0414
Willingness to Pay for Beef Stroganoff	0.0699	0.8591	−0.0339	0.0128
Willingness to Pay for Chili Verde	0.1267	0.7894	0.0143	0.0264
Weekly Grocery Expenditures	0.0946	0.1063	0.1360	0.0449
Weekly Meat Expenditures	0.0386	0.0217	0.0711	0.0088
Secondary Market for Meat (Supermarket is Primary Market for >95% of Respondents)				
Meat Shop	−0.0739	−0.0103	0.1138	−0.0042
Farmers' Markets	−0.0151	0.0905	0.0474	0.0105
Direct from Producer	−0.1007	−0.0326	−0.0787	0.0577
Internet	−0.0210	−0.0294	0.0294	0.0082
Health Food Store	−0.0708	−0.0818	0.0086	−0.0636
Importance of Product or Meat Attributes (1 to 5, 5 = Most Important)				
Open Range	0.8227	−0.0038	−0.0726	0.0076
No Antibiotics	0.8169	−0.0485	−0.1713	0.3102
No Hormones	0.8253	−0.0434	−0.0876	0.2873
Natural	0.7909	−0.0157	−0.0703	0.1964
Organic	0.7707	0.0895	−0.1290	0.1711
Grass-fed	0.7815	−0.0651	−0.0941	0.1507
Preserve Streams	0.7860	−0.0379	0.0150	−0.3041
Protect Endangered Species	0.8192	−0.0112	0.0228	−0.4687
Humane Treatment	0.7601	−0.0670	0.0036	−0.1208
Traceable from Farm to Consumer	0.6782	−0.0932	0.0555	0.1316
Country of Origin Labeling	0.6066	−0.1132	0.2106	0.0814
USDA Certified Organic	0.6599	0.1333	0.0279	0.1744
Value for Price	0.1217	−0.1918	0.3244	0.0083
Nutritional Value	0.4221	−0.1105	0.3730	0.1189
Percent Lean	0.3536	−0.1123	0.3064	0.2607
BSE Tested	0.4759	−0.0117	0.2911	0.1637
Fresh	0.3370	−0.0756	0.3779	0.0964
Aged >14 days	0.3009	−0.0895	0.1359	0.1135
Boneless	0.2142	−0.0252	0.3757	0.1767
Premium Brand	0.2722	0.0078	0.5496	0.1339
Ready to Heat	0.0831	0.0749	0.3462	−0.0108
Pre-seasoned	0.0252	0.1767	0.3953	−0.0282
Purchased Natural Beef (Yes = 1)	0.2344	0.1598	0.1017	0.1830
Share of Price Premium Designated To Concern About . . .				
Personal Benefits	−0.1886	−0.0630	0.1433	0.1110
Broad Societal Benefits	0.0418	−0.0214	−0.0914	−0.2238
Public Health Benefits	0.3149	0.1416	−0.0912	0.1277
Age	−0.0426	−0.3135	−0.0856	0.0641
Gender	0.2679	−0.1140	0.0885	0.1476
City Size	−0.0663	0.0407	0.1495	0.0570

Factor	**Variance**	**Difference**	**Proportion**	**Cumulative**
1	8.2292	5.6055	0.6132	0.6132
2	2.6236	1.6302	0.1955	0.8087
3	1.5732	0.0000	0.1172	0.9259
4	0.9935	−0.5797	0.0740	1.0000

Table 3a. Summary statistics for Colorado consumer clusters.

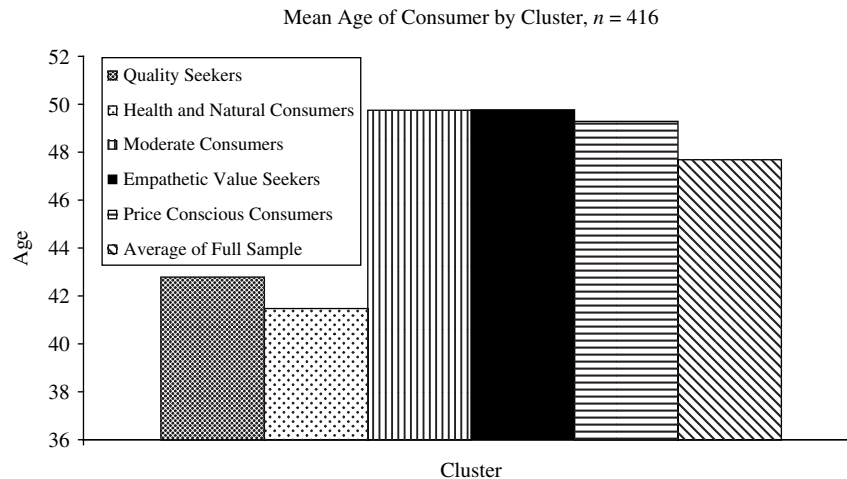| Variable	Cluster 1: Quality Seekers (*n*=52)		Cluster 2: Health and Natural Consumers (*n*=55)		Cluster 3: Moderate Consumers (*n*=123)		Cluster 4: Empathetic Value Seekers (*n*=94)		Cluster 5: Price Conscious Consumers (*n*=92)		Full Sample (*n*=416)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Maximum Willingness to Pay (1 to 8, 10% price increments)												
Willingness to Pay for Ground Beef	5.63[c,d,e]	1.67	5.25[c,d,e]	1.48	2.56[a,b,d,e]	1.80	1.67[a,b,c]	1.62	1.63[a,b,c]	1.68	2.89	2.28
Willingness to Pay for Ribeye Steak	4.61[b,c,d,e]	1.78	3.69[a,c,d,e]	1.35	1.51[a,b]	1.32	1.23[a,b]	1.36	1.13[a,b]	1.25	2.04	1.87
Willingness to Pay for Beef Stroganoff	3.38[b,c,d,e]	1.86	2.47[a,c,d,e]	1.55	0.67[a,b,d]	0.88	0.44[a,b,c]	0.68	0.55[a,b,c]	0.91	1.17	1.54
Willingness to Pay for Chili Verde	3.17[c,d,e]	1.98	2.76[c,d,e]	1.84	0.67[a,b,d]	0.97	0.59[a,b]	1.09	0.57[a,b]	0.88	1.22	1.64
Secondary Market for Meat (Supermarket Primary for >95%)												
Health Food Store	0.15[b]	0.36	0.29[a,c,d,e]	0.45	0.09[b]	0.30	0.13[b]	0.34	0.07[b]	0.25	0.13	0.34
Meat Shop	0.31[c]	0.47	0.24[c]	0.43	0.35[a,b,d,e]	0.48	0.20[c]	0.40	0.26[c]	0.44	0.28	0.45
Farmers' Markets	0.12[c]	0.32	0.05	0.23	0.02[a]	0.15	0.05	0.23	0.08	0.27	0.06	0.23
Direct from Producer	0.02[e]	0.14	0.02[e]	0.13	0.03[e]	0.18	0.02[e]	0.15	0.08[a,b,c,d]	0.27	0.04	0.19
Internet	0.06	0.24	0.04	0.19	0.05	0.22	0.04	0.20	0.04	0.21	0.05	0.21
Have Purchased Natural Beef (Yes = 1)	0.33[b,e]	0.47	0.64[a,c,d,e]	0.49	0.33[b,e]	0.47	0.38[b,e]	0.49	0.16[a,b,c,d]	0.37	0.35	0.48
Share of Price Premium Designated to Concern about … (%)												
Personal Benefits	46.67	26.06	41.13[c,e]	24.63	49.22[b,d]	23.99	43.44[c,e]	24.16	54.17[b,d]	34.64	47.72	27.29
Broad Societal Benefits	21.54	16.23	21.35	19.45	23.01	18.56	23.64	20.89	22.17	27.51	22.56	21.15
Public Health Benefits	25.06[b,e]	17.99	33.53[a,c,d,e]	21.83	23.50[b,d,e]	19.76	27.99[b,c,e]	19.85	14.13[a,b,c,d]	15.98	23.96	19.96
Demographics (See Table 1)												
Gender	0.60[b,c,d]	0.50	0.82[a,e]	0.39	0.75[a,e]	0.44	0.85[a,c,e]	0.36	0.57[b,c,d]	0.50	0.72	0.45
Size of Hometown	3.23[d]	1.46	3.36[d]	1.51	3.44[d]	1.43	2.78[a,b,c,e]	1.37	3.15[d]	1.39	3.19	1.44
Income	3.29[e]	1.47	3.24	1.44	3.07	1.44	3.06	1.54	2.85[a]	1.49	3.07	1.48
Non-Caucasian	0.10	0.30	0.13	0.34	0.13	0.34	0.14	0.35	0.12	0.33	0.13	0.33
Single, No Dependents	0.23	0.43	0.24	0.43	0.19	0.39	0.21	0.41	0.26	0.44	0.22	0.42
Couple, No Dependents	0.44	0.50	0.51[d]	0.51	0.42	0.50	0.34[b]	0.48	0.40	0.49	0.41	0.49
Parent	0.21	0.41	0.24	0.43	0.20	0.40	0.20	0.40	0.16	0.37	0.20	0.40
Woman with Child	0.19	0.40	0.24	0.43	0.17	0.38	0.20	0.40	0.15	0.36	0.19	0.39

[a] Significantly different than Cluster 1, Quality Seekers, at the 5% level.
[b] Significantly different than Cluster 2, Health and Natural Consumers, at the 5% level.
[c] Significantly different than Cluster 3, Moderate Consumers, at the 5% level.
[d] Significantly different than Cluster 4, Empathetic Value Seekers, at the 5% level.
[e] Significantly different than Cluster 5, Price Conscious Consumers, at the 5% level.
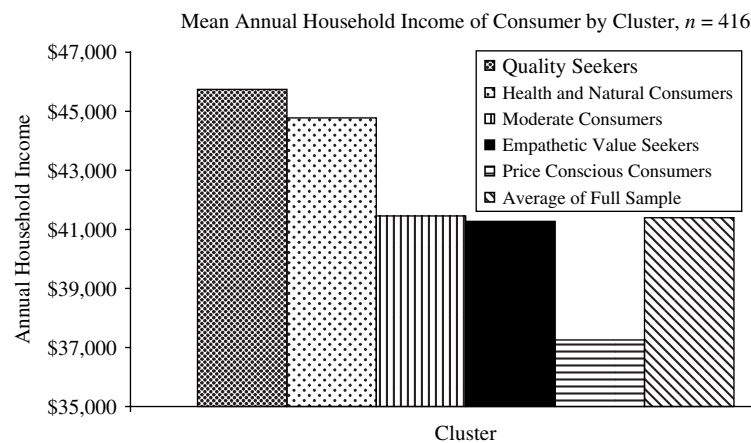
Table 3b. Average attribute ratings for Colorado consumer clusters.

Variable	Cluster 1: Quality Seekers (n=52) Mean	S.D.	Cluster 2: Health and Natural Consumers (n=55) Mean	S.D.	Cluster 3: Moderate Consumers (n=123) Mean	S.D.	Cluster 4: Empathetic Value Seekers (n=94) Mean	S.D.	Cluster 5: Price Conscious Consumers (n=92) Mean	S.D.	Full Sample (n=416) Mean	S.D.
Open Range	2.44[b,d,e]	0.98	4.16[a,c,e]	0.76	2.59[b,d,e]	0.93	4.34[a,c,e]	0.77	1.58[a,b,c,d]	0.80	2.95	1.36
No Antibiotics	2.56[b,c,d,e]	0.96	4.23[a,c,d,e]	0.84	2.92[a,b,d,e]	0.99	4.57[a,b,c,e]	0.65	1.76[b,c,d,e]	0.89	3.17	1.37
No Hormones	2.65[b,c,d,e]	1.05	4.38[a,c,d,e]	0.78	3.18[a,b,d,e]	1.04	4.66[a,b,c,e]	0.60	1.77[a,b,c,d]	0.85	3.30	1.39
Natural	2.69[b,c,d,e]	0.94	4.05[a,c,d,e]	0.80	2.99[a,b,d,e]	0.91	4.36[a,b,c,e]	0.80	1.76[a,b,c,d]	0.79	3.13	1.27
Organic	2.21[b,c,d,e]	0.84	3.67[a,c,e]	1.00	1.97[a,b,c,e]	0.81	3.74[a,c,e]	1.20	1.27[a,b,c,d]	0.52	2.47	1.32
Grass-fed	2.25[b,c,d,e]	0.86	3.82[a,c,d,e]	0.77	2.67[a,b,d,e]	0.87	4.15[a,b,c,e]	0.94	1.71[a,b,c,d]	0.82	2.89	1.26
Preserve Streams	2.33[b,d,e]	0.94	3.60[a,c,d,e]	1.03	2.41[b,d,e]	0.93	3.91[a,b,c,e]	1.03	1.57[a,b,c,d]	0.83	2.71	1.29
Protect Endangered Species	2.42[b,d,e]	1.11	3.71[a,c,e]	0.99	2.39[b,d,e]	1.01	3.95[a,c,e]	1.06	1.58[a,b,c,d]	0.80	2.74	1.33
Humane Treatment	2.77[b,d,e]	1.04	4.07[a,c,d,e]	1.07	3.05[b,d,e]	1.05	4.48[a,b,c,e]	0.76	2.02[a,b,c,d]	0.98	3.25	1.32
Traceable from Farm to Consumer	2.77[b,c,d,e]	1.10	3.78[a,c,d,e]	0.85	3.28[a,b,d,e]	1.11	4.30[a,b,c,e]	0.95	1.89[a,b,c,d]	0.94	3.21	1.31
Country of Origin Labeling	2.63[b,c,d,e]	1.10	3.78[a,d,e]	0.99	3.46[a,d,e]	1.10	4.30[a,b,c,e]	1.01	1.99[a,b,c,d]	0.99	3.26	1.33
BSE Tested	3.81[b,c,d,e]	0.99	4.44[a,c,e]	0.94	4.12[a,b,d,e]	1.00	4.55[a,c,e]	0.82	2.92[a,b,c,d]	1.26	3.96	1.18
USDA Certified Organic	2.46[b,d,e]	0.92	3.96[a,c,d,e]	0.88	2.52[b,d,e]	0.96	3.62[a,b,c,e]	1.25	1.52[a,b,c,d]	0.78	2.73	1.30
Value for Price	4.07[a,d,e]	0.76	4.36[a,d]	0.73	4.39[a,d]	0.70	4.54[a,b,c,e]	0.79	4.32[a,d]	0.75	4.37	0.75
Nutritional Value	3.25[b,c,d,e]	0.86	3.95[a,c,e]	0.95	3.82[a,b,c,d]	0.77	4.09[a,c,e]	0.92	2.87[a,b,c,d]	1.06	3.62	1.02
Percent Lean	3.58[b,c,d]	0.91	4.15[a,c,e]	1.01	4.02[a,d,e]	0.72	4.33[a,c,e]	0.69	3.42[b,c,d]	1.08	3.92	0.93
Fresh	3.48[b,d,e]	0.96	4.07[a,c,e]	0.92	3.59[b,d,e]	1.01	4.07[a,c,e]	0.94	3.05[a,b,c,d]	1.01	3.63	1.05
Aged >14 days	2.44[b,c,d,e]	1.02	3.13[a,c,e]	1.19	2.89[a,b,d,e]	1.05	3.12[a,c,e]	1.23	2.01[a,b,c,d]	0.97	2.72	1.17
Boneless	3.02[d]	0.98	3.35[e]	1.20	3.11[d,e]	1.08	3.54[a,c,e]	1.09	2.82[b,c,d]	1.02	3.16	1.10
Premium Brand	3.12[d,e]	0.92	3.44[e]	1.21	3.34[e]	0.99	3.51[a,e]	1.22	2.50[a,b,c,d]	1.08	3.18	1.15
Ready to Heat	2.54	1.13	2.55	1.12	2.47	1.07	2.67[e]	1.16	2.35[d]	1.11	2.51	1.11
Size of Package	3.54[b,c,d,e]	0.90	3.91[a,e]	0.97	3.78[a,e]	0.84	3.71[a,e]	1.15	3.20[a,b,c,d]	1.14	3.62	1.03
Pre-seasoned	2.13[d,e]	0.84	2.16[d,e]	0.98	1.96	0.97	1.83[a,b]	1.02	1.77[a,b]	0.94	1.94	0.97

[a] Significantly different than Cluster 1, Quality Seekers, at the 5% level.
[b] Significantly different than Cluster 2, Health and Natural Consumers, at the 5% level.
[c] Significantly different than Cluster 3, Moderate Consumers, at the 5% level.
[d] Significantly different than Cluster 4, Empathetic Value Seekers, at the 5% level.
[e] Significantly different than Cluster 5, Price Conscious Consumers, at the 5% level.

Mean Age of Consumer by Cluster, *n* = 416

Figure 1. Consumer age profile by cluster.

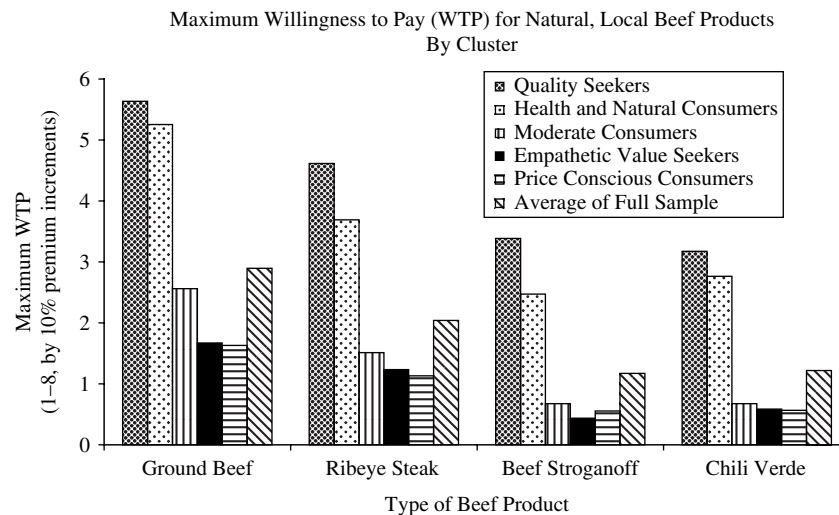Mean Annual Household Income of Consumer by Cluster, *n* = 416

Figure 2. Consumer income profile by cluster.

Well-organized Eco-families, and represent the best potential consumer targets for CHR's current marketing strategies and product position. Thus, these clusters receive the most attention in defining the customer base, but other segments will be the comparative baseline from which to contrast the targeted consumers' attitudes and behavior. The third cluster, titled Moderate Consumers, includes 123 respondents (29.6%), the fourth is Empathetic Value Seekers (94 or 22.6%), and the last is the Price Conscious Consumers (92 or 22.1%).

First, we can explore basic demographic differences among the five clusters. Figure 1 indicates that targeted consumers (Quality Seekers and Health and Natural Consumers) are a bit younger than the sample average of 48 years. Table 3a indicates that the full sample is primarily female (over 70%), but that one of our targeted segments, Quality Seekers, are significantly more male than the others, as are the Price Conscious Consumers. In contrast, Health and Natural Consumers, another target cluster, as well as Empathetic Value Seekers are relatively more female than the Moderate Consumers. The proportions of each cluster that are non-Caucasian (13% on average) are also shown in Table 3a, but there are no significant

differences between clusters and the total sample in terms of ethnic background. Figure 2 illustrates the final demographic to be analyzed, income. Income is important when discussing a differentiated product with a slightly higher price, as household income often influences the amount of disposable income, and subsequently, price sensitivity (Fig. 3). Not surprisingly, one targeted consumer segment, Quality Seekers, has relatively higher income, while the Price Conscious consumers may feel unable to buy quality products because of relatively lower household income. While graphically there appear to be some income differences across clusters, it should be noted that the average incomes for these clusters were only significantly different among Quality Seekers and Price Conscious Consumers, thereby suggesting the long-held belief that only affluent consumers will purchase natural meat products is misleading, once other consumer preferences are considered.

Demographics were once the primary source of market analysis, because they were common descriptors of people, and were even used to make promotional print and televised media buys. However, for a more personal promotion and marketing strategy like the one that CHR and other niche producers might use, demographics are limited in

Maximum Willingness to Pay (WTP) for Natural, Local Beef Products
By Cluster

Figure 3. Consumer willingness to pay by consumer profile.

terms of the focus they give to market planning. Still, these demographic descriptions of our consumer clusters do allow us to understand what a representative consumer looks like, and begin to provide some basic information on how a marketing campaign might be structured.

Analysis of shopping and past consumption behavior is a more directed approach to analyzing the market potential for any one consumer cluster. Another important factor to understand about the potential natural beef consumers is their propensity to shop in less traditional food markets for some of their purchases, even if traditional supermarkets are still the dominant food shopping location. The shares of consumers in each cluster that use various alternative shops as their secondary meat shopping location are portrayed in Table 3a. Quality Seekers (cluster 1) are less likely to shop at meat shops than Moderate Consumers (cluster 3); however, they shop more at farmers' markets than Moderate Consumers. Health and Natural Consumers (cluster 2) are less likely than Moderate Consumers to shop at meat shops, and are more likely to shop at health food stores than all other clusters. Conversely, while Price Conscious Consumers (cluster 5) are less likely than some clusters to shop at either health food stores or meat shops, they are more likely than any other cluster to buy meat directly from producers (indicating some potential as a target market for lower priced, freezer beef marketers).

The most obvious signal of a consumer's propensity to purchase natural, local beef is their response to the question of whether they have purchased natural beef in the past. Table 3a provides evidence that the Health and Natural Consumers were more likely than all other clusters to have purchased natural beef products in the past, with 64% responding they had previously purchased natural beef. As a contrast, only 16% of Price Conscious consumers had made prior natural beef purchases, a share significantly lower than all other clusters. It is interesting to note that although cluster 1 (Quality Seekers) shows strong potential as a customer base, they still need to be convinced of the

quality or other benefits that any natural beef products might offer (Table 3b).

The most stark differences among consumers were in their ratings of production and meat attributes, as the factor analysis indicated would be the case. One of the target clusters (Quality Seekers) rated natural, alternative and environmentally friendly production practices significantly lower than all other clusters except Moderate Consumers in a few cases (open range, preserve streams and endangered species, and humane treatment), and Price Conscious Consumers in all cases. Yet, Quality Seekers state they are willing to pay a significant premium for local, natural meat products. They also rated other attributes, such as freshness, package size and pre-seasoned, significantly lower than consumers in all or most of the other clusters, so that preferences about product attributes that directly influence their personal usage seem less important to this group. This outcome may simply indicate that Quality Seekers are primarily interested in the "local" attribute of the local, natural beef product and have a desire to support their local economy, with less particular emphasis on any tangible product attribute. This cluster presents a challenge to CHR, or similar natural beef producers, particularly if other regional beef producers choose to also market their qualifying beef products as "local." In order to sustain their competitive advantage with Quality Seekers, CHR may need to maintain a high-level of customer service, and will have to be innovative in order to continue to differentiate their product from commodity beef based on more intangible quality signals and "local" aspects this group seeks.

A sizeable cluster (Health and Natural Consumers and Empathetic Value Seekers) of consumers values the use of alternative production practices, so labeling of intrinsic production attributes should be a part of the larger marketing strategy. While Empathetic Value Seekers rate most production practice attributes high, they are not as willing to pay a premium for the local, natural beef product as Health and Natural Consumers. For the Empathetic

Value Seeker cluster, with its strong interest in beef raised with production assurances, there may be some opportunity to market large volume, low margin natural beef (freezer beef) at affordable prices, if producers are initially entering the market and are still working to develop a reputation and brand name. Price Conscious consumers, on the other hand, do not require production assurances but they have a propensity to buy direct.

As suggested throughout the discussion, and illustrated in Table 3a, all the consumer segments have significantly different levels of willingness to pay for the four types of beef products compared to one another (Fig. 3). The highest relative premium for each group is for ground beef, followed by ribeye steaks, and then the convenience entrée products. The two segments, Quality Seekers and Health and Natural Consumers, were targeted because of their willingness to pay the prices that CHR hopes to charge in order to meet their goals for returns to meat, but it should be noted that there is a significant difference in each segment's willingness to pay for ribeye steak and beef stroganoff. Consumers in these two segments represent a small enough market share so that a direct marketing producer group, such as CHR, could handle the volume necessary to supply a targeted region (in this case, Colorado's Western slope). The differences in each cluster's preference ratings for the beef attributes discussed previously can provide further direction for producer groups that are aspiring to develop alternative direct marketing strategies for each consumer segment or cluster. In addition to measuring possible premiums and to understanding preferences for different beef quality attributes, it is also helpful to understand *why* consumers are willing to pay these premiums.

As mentioned previously, there is increasing interest in understanding consumer attitudes toward the private and social benefits of the natural beef products that they purchase, and this survey attempted to elicit information with the following question:

There may be various reasons you prefer the natural beef products previously described above. Please estimate what share or percentage of your premium is based on the following: (Your answers must add up to 100 percent)
—— Nutrition, quality, safety (Personal Benefits)
—— Support local agriculture, environmental benefits (Broad Societal Benefits)
—— Potential antibiotic resistance, unknown hormonal effects (Public Health Concerns)
—— Other, Please Specify: ————

On average, the sample reported that 48% of their premium was based on personal benefits. Public health concerns accounted for an average of 24%, broad societal benefits made up 23%, and other concerns represented 5% of the premium a consumer was willing to pay. Health and Natural consumers were more likely to designate a significantly higher (than the sample average) proportion of their premium for natural beef to public health

benefits compared to all other clusters and a significantly lower proportion of their premium was assigned to personal benefits compared to Moderate and Price Conscious consumers. Conversely, Price Conscious consumers ascribed a significantly higher proportion of their premium for natural beef to personal benefits (compared to Health and Natural and Empathetic Value Seekers), and a significantly lower share of their premium was assigned to public health benefits relative to all other clusters. Interestingly, there were no significant differences in shares among the clusters for broader societal benefits. The sample of respondents who stated that a share of their premium was based on 'other' potential benefits specified these other benefits as including, but not limited to, the following: cost or price, product appearance, taste of the product, desire not to purchase natural beef, and preference for convenience. Another cluster analysis was performed that included all of these other variables, in addition to those listed in the first analysis. There were still five clusters, but the inclusion of these variables made the distribution across segments far less uniform, with two clusters dominating the sample, so they were excluded from subsequent cluster exercises.

Marketing Implications and Conclusions

The growth in natural meat sales in the United States has outpaced all other natural food sectors in recent years. The industry has responded with a number of beef products and brands to meet the needs of interested consumers. Such market innovations have also encouraged smaller producers, such as CHR, to explore strategies that allow them to capture the consumer market for meat raised using sustainable methods.

This research presents analysis of CHR's relevant market, Colorado consumers, using factor and cluster analysis. Given their discussions with customers while conducting direct sales, it was not surprising to them that the most important factor explaining almost two-thirds of the differences among consumer responses relates to production practices (use of antibiotics, hormones, and environmentally friendly grazing). Producer-members of CHR have used their sustainable practices as a product differentiation strategy, but as the cluster analysis indicates, customers are also motivated by a number of different factors.

Quality Seekers and Health and Natural Consumers (12.5 and 13.2% of the total sample, respectively) both indicate a willingness to pay a premium for natural, local beef. Quality Seekers' willingness to pay a premium for natural, local beef appears to be motivated by their perceptions of the premium quality of natural beef products. On the other hand, Health and Natural Consumers' willingness to pay premiums for natural, local beef products may be more altruistic in nature; this segment of consumers ranked production attributes such as 'no antibiotics', 'no hormones', and 'humane treatment'

significantly higher than the sample average. Additionally, Health and Natural consumers attributed a significantly lower (than the full sample) percentage of their premium to personal benefits, and a significantly higher percentage of their premium to public health benefits.

As a contrast to Quality Seekers and Health and Natural Consumers, Empathetic Value Seekers (22.6% of the sample) are not willing to pay a premium price for local, natural beef; however, CHR has still garnered some of their business by offering lower price points on some meat cuts (roasts, ground beef) that otherwise do not sell as quickly, in order to attract some price sensitive consumers. Overall, these results indicate the potential strength of production methods (and marketing of such quality differences) as product differentiation criteria.

This paper illustrates the type of market research that may be useful for beef producers seeking value-added marketing opportunities, as well as painting a bigger picture about the types of consumers who are fueling the growth in natural meat sales in the United States. On a broader scale, further analysis of these consumer segments could also help different meat market participants (supermarkets, meat shops, and producers who directly market their natural beef products) differentiate themselves by the type of consumer segment they hope to attract with their product offerings and their own market image. This information can inform emerging producer initiatives, helping them to differentiate their beef products through adoption of new production protocols, certification processes, and labeling of such attributes.

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