

**QUALITY PERCEPTION IN A MEAT
DEPARTMENT OF A RETAIL STORE**

by

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ABSTRACT

HEB is a privately-held grocery retailer founded in 1905 in Kerrville, TX. Since then, HEB has grown to 399 stores in 155 communities. Although the majority of its operations have been in southern Texas, nearly 10 percent of HEB's stores (39) are in Mexico. This may be considered an impressive feat since its entry into Mexico occurred in 1997 to take advantage of the growth opportunities in Mexico and the North American Free Trade Agreement involving Canada, the U.S. and Mexico.

The research was conducted using primary data collected through a survey. Secondary data from the Shapiro Index were also employed to explain the observations from the survey. Econometric and statistical models were used in the analyses.

Customer quality perception is an important metric for the retail industry. This research evaluates the effect of purchase history, frequency of shopping, price perception, quality and service changes through time on the quality perception of a meat department in a supermarket. The impact of additional labor was analyzed to determine the effect on those variables. The quality perception of the customers of other meat retailers in the same trading areas was also evaluated. The results of the study were then compared to the actual metric used to measure quality perception (Shapiro Index). The study found that the company has a significant higher quality perception than other supermarkets, that labor had a positive effect on quality and service change, customers noticed the change, and with time, it will increase their quality perception. The results show a different perception from

customers than the Shapiro Index, customers do not notice a decrement on quality in the meat departments. Based on these results, a further research on the actual methodology used was performed, training and new purchasing specifications were applied to improve the intrinsic characteristics of the products and a new marketing campaign was launched based on quality and freshness.

TABLE OF CONTENTS

List of Figures	v
List of Tables	vi
Acknowledgments	vii
Chapter I: Introduction	1
1.1 Background Information	1
1.2 Research Questions	3
1.3 Objectives	5
1.4 Methods	6
1.5 Outline	7
Chapter II Literature Review	8
2.1 Customer perception vs. reality	8
2.2 Cultural differences in the Hispanic market	11
2.3 Effect of service in quality perception.....	13
2.4 Quality in the meat industry.....	14
Chapter III Results and Discussion	17
3.1 Summary Statistics	18
3.2 Multinomial Regression Analysis.....	23
3.3 Competitor Analysis.....	27
3.4 Comparisons Using the Shapiro index	28
3.5 Summary.....	31
Chapter IV Conclusions	33
4.1 Future Research.....	34
References	36
Appendix 1: Survey	38

LIST OF FIGURES

Figure 2.1: The Total Food Quality Model.....	15
Figure 3.1: Total store Shapiro Index differential between HEB and competitors in the Monterrey trading area (February 2003 to April 2011).....	29
Figure 3.2: Meat department Shapiro Index differential between HEB and competitors in the Monterrey trading area (February 2003 to April 2011)	29
Figure 3.3: Shapiro Index scores for total store and meats, produce and edible groceries from February 2003 to April 2011.....	31

LIST OF TABLES

Table 3.1: Explanation for each variable analyzed	18
Table 3.2: Summary statistics for primary data.....	19
Table 3.3: Correlations among perception variables for stores without additional labor (Labor = 0)*.....	19
Table 3.4: Correlations among perception variables for stores with additional labor (Labor = 1)*	20
Table 3.5 Summary statistics for stores without additional labor (Labor = 0).....	21
Table 3.6 Summary statistics for stores with additional labor (Labor = 1)	21
Table 3.7: Significance test results for means of selected variables (Labor = 1 and Labor = 0)	22
Table 3.8: Multinomial logistic regression results for quality change perception*	24
Table 3.9 Multinomial logistic regression results for service change perception	26
Table 3.10: Means differences between HEB and competitors.*	27
Table 3.11: Means differences between HEB and competitors across different store formats.*	28
Table 3.12: Correlations between the Shapiro Index scores by department for select competitors and HEB	30

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CHAPTER I: INTRODUCTION

1.1 Background Information

HEB is a privately-held grocery retailer founded in 1905 in Kerrville, TX. Over the 100 years since its founding, HEB has grown to 399 stores in 155 communities. Although the majority of its operations have been in southern Texas, nearly 10 percent of HEB's stores (39) are in Mexico. This may be considered an impressive feat since its entry into Mexico occurred in 1997 to take advantage of the growth opportunities in Mexico and the North American Free Trade Agreement involving Canada and the U.S. and Mexico.

This first store in Mexico was opened in a high income suburb of the city of Monterrey. The store redefined the Mexican retail model by having a strong focus on the freshness and quality of its perishables, and novelties and innovations in the center of the store. That store model was repeated in two new store openings, followed HEB's first attempt to have another format, the more aggressive price format store, Economax. The latter format was retired from the market two years after its start and those store locations were converted to the first format, which enabled the growth of that format in other locations. Today, the company re-launched the price aggressive format under the Mi Tienda label with six stores now operating in Mexico.

One of the biggest problems for a company when it expands into international markets, especially one that has significantly different cultural and demographic characteristics, is the execution of an effective business strategy. This was no different for HEB and its expansion into Mexico. However, the potential challenges were mitigated by strategic moves by management. For example, the Mexican operation does not depend of the

United States office to create and execute a strategy despite a close relationship and exchange of ideas between management in countries and the close collaboration among the different teams in the two countries.

The focus of this research is the fresh meat category. In the last six years, the financial performance of this category has been very strong, resulting from increasing sales combined with impressive margins and low direct and indirect expenses. Operational streamlining has resulted in significant reductions in administrative and labor costs over the last few years.

Pursuing a labor reduction initiative generated ideas to increase efficiency. For example, center of store shelf stocking was outsourced, while supplier's employees were used to perform in-store processing activities and the procurement teams focus on obtaining case ready products or further processed products that reduced the amount of labor at the stores.

Despite obvious benefits, this strategy generated some challenges. For example, consumer complaints about quality increased during the implementation period due to perceived reduction in product freshness and service hours. Because the company's value proposition encompassed quality and service, any adverse changes in consumer perception regarding quality and service were very troublesome for management.

The problem of this research is to address these perceived reductions in quality and service expressed by consumers. While this issue is very simple to express, it is very complicated to solve. The logical process may follow something like this: A decrease in labor expenses generated a decrease in quality perception from consumers in the total store

evaluation and in the meat department. Can the perception gap be addressed by increasing the number of employees, thereby increasing labor expenses? And can this be achieved without sacrificing the profitability of the meat department? This was the problem confronting management as it sought to deal with the reports of consumer concerns.

Quality and price perception in the Monterrey trading area is measured by the Shapiro Index that examines consumer perceptions about total store and departmental price and quality. The trends in the Shapiro Index provide the objective framework for assessing the problem and the effect of any solutions implemented. However, communication to top management about the necessary changes that need to take place to achieve the goal of increasing perception without sacrificing financial performance can be challenging because of the complexity of the perception measurement. For example, while the problem of consumer perceptions may be attributed to reductions in labor, it is also possible that procurement changes and inadequate training of employees deployed to take over new functions may have contributed to product quality decline. Additionally, because the perception metrics are based on recall surveys, it is possible that the culprit triggering adverse perception may not be the meat department at all but some other department, which is then attributed to the meat department because of the sequencing of questions in the survey or other triggers in the survey process.

1.2 Research Questions

The foregoing discussion frames the research question of interest. What are the factors that explain the changes in customer perceptions about quality and freshness in the meat department of HEB's Mexico stores? Addressing this question is important because it

allows a systematic response to the problem so that gains emanating from operational excellence are not discarded prematurely.

The initial course of actions was based on product quality. Stronger quality audits were performed on received products, training of store partners was given to assure the following of standards of operation procedures to eliminate poor quality finished product on the shelves and higher frequency of store visits by the supervising partners to audit the overall quality of the department were some of these initial actions.

The next quality perception results showed no improvement, indeed they showed a decline, which created significant consternation among management to warrant an internal search for an enhanced understanding of the problem and the development of an effective solution. The focus was on understanding the role of labor on changes in perceptions about quality and service. The expectation was that by identifying the sources of the factors that define the perception changes in quality, all management could take the necessary steps to address the problem. However, it is important to recognize that the decision-making process was very complex because during visits from store managers, meat managers and management, the overall quality of the product was found to be higher in the company by a large margin. Was the customer considering factors other than the quality of the product? Was the company not efficiently delivering the right information to enhance perception? The effect of service on quality perception was a concern. If customers were taking into consideration the service level provided in the store to determine their evaluation of quality the company needed to measure the effect on quality perception of adding labor hours to meat markets.

It is important to also place into context the dynamics in the general meat market in the Monterrey area vis-à-vis the strategic behavior of new and existing competitors that include new supermarkets, independent meat stores and informal markets that were offering differentiated products with a high service level, usually, with lower operational costs, and thus, have lower prices. The company's problem is, thus, complicated by these environmental shifts that were going on, shifts that triggered the streamlining that was considered to have triggered declines in consumer perception.

1.3 Objectives

The first objective of this research is to determine the prevailing customer quality and service perceptions of HEB meat department with the view to identifying its causes. The second objective is to determine if the input of additional labor into the stores increases quality perception in the meat department. This objective gets at management's belief that labor reductions in the stores are responsible for the lower quality perception score.

The third objective is to analyze the actual Shapiro Index scores under a different view. This is to look at the differences between HEB's meat department on the one hand and its competitors on the other and evaluate the trends in these differences over time. The objective also compares meat department and total store performance for each of the competitors and contrasts these with HEB's.

The final objective is to develop a solution to increase quality perception in the meat department. This requires all other objectives to be achieved to have a more analytical perspective of the issue and determine an action plan that is based on data analysis, not intuition.

1.4 Methods

The research was conducted using primary data collected through a survey. Secondary data from the Shapiro Index were also employed to explain the observations from the survey. Econometric models were used in the analyses.

A survey was conducted using a structured questionnaire to measure customer perceptions of quality and price in HEB stores and of the same in competitor stores. (Appendix 1). The survey was given to 432 HEB customers in six different stores with a 100 percent response rate. Three of the six stores had additional labor added a few weeks before the survey was conducted and the other three did not. This facilitated a comparison of the labor effect across the organization.

The survey was conducted during two weeks to eliminate the effect of pay week and non- pay week, and during days that customers usually buy meat for daily use (Tuesday) and meat for the grill (Friday). It encompassed Likert-scale type questions that sought respondents to rate their perceptions about quality, service and price. The survey asked customers how long they have been clients of the store, their shopping frequency (visits per month to the store), their quality and price perception of the meat department using a 1 to 5 scale, with 1 being the worst and 5 the best. Also, the survey asked customers to measure the change in quality and service since they started visiting the store by using a scale from -3 for a high decrement in quality and service and +3 for a high increment. Finally, they were asked if they visited a competitor to purchase meat products and if the answer was positive, then to evaluate their quality and price perception of the competition.

1.5 Outline

The next section of the thesis presents an overview of the literature defining the problem focus of this research. Chapter 3 presents the data and analytical methods as well as the results and discussion. Chapter 4 presents the solution to the driving problem and the summary and conclusions emanating from the research.

CHAPTER II LITERATURE REVIEW

2.1 Customer perception vs. reality

Perception is when people translate sensory impressions into a coherent and unified view of the world (Business Dictionary, 2012). Most of the time, it is based on incomplete and unverified information, but perception is equal to reality for most purposes and guides human behavior (Business Dictionary 2012). Based on this definition, customer perception is the view that a customer has of a certain product or service based on one's own sensory impression and other characteristics which, despite being incomplete information, becomes that customer's reality.

The phrase "perception is reality" is very common in marketing and product development literature. Customer perceptions define the value they place on products and services, directly affecting the performance of each product or service in the market (Sismanoglou and Tzimitra-Kalogianni 2011).

Sometimes, managers and developers ignore customer perception and choose to believe that the scientific, statistical and research data support behind a product or service is "reality". Management problems generated by this usually include low performance, conflict among members and incorrect decisions that instead of improving results reduces the life of the product or service.

Trying to improve customer perception of a product usually requires information and sustained interventions such as advertising and/or education. The purpose of the information and interventions is to frame the product or service in ways that enhance customer perception. This is what a well-functioning marketing team does for an organization: deliver the correct information and other sustained interventions to enhance customer perception.

When done properly, the feedback from the interactions with the consumers can also lead to changes in the nature and characteristics of the product or service to ensure customer engagement and support, which yields the right perception to facilitate success in the chosen marketplace.

Improvement in consumer perception starts with a good measurement system that evaluates the entire process through the customer's eyes (Recklies 2008). The information has to be reliable, but more importantly, it has to be generated by customers. It is important to recognize the dynamic nature of customer perception in thinking about the development and installation of these measurement systems. The large amount of information available, and changes in the competition also move the customer's standards and perceptions, and public opinion. All of these factors generate change in customers.

There are a wide range of definitions for consumer satisfaction, but as mentioned by Giese and Cote (2002), most of them include three key elements: an emotional or cognitive response; responses pertaining to a particular focus such as expectations, product or consumption experience; and the time when the particular response is experienced (Giese and Cote 2002).

There are two factors that consumers consider when purchasing a food product: benefits and risks. Benefits include with the ability of the food product to eliminate hunger, to provide pleasure through consumption of the product and the socializing that it may generate, but also include health considerations of the consumer and environmental effects caused by the production cycle. Benefits and risks are inversely correlated; so when a product is perceived as highly beneficial, it is also perceived as low-risk. In today's food marketplace, consumers tend to be conservative and perceive that products that are

traditional are beneficial, and products that are novel or highly processed are seen as higher risk (Ueland, et al. 2012).

For the purpose of this research, the Shapiro Index is used to measure customer perception of quality and price for each department and the store as a whole. It is important to understand the meaning of customer perception and how it relates to customer satisfaction to determine correctional actions to improve on this variable. To manage perception, good feedback is required (Russell 2008). In the meat market, this feedback is given by customers in a survey used in the Shapiro Index methodology.

The Shapiro Index converts a subjective variable, customer perception, into an objective variable by using a survey and a scale. The management of customer perception is difficult based on this measurement because it only gives a score but no further information of the reasons behind the number and specific issues generated the changes in the customer's perception. The main reason for this research is to extend the analysis of these issues that generate customer perception and test a hypothesis that helps improve the perception of the meat department.

Consumer perception is a subjective issue; based on a Newtonian organization management team (Wheatley 1993) this issue lead to a lot of task forces and assignments trying to improve objective variables like temperature, bacterial count, thickness, shelf life days, etc., but the solution may rely on a new approach that requires a change in organizational culture, and solutions that are outside the boundaries of the "running the business" culture and will require a "changing the business" mentality.

2.2 Cultural differences in the Hispanic market

Many management information systems are developed in first world countries like the USA and most of Europe and Japan, because these are the most advanced countries with a very high tendency for the development of methods, processes and services to reduce labor. The problem with this is that when other countries try to imitate them by acquiring these systems no adjustments are made to fit the cultural profile of the country.

If we focus on the measurement of perceived quality of a product or a service, the methodology has to be revised and modified for the cultural profile of the people being tested or analyzed. For example, in two different areas of Mexico, the perception of meat quality is completely different. In the north, high marbling is perceived as good quality and in the south, marbling is perceived as bad quality due to a high fat content.

We conducted a small observational test with different top managers of the company, visiting the different competition stores and evaluating them on a subjective basis to measure the quality of each of them. The results differed completely from the Shapiro Index reports, the perceived quality of the product was better in our stores than in the competition.

This result demonstrated that the quality perception by the consumer was not measured only with the inherent quality of the product, but included other subjective variables.

When providing a service, it is important to understand the characteristics of the consumer that is being served. These characteristics include the demographics and psychographics. While demographic factors such as income and education can provide similarity in need across ethnic groups, the specific needs of particular ethnic groups can have significant impact on products and services that are brought to the market (Wilson

2009). This research focuses on activities that are geared towards specifically Hispanic consumers and, thus, understanding the unique characteristics of this population can provide interesting and valuable perspectives on the problem and its solutions. Additionally, it is important to cast this evaluation within the context of the product, which is, in this case, meat products.

Some specific traits and variables that are important for Hispanics when purchasing meat products are as follows:

- Service, the interaction with the people behind the counter is very important.
- Volume exhibits that show that a lot of product is being sold in that location.
- Freshness, most of the customers have no confidence on food processing technology and prefer the “old fashion” freshness of a meat market.
- Different cooking methods.
- The use of all the cuts and parts from the animal is important, therefore offer offals and end cuts.
- Preference for thin sliced cuts.
- Big volume transactions, the average purchase in pounds is higher among Hispanics (Beef Retail 2010).

The relationship of this information to quality perception is the way a company measures quality or any other subjective variable, and has to be adapted to the demographics where company-customer interactions occur to have reliable information.

The perception of quality is different among different income levels groups, and it is important to measure these differences to make correct decisions. The quality of meat is usually measured by tenderness and eating experience, but in retail it also includes service,

cleanliness and variety. While it is important to differentiate quality from price, many managers make the mistake that higher quality means higher prices and this is far from being true. Quality has to be present in every product or service independent of its price.

2.3 Effect of service in quality perception.

In today's globalized economy, it is harder to differentiate a product or service from the competition in the market place because of the offerings and a lot of information available. The relationship between customer and company is not based on price and quality only. Each interaction counts and the effects of a negative experience can change quality perception very quickly (Recklies, 2006).

This is why customer service is so very important and is hard to separate from quality measurement. Service and quality of a product are bound together in the customer perception of a company. According to Goofin and Price (1996), high customer service increases product quality, and also competitive advantage, profitability, and as a result increasing sales and income. The importance of this conclusion to this research is to determine if lower service levels have a negative effect on quality perception of meat products.

Grunert et al. (2004) assessed consumer perception of meat quality and its implications for product development in the meat sector study in Europe. They observed that, customers prefer to purchase meat from a butcher rather than from a supermarket. The explanation of this behavior is that consumers perceive a higher knowledge and experience from the butcher and this has a positive effect on the quality of the product (Grunert, Bredahl and Brunso 2004). For a supermarket to increase quality perception, the people cutting the meat and providing customer service on the service counter need to have the knowledge, image and service disposition of a butcher from a specialty meat shop.

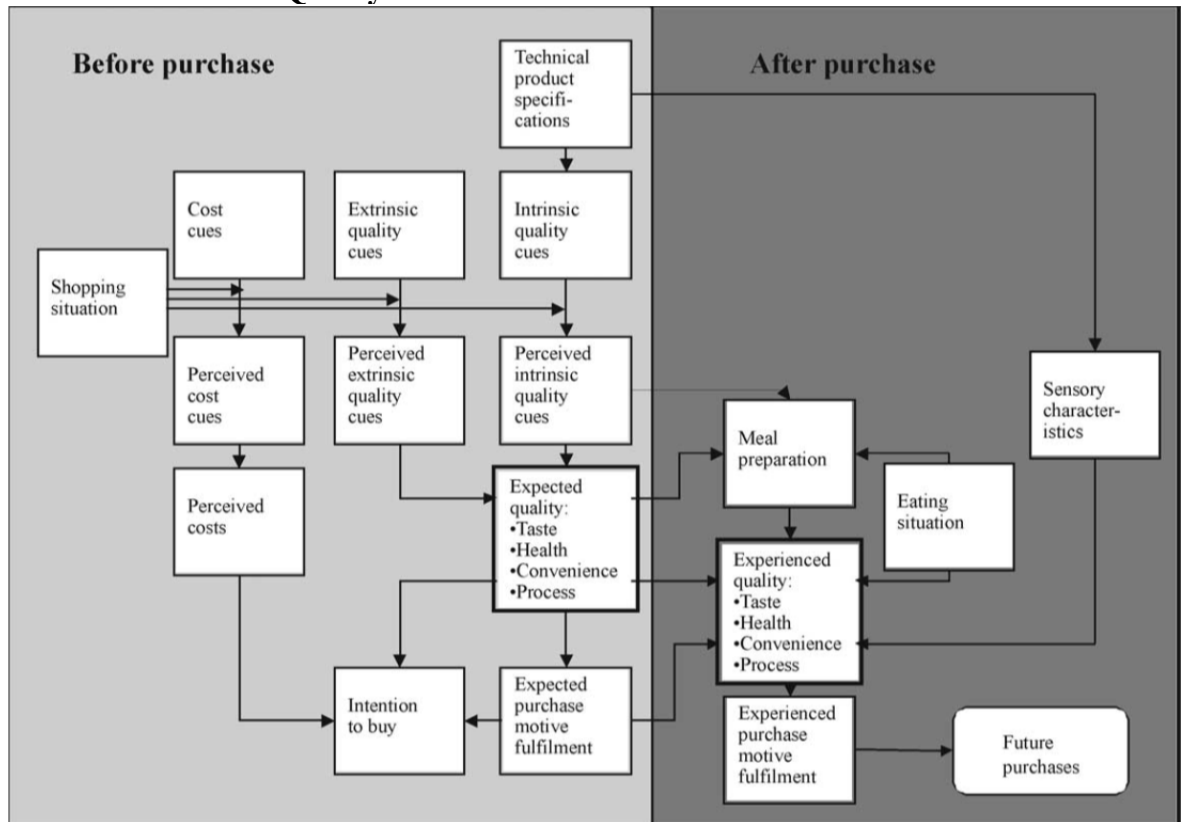
2.4 Quality in the meat industry

Many factors may affect meat quality throughout the supply chain from producer to consumer. Meat science is the discipline that studies and analyzes the factors that have an effect on quality. But, quality in meats is defined differently depending on the phase of the supply chain being discussed. A good approach to a definition for meat quality can be achieved by dividing into:

- Food safety, measured by the hygienic and toxicological quality of the meat.
- Nutritional value, measured by the value of nutrients that the piece of meat provides.
- Technical properties, the quality of the meat for fresh consumption or further processing, and its functional properties.
- Sensory quality, the attributes that the final consumers are going to experience with their senses when making a purchasing decision.
- Ethical quality, this refers to a new market concern on animal welfare. And the effects of production methods on the environment (Blodgett 2008).

Grunert, Larsen, Madsen and Baadsgaard proposed the Total Food Quality Model (Figure 2.1) to integrate several variables that consumers consider to form their quality perception and their decision making process for purchasing. The distinction between before and after purchase is what separates the variables in the model. The appearance of a meat product can be evaluated before purchase (left side of the model) and the taste or tenderness of the product can only be evaluated after purchase (right side of the model). There are some other variables like the healthiness of the meat that the average consumer does not evaluate but is a matter of trust and faith in the information provided (Grunert, Bredahl and Brunso 2004).

Figure 2.1: The Total Food Quality Model



Source: (Grunert, Bredahl and Brunso 2004).

The variables in the model can also be divided into two different groups based on the location where the control points are established to increase or decrease quality perception. There are factors, such as cost cues, extrinsic quality cues and technical specifications, that can be controlled in the procurement process of a supermarket and, where suppliers need to be reviewed and required to perform under certain specifications to good quality product. Other factors, such as perceived extrinsic clues, perceived cost and expected quality, can be grouped to in-store processes, where the creation and following of Standard Procedures of Operation become important to control the internal processes and assure a good quality product.

Another study on consumer perceptions of fresh meat quality divided the evaluation on two phases: a stage prior to the actual purchase and a stage after the purchase while consuming the product. This study shows that the place of purchase plays a major role as a quality indicator for beef and pork products and that color is the most important intrinsic quality cue for consumers when purchasing. On the after-purchase phase, flavor is the most significant characteristic for consumers. Also, the safety of meat products was evaluated, and freshness was the most important indicator of meat safety. The use of a signing package that enhances the freshness image of the product helps to improve the safety quality perception of consumers (Glitsch 2000).

A study conducted in four European countries to analyze the intrinsic and extrinsic cues that customers use to base their quality expectations for meat products. Found that the most important factors were perceived fat and place of purchase. For perceived fat, the consumer's idea was completely opposite to what is known. The amount of marbling enhances tenderness and juiciness, but customers considered the presence of fat as a negative in their quality expectations. In regards to place of purchase, customers preferred buying from a butcher than from the supermarket due to the knowledge and experience of the sales person. For them, this increases the quality of the product and is a factor that increases their quality perception (K. G. Grunert 1997).

CHAPTER III RESULTS AND DISCUSSION

This chapter focuses on presentation of the data and a discussion of the analytical methods. As indicated, a structured survey tool was employed to collect primary data from customers in six HEB stores. The information gathered covered their perceptions about price, quality and service in HEB stores as well as HEB's competitors. The purpose was to determine the extent to which store labor situation and other characteristics influenced perception and assess these perceptions against their perceptions of HEB's competitors.

The survey data were then analyzed using Stata Version 11.2. First, means and standard deviation of the mean for each variable was obtained, correlations among all variables were also measured using a 95% confidence level ($P > 0.05$). Quality perception in the market place was analyzed by mean differences, using the hypothesis that quality level was different between our stores and each of the competitors. The same analysis was performed using the format of the competing grocery store or supermarket, meats specialty store, price clubs or informal businesses such as neighborhood stores and wet markets. The hypothesis that our stores quality perception is higher than the competitors was also tested. Prior to proceeding, it is appropriate to define the variables used in the analysis to facilitate the discussion (Table 3.1). It shows, for example, that labor is a binary variable used to describe the stores that had additional labor (Labor = 1) and those that did not (Labor = 0). The rest of the variables are as defined in the table.

Table 3.1: Explanation for each variable analyzed

Variable	Description
Store	Six different HEB stores were used to apply the survey, this variable goes from one to six and identifies the store in which the survey was applied.
Labor	Binary variable that received the value of one if the store had additional labor and zero if it maintains its regular labor.
History	The measurement in months of how long has a customer being a HEB client.
Frequency	Visits per month that the customer makes to the store.
HEB Quality	The value given by customer to their quality perception of the meat department in a particular store. It ranges from 1 to 5, being 1 the worst quality perception and 5 the best quality perception.
HEB Prices	The value given by customer to their price perception of the meat department in a particular store. It ranges from 1 to 5, being 1 the worst price image and 5 the best price image.
Quality Change	The measurement of the change in quality since a particular customer has been a customer. It ranges from -3 for the higher decrement in quality through time and 3 for the higher increment in quality.
Service Change	The measurement of the change in price since a particular customer has been a customer. It ranges from -3 for the higher decrement in price perception through time and 3 for the higher increment in quality.
Competitor	The different competitors that customers mentioned as their second or third store of choice to purchase meat products.
Competitor format	All competitors were classified under four different formats: grocery stores, specialty meats, price clubs and informal businesses.
Competitor Frequency	Visits per month that the customer makes to the competition store.
Competitor Quality	The value given by customer to their quality perception of the meat department in a competitor's store. It ranges from 1 to 5, being 1 the worst quality perception and 5 the best quality perception.
Competitor Prices	The value given by customer to their price perception of the meat department in a competitor's store. It ranges from 1 to 5, being 1 the worst price image and 5 the best price image.

3.1 Summary Statistics

The means, standard deviation, minimum and maximums values for the analyzed variables in this study are presented in Table 3.2. The total number of respondents to the survey was 432 customers. They have each been clients of HEB stores in average 36 months and make 3.97 visits per month to the store. When compared to the competitors, customers visit 3.25 times per month their secondary store preference, and 1.82 times per month their third store choice.

Table 3.2: Summary statistics for primary data

Variable	N	Mean	Std. Dev.	Min	Max
History (Months)	432	36.02	24.01	0.5	84
Frequency	432	3.97	2.64	1	16
HEB Quality	432	4.77	0.55	2	5
HEB Prices	432	4.14	1.06	1	5
Quality change	432	1.56	1.35	0	3
Service change	432	1.29	1.46	-3	3
Competitor Frequency	192	3.25	1.41	1	8
Competitor Quality	192	4.09	0.97	1	5
Competitor Prices	192	4.20	0.86	1	5
2nd Competitor Frequency	28	1.82	1.12	1	4
2nd Competitor Quality	28	3.82	1.09	2	5
2nd Competitor Prices	28	3.68	1.02	1	5

The correlations among variables was calculated with a 95% confidence level ($P < 0.05$). The correlations shown on table 3.3 were obtained using the data for stores that did not have an additional input of labor. The frequency by history was significant, as well as the Quality change by HEB Prices and Service change by Quality change. From these results, we can establish that there is relationship between the customers noticing a positive change in quality and their perception in quality; and also, that there is a significant correlation between customers noticing a change in service with a change in quality.

Table 3.3: Correlations among perception variables for stores without additional labor (Labor = 0)*

	History	Frequency	HEB Quality	HEB Prices	Quality change	Service change
History	1.00					
Frequency	0.18	1.00				
HEB Quality	0.06	0.06	1.00			
HEB Prices	0.09	0.07	0.10	1.00		
Quality change	0.07	-0.03	0.00	0.17	1.00	
Service change	0.03	0.01	0.03	0.12	0.19	1.00

* Greyed cells indicate significant results at the 5% level of lower.

Table 3.4 also shows the correlation coefficients for the perception variable for stores with additional labor input. More correlations were significant in these stores, but there is a strong correlation for quality change and service change; when customers noticed a positive change in service, it also increased their awareness of appositive change in quality. In these stores, HEB Quality is also significantly correlated to HEB Prices, Quality change and Service change.

It is interesting, that there is positive correlation between HEB Prices and history, frequency and HEB Quality. As customers are clients of the store for a longer period of time or visit it more times per month, it increases their positive perception of prices when the additional labor is present. The positive correlation between HEB Quality and HEB Prices explains the effect that as customers have a better perception of quality, their price perception also increases. Two questions that arise from the foregoing correlation results:

1. Are customers willing to pay more for higher quality?
2. Do customers just have a better perception of prices when their perception of quality is higher?

Table 3.4: Correlations among perception variables for stores with additional labor (Labor = 1)*

	History	Frequency	HEB Quality	HEB Prices	Quality change	Service change
History	1.00					
Frequency	0.08	1.00				
HEB Quality	-0.05	0.08	1.00			
HEB Prices	0.16	0.21	0.24	1.00		
Quality change	0.10	0.13	0.24	0.26	1.00	
Service change	0.11	0.21	0.21	0.22	0.56	1.00

* Greyed cells indicate significant results at the 5% level of lower.

When the correlations are compared for additional and no additional labor, it can be determined that the presence of labor in the stores increases the significance of the correlation between quality perception and perception of prices, quality change and service change. The input of additional labor, therefore, does increase the effect of other variables on quality perception.

The data was also analyzed by separating the effect of having additional labor in some stores. Table 3.5 shows the summary statistics for all variables when store received no additional labor and Table 3.6 shows the same when additional labor was used in the meat market. They also show the interaction effect between perceptions about quality and change in quality and change in service (last two rows in the tables).

Table 3.5 Summary statistics for stores without additional labor (Labor = 0)

Variable	Mean	Std. Dev.	Min	Max
History	42.15	23.99	2	84
Frequency	4.42	2.81	1	16
HEB Quality	4.88	0.36	3	5
HEB Prices	4.46	0.73	2	5
Quality change	1.37	1.36	0	3
Service change	0.95	1.45	-3	3
HEB Quality*Quality change	6.68	6.69	0	15
HEB Quality*Service change	4.64	7.15	-15	15

Table 3.6 Summary statistics for stores with additional labor (Labor = 1)

Variable	Mean	Std. Dev.	Min	Max
History	29.90	22.48	0.5	84
Frequency	3.53	2.39	1	16
HEB Quality	4.66	0.68	2	5
HEB Prices	3.81	1.23	1	5
Quality change	1.74	1.31	0	3
Service change	1.63	1.39	-3	3
HEB Quality*Quality change	8.32	6.41	0	15
HEB Quality*Service change	7.77	6.72	-15	15

Based on these results, the difference between the means were analyzed using a t-test at the 5% level of significance for the variables of interest: quality change, service change, the interaction of quality and quality change, and the interaction of quality and service change (Table 3.7). The mean differences between observations in the stores with labor and those without additional labor for all variables HEB Quality and HEB Service were found to be significant at the 5% level, indicating that the addition of labor actually altered the perceptions of customers about quality change and service change as well as the interactions between HEB Quality perceptions and perceptions about changes in quality and service. However, perceptions about HEB quality and HEB service were themselves not significantly different at the 5% level between stores with additional labor and those without. This leads us to argue that the additional labor did not make a difference in quality perception and perceptions about service, but it did influence perceptions about changes in quality and service. It may be argued that the duration between the addition of labor and the survey was probably not long enough to change customer perceptions about quality and service, suggesting that allowing time could alter these perceptions.

Table 3.7: Significance test results for means of selected variables (Labor = 1 and Labor = 0)

Variable	Mean Diff	Pr(T > t)
HEB Price	-0.6435	0.0000
HEB Quality	-0.2129	0.0000
Quality Change	0.3704	0.0042
Service Change	0.6759	0.0000
HEB Quality*Quality change	1.6435	0.0047
HEB Quality*Service change	3.125	0.0000

3.2 Multinomial Regression Analysis

A multinomial logistic regression was performed to determine the effect that each variable has on quality and service change (Table 3.8). It is important to mention that no negative scores were given to quality change, implying that no customer surveyed had the perception that quality has decreased in the meat markets since they became clients of the store. This observation runs counter to the Shapiro Index results which showed customers indicating lower quality perceptions about the meat department.

The model underlying the multinomial logistic regression argued that perceived quality change is a function of whether or not additional labor was in the store (Labor = 0 or 1), the frequency with which a customer shopped in the store, how long they have been a customer, and their perception indicators about quality and prices, summarized as follows:

$$\Pr(y = i) = \frac{\exp(X\beta^{(i)})}{\sum_{i=1}^N \exp(X\beta^{(i)})} \quad (3.1)$$

Where X are the explanatory variables and y is the explained variable. The indicator i defines the response level of the explained variable. For example, quality change ranges from 1 to 3 in the data, implying that i would range from 1 to 3 in the analysis. To ensure that the model is identified, the base response level was set to 0, in other words, comparing all responses to the response level at 0. This produces estimates that are relative to the reference response, facilitating both identification and ease of interpretation of the multinomial regression model.

The results from Table 3.8 show that when customers' quality change was equal to 1, none of the regression coefficients was significant at the 10% or lower level in comparison to

when they scored quality change as zero. On the other hand, when the quality change score was equal to 2, labor and perceptions about HEB prices became significant at the 1% and 10% levels respectively. For customers scoring quality change a high 3, the results shows that labor, perceptions about HEB quality and perceptions about HEB prices were all significant at the 1%, 5% and 1% levels respectively in comparison to a score of zero.

Table 3.8: Multinomial logistic regression results for quality change perception*

<i>Quality Change = 1</i>	Coef.	Std. Err	z	P>z	Conf. Interval	
Labor	0.32	0.53	0.61	0.54	-0.71	1.36
History	0.00	0.01	-0.01	0.99	-0.02	0.02
Frequency	0.04	0.08	0.48	0.63	-0.12	0.20
HEB Quality	0.44	0.48	0.92	0.36	-0.50	1.39
HEB Prices	-0.09	0.23	-0.42	0.68	-0.54	0.35
Constant	-4.13	2.48	-1.66	0.10	-8.99	0.73
<i>Quality Change = 2</i>						
Labor	0.99	0.32	3.10	0.00	0.36	1.62
History	0.00	0.01	0.61	0.54	-0.01	0.02
Frequency	0.00	0.06	-0.08	0.94	-0.12	0.11
HEB Quality	0.11	0.24	0.46	0.64	-0.36	0.59
HEB Prices	0.28	0.14	1.90	0.06	-0.01	0.56
Constant	-3.11	1.27	-2.44	0.02	-5.61	-0.62
<i>Quality Change = 3</i>						
Labor	1.08	0.25	4.27	0.00	0.59	1.58
History	0.01	0.00	1.26	0.21	0.00	0.02
Frequency	0.00	0.04	0.05	0.96	-0.08	0.09
HEB Quality	0.58	0.24	2.38	0.02	0.10	1.06
HEB Prices	0.43	0.12	3.59	0.00	0.20	0.67
Constant	-5.33	1.27	-4.21	0.00	-7.81	-2.84

* Greyed cells indicate significant results at the 5% level of lower.

The multinomial logistic regression results for service change are shown in Table 3.9. The explanatory variables are the same as for quality. However, unlike quality, some customers did notice a decrease in the service level they were receiving in the meat department, thus the service level scores ranged from -3 to 3. The results shows that none of the variables were significantly different at the 10% level or lower when customers indicated

that service level had decreased since they started shopping in HEB stores relative to those who scored a zero (i.e., no change in service quality since they started shopping in HEB stores).

Positive scores for service change perceptions resulted in significant coefficients relative to a score of zero for service change perception. Table 3.9 shows that when Service Change perception is equal to 1, the duration the customer has been shopping at HEB (History) and the frequency of shopping in the store were significant at the 5% level and their perception of HEB quality was significant at the 10% level. Contrarily, history and labor were respectively significant at the 10% level when perception of service change was ranked a 2. Labor was significant at the 1% level only when perception about service change was ranked a 3 in this analysis. This would suggest that labor was more significant in influencing the perceptions of customers who perceive higher service change in the meat department compared to those who see no change in service. Also, the quality and price perception have a significant effect on the service change noticed by customers who rank service change high (3) compared to those who see no change. At this point, high quality and price perceptions do influence customers to also notice a better service level.

Table 3.9 Multinomial logistic regression results for service change perception

Service Change = -3	Coef.	Std. Err	z	P>z	Conf. Interval	
Labor	-0.672	1.127	-0.600	0.551	-2.881	1.538
History	0.019	0.017	1.130	0.257	-0.014	0.052
Frequency	-0.128	0.196	-0.660	0.512	-0.512	0.256
HEB Quality	13.278	681.040	0.020	0.984	-1321.535	1348.092
HEB Prices	0.393	0.557	0.710	0.480	-0.698	1.484
Constant	-71.298	3405.200	-0.020	0.983	-6745.367	6602.771
Service Change = -1						
Labor	-0.721	1.127	-0.640	0.522	-2.930	1.487
History	-0.005	0.020	-0.260	0.798	-0.043	0.033
Frequency	0.034	0.171	0.200	0.844	-0.302	0.370
HEB Quality	-0.566	0.470	-1.200	0.229	-1.487	0.356
HEB Prices	-0.651	0.445	-1.460	0.144	-1.523	0.222
Constant	1.878	2.770	0.680	0.498	-3.552	7.308
Service Change = 1						
Labor	0.455	0.386	1.180	0.239	-0.301	1.210
History	-0.016	0.008	-2.000	0.046	-0.033	0.000
Frequency	0.128	0.058	2.190	0.029	0.013	0.242
HEB Quality	0.657	0.398	1.650	0.099	-0.124	1.437
HEB Prices	-0.145	0.166	-0.870	0.385	-0.471	0.182
Constant	-4.152	2.036	-2.040	0.041	-8.141	-0.162
Service Change = 2						
Labor	0.956	0.373	2.560	0.010	0.224	1.688
History	0.013	0.007	1.780	0.075	-0.001	0.027
Frequency	0.016	0.072	0.220	0.827	-0.125	0.157
HEB Quality	0.326	0.306	1.060	0.287	-0.274	0.926
HEB Prices	-0.003	0.167	-0.020	0.984	-0.331	0.324
Constant	-3.870	1.585	-2.440	0.015	-6.977	-0.764
Service Change = 3						
Labor	1.482	0.262	5.650	0.000	0.968	1.996
History	0.004	0.005	0.790	0.432	-0.006	0.014
Frequency	0.069	0.048	1.460	0.144	-0.024	0.163
HEB Quality	0.528	0.243	2.170	0.030	0.052	1.005
HEB Prices	0.360	0.125	2.880	0.004	0.115	0.605
Constant	-5.401	1.272	-4.250	0.000	-7.895	-2.907

* Greyed cells indicate significant results at the 5% level of lower.

3.3 Competitor Analysis

The mean differences between customer quality perceptions for HEB and its principal competitors were also calculated tested for statistical significance using a t-test at the 5% level. Please note that only competitors with 10 or more stores in the study area are included in the results. Table 3.10 shows the P values for the significance of these differences, and it can be established that with the exception of Carniceria San Juan, quality perception in HEB's meat department is higher than that of all its competitors. Neighborhood Meat Stores, Soriana, Sukarne and Wal-Mart. Selecta and Smart were only mentioned one time as a competitor that customers also visit to purchase meat products; due to this, the t-test was not realized for these two competitors. However, this difference between the mean quality perception between HEB and Carniceria San Juan was not statistically significant at the 5% level.

Table 3.10: Means differences between HEB and competitors.*

Competitors	Mean Diff	Pr(T > t)	Number of Stores Included
Neighborhood Meat Store	1.25	0.00	20
Central de Carnes	0.55	0.05	11
Wet Market	1.73	0.00	11
Ramos	0.23	0.20	31
Sam's	0.4	0.10	10
San Juan	-0.03	0.81	33
Soriana	1.39	0.00	28
WalMart	1.07	0.01	14

* Greyed cells indicate significant results at the 10% level of lower.

The t-test was also used to analyze differences at the 5% level between HEB's store formats and comparative formats of the competition. These formats were grocery stores, specialty meats stores, price clubs and informal businesses. The results, presented in Table 3.11, show that all the mean differences were significant with a higher quality perception for

HEB in its meat department when compared to the competition. The higher difference is against informal businesses that include neighborhood stores and wet markets, which was expected. But it is important to notice the high mean difference when compared to other grocery stores or supermarkets. The results show a higher quality perception for HEB, but the results of the Shapiro Index do not show this superiority.

Table 3.11: Means differences between HEB and competitors across different store formats.*

Store Format	Mean Diff	Pr(T > t)	N
Grocery Stores	1.33	0.00	46.00
Speciality Meats	0.23	0.01	91.00
Price Clubs	0.38	0.01	24.00
Informal	1.42	0.00	31.00

* Greyed cells indicate significant results at the 1% level.

3.4 Comparisons Using the Shapiro index

It has been indicated that the Shapiro Index has not been effective in distinguishing the differences so far presented. Figure 3.1 and Figure 3.2 present customers' quality perceptions for competitors relative to their perception for HEB at the total store level and in the meat department respectively. The figure tracks the trend in these variables over time. Both graphs have very similar tendencies, with HEB always having a higher score than any of the competitors until October 2009 when Soriana and WalMart received a higher quality perception score for total store and only Soriana receiving a higher score in the meat department. This decrease in quality perception for HEB continued until February 2011 when the scores for HEB increased again.

Figure 3.1: Total store Shapiro Index differential between HEB and competitors in the Monterrey trading area (February 2003 to April 2011)

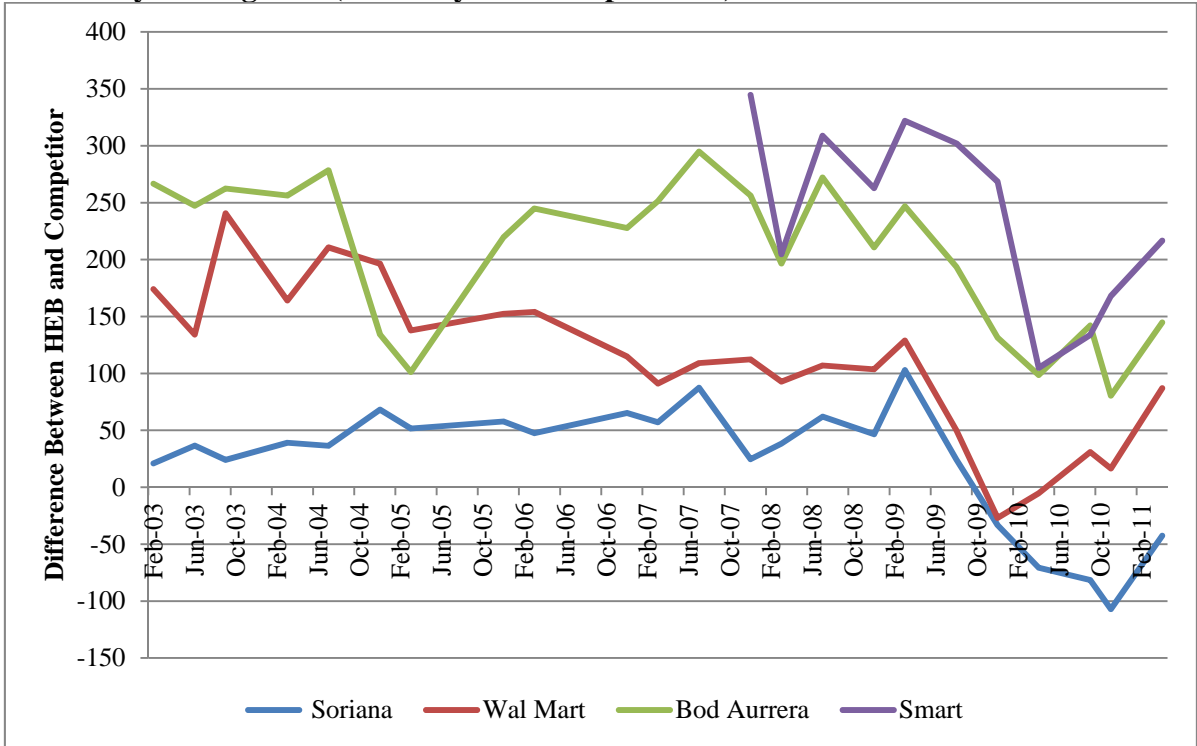
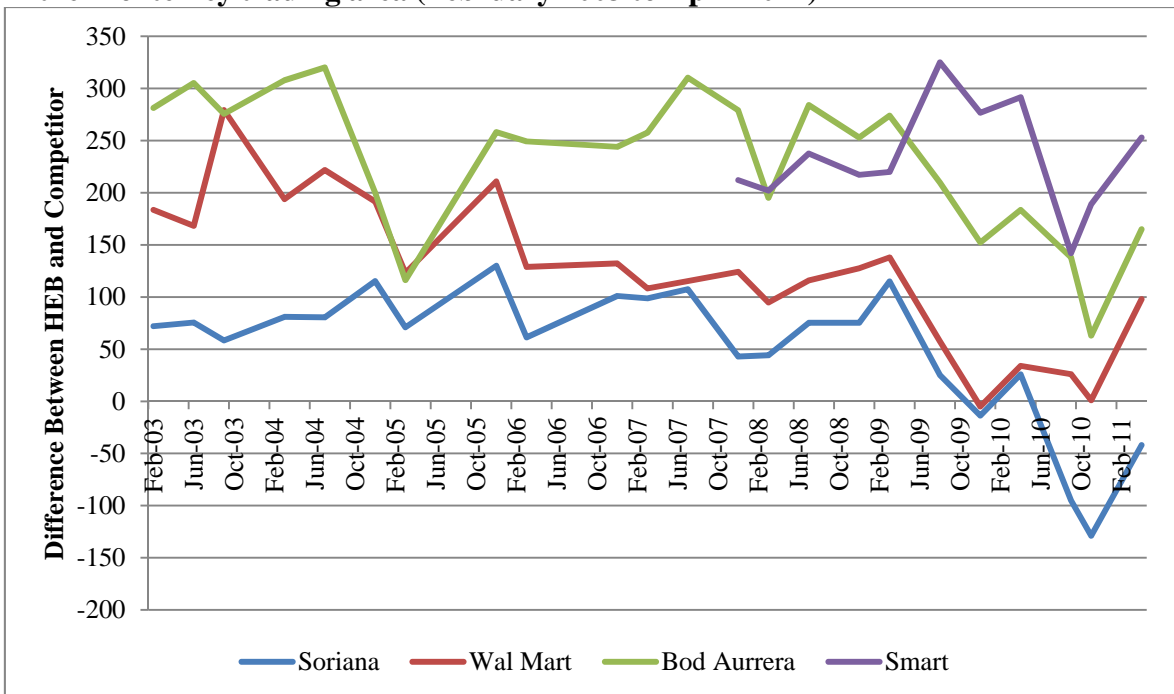


Figure 3.2: Meat department Shapiro Index differential between HEB and competitors in the Monterrey trading area (February 2003 to April 2011)

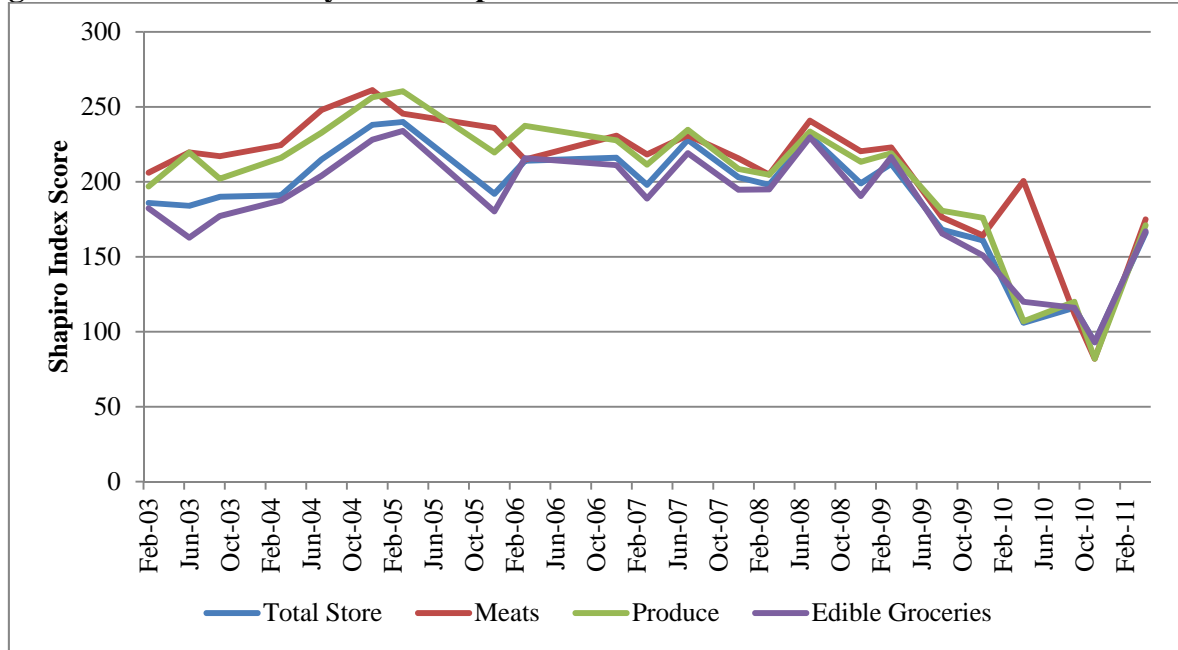


The data from the Shapiro Index, which measures the quality and price perception of all the grocery stores in a market by total store and specific departments, were compared using a correlation analysis of total store against different departments per grocery store. This will allow determining the weight of the perception of total store in a customer when evaluating the departments in the store. The results (Table 3.12) show that all the correlations are relatively high for all the departments analyzed for every competitor, with the exception of the meat market from S-mart that has a lower correlation. This result shows how customers that fill this survey from the external provider of the Shapiro Index are not able to distinguish particular differences in the departments and their total quality perception of the store establishes the scores given to each department. This effect can also be seen on Figure 3.3, the scores have the same pattern and dependability from the total store score can be determined for all departments.

Table 3.12: Correlations between the Shapiro Index scores by department for select competitors and HEB

Relevant Stores	Meats	Produce	Edible Groceries
HEB	0.86	0.98	0.98
Soriana	0.93	0.98	0.93
Wal Mart	0.95	0.99	0.99
Bodega Aurrera	0.97	0.98	0.99
Smart	0.13	0.99	0.96

Figure 3.3: Shapiro Index scores for total store and meats, produce and edible groceries from February 2003 to April 2011



3.5 Summary

This chapter focused on presenting the primary data collected to assess customers' perceptions about HEB prices, quality and services and compare the analyses of these results with the information emanating from the Shapiro Index. The analyses have led to the following observations:

1. Consumer's perceptions about quality in HEB are higher than any other supermarket evaluated.
2. Labor was significant in explaining some of the realized perceptions. Labor did improve the customer's recognition of change in quality and service. It is presumed that in the future, these improvements in quality and service will translate into higher customer quality perceptions.

3. Although the Shapiro Index scores show a high decrease in quality perception from 2009 to 2010, the 2011 numbers indicate a recovery. The results of this research show that quality is improving. It is more telling to observe that consumer assessment of the change in quality was positive in the survey. For example, although about 39% of respondents indicated seeing no change in quality, the remaining 61% reported seeing quality change between 1 and 3, with 39.1% of them indicating seeing a higher level of quality change (3) and only 4.9% suggesting a quality change level of 1.

The next chapter presents some strategic steps that may be employed to address the foregoing challenges the have been presented by customers' perceptions about quality, service and prices and how to address managers' concerns about labor.

CHAPTER IV CONCLUSIONS

Based on the results of this project, a plan of actions was established to try to increase customer's quality perception. The initial stage included asking for more explanations from the company that generates the Shapiro Index report, trying to understand more the methodology and the final outcome. Also, at this stage, the data was broken down into clusters of stores based on the demographic group they serve. This initial stage enabled HEB's management team to have better understanding of the problem in order to find the appropriate solution.

The second phase identified and classified the causes of a poor quality perception. These were divided into two groups: one on the procurement team and the other on the operations team. The actions generated in this phase, were highly related to the intrinsic quality of the product: assuring a good eating quality of the product by more strict purchase requirements with suppliers, a renewed training program with store partners and store management involvement in this issue.

The third phase, and the most important in terms of direct effect on quality perception of customer's, was the creation of a marketing campaign based on freshness and quality. This campaign delivered a simple message: freshness and quality are the most important attributes that the company has to offer to its customers. The campaign had a high brand recognition success and it is going to be re-launched this year with new materials, with the same message about quality and freshness.

The level of involvement of the fresh department's management team was very high throughout these initiatives. A low score in quality is very serious when people are proud of

what they do and how they do it. The results from their actions generated an improvement in quality perception, and also, in sales and profitability.

The research answered the questions that were established as the purpose for this project. Indeed, additional labor was significant for customers as they became aware of changes on service and quality, probably requiring still more time to increase customer perception.

The most critical outcome of this research was that the survey results did not agree with the Shapiro Index information received from a third party. According to HEB customers responding to the survey, there has not been a negative change on quality in the meat department, yet the Shapiro Index does show a large decline. Also, it was proven that the correlation of total store Shapiro Index score and individual department's scores is very high, indicating that their methodology is not able to differentiate quality perceptions about the different departments when customers have a total store quality contextual framework.

4.1 Future Research

The results from this research are by no means complete. Future research needs to be conducted on specific regions and some important competitors, for example, to confirm that strategic efforts are tailored to achieve the highest impact. For example, there is need to confirm if the quality perception of Carniceria San Juan is higher than HEB's. The data showed that it was the only one that had a slightly superior score, and while the mean difference was not statistically significant, even that it was not significant, is something worth looking at from the customers perspective and not the science behind the product, in order to make the required changes on the communication to customers or on the product itself.

It is recommended that another survey is conducted in the next six months to a year to test the effect of the additional labor on quality perceptions one more time. The results show an improvement on the service and quality change variables, but not for the quality perception. This will finalize the argument that labor does enhance quality perceptions. Finally, the linkage between perceptual variables and performance need to be assessed to provide the connection of these metrics to the financial outcomes for the company.

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APPENDIX 1: SURVEY

Date: _____

FOLIO: _____

Store: _____

1. For long how you bought meat products in HEB? _____
2. Besides H-E-B, where else do you purchase meat products?
3. How often do you purchase meat products in (answer from question 2) _____
4. On a scale of 1 to 5, (1 = worst and 5 = best), please grade the quality of the HEB meat department. ____
5. On a scale of 1 to 5, (1 = worst and 5 = best), please grade the prices of the HEB meat department ____
6. We want to know your perception about change in quality since you started buying meat at HEB. Please indicate, on a scale of -3 (Decreased a lot) to +3 (Increased a lot) your assessment of the change in meat quality at HEB. _____
7. We want to know your perception about change in service since you started buying meat at HEB. Please indicate, on a scale of -3 (Decreased a lot) to +3 (Increased a lot) your assessment of the change in service in the meat department at HEB. _____
8. If you purchased meat in other locations beside HEB, please complete the following table with respect to Questions 3 through Question 5 for the other locations.

Other Meat Purchase Locations	Question 2	Question 3	Question 4	Question 5
Other 1:				
Other 2:				
Other 3:				
Other 4:				
Other 5:				